

Appendix B.2 Science Standards Review Committee Member Rubrics

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential² **Concise** – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵ **Liberal Arts Tradition** – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning –the ongoing, voluntary, self-motivated pursuit of knowledge:⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status: https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Daily and Seasonal Changes</p> <ul style="list-style-type: none"> • Weather changes are long-term and short-term. • The moon, sun and stars are visible at different times of the day or night.
Life Science	<p>Topic Physical and Behavioral Traits of Living Things</p> <ul style="list-style-type: none"> • Living things are different from nonliving things, • Living things have physical traits and behaviors which influence their survival
Physical Science	<p>Topic: Properties of Everyday Objects and Materials</p> <ul style="list-style-type: none"> • Objects and material can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound
Kindergarten	<p>Strand Connections: Living and nonliving things have specific physical properties that can be used to sort and classify. The physical properties of air and water are presented as they apply to weather.</p>

Review level **Yes** it meets the review criteria
Partially meets the review criteria or **undetermined**
No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Par	Deleting second half of first sentence of first Content Statement would make it clear for readers.
	C. Yes	Content statements are clearly stated with brief descriptions for clarity

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Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A. Yes	Visible weather and seasonal changes that young children can observe over time
	B. Yes	Students learn attributes of living and nonliving things and learn to identify and differentiate them. Kindergarten children are ready to differentiate between living and non-living things and recognize the physical attributes of living things. Suggestions are made in the Model Curriculum (MC) concerning how to present content to elementary students ensure it is grade appropriate, e.g. use of the term “weight,” which is a familiar term to children rather than use of term “mass.”
	C. Yes	Great introduction to physical science for kindergarten students.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	This may be the first-time children are exposed to weather and seasonal changes. Appropriate content for introducing basic science earth and space concepts.
	B. Yes	Students begin collecting and comparing simple data through observing and counting bees or planting seeds and watching them grow, etc. and noting what is needed for survival of the bees and/or plants. These content statements provide students with specific traits and behaviors of living things they need to observe, investigate, recognize and study through hands-on projects. These concrete experiences deepen knowledge and understanding.
	C. Yes	Students are introduced to objects and materials and then to how some objects and materials can be made to vibrate to produce sound through vibration of the object.

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Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	Having students measure amount of snow with a dowel rod to check depth introduces how scientists observe and use “technology” to investigate and study weather changes.
	B. Yes	Definitely. Provides students with opportunities to design technological or engineering solutions for science concepts they are studying. This is a beginning building block for students to connect later learning about living things. The hands-on activities engage young learners enhance and support their comprehension.
	C. Yes	Through the creation and use of student-constructed instruments, students learn how vibrations produce sound when the instrument vibrates. They also learn what produces high and low sounds.
Does the element promote essential knowledge in the subject ?	A. Yes	Basic knowledge from which to serve as a springboard for additional science learning. All kindergarten children should know the difference between living and non-living things and about physical traits and attributes of living things
	B. Yes	One way to promote essential knowledge is to make it interesting to the learner. The Visions into Practice activities as well as the Instructional Strategies and Resources provide opportunities for teachers to differentiate instruction to ensure all students are engaged in learning activities that promote their knowledge about living things. Investigating, comparing and identifying plants and animals promotes essential early science knowledge.
	C. Yes	This is a great hands-on physical science learning experience for kindergarten children.
Does the element promote lifelong learning ?	A. Yes	Students begin at a young age observing changes occurring with the earth and making predictions and measuring and interpreting what they are observing.
	B. Yes	This element provides students with baseline learning from which to build.
	C. Yes	It introduces children to inquiry-based physical science

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Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition ?	A. Yes	Students are also learning about weather and the changing seasons during kindergarten through reading and art.
	B. Yes	Students are drawing what they observe and learn basic science through books being read to them. They can connect what they hear in stories with what they are learning about living things through their study of life science.
	C. Yes	This physical science learning can easily be connected with music and instruments that kindergarten children are using in the classroom and in music class.
Does the element promote college and career readiness ?	A. Yes	Basic learning of physical science promotes college and career readiness.
	B. Yes	Students begin the fundamental investigation by observing and keeping accurate records of what they have observed. They are beginning to interpret and communicate science concepts by explaining concepts in their own words.
	C. Yes	All basic science learning promotes college and career readiness.
Does the element reduce the need for remediation ?	A. NA	
	B. NA	
	C. NA	
Does the element meet the definition of a standard ?	A. Yes	Basic science knowledge all students should know and be able to do.
	B. Yes	Basic science knowledge all students should know and be able to do
	C. Yes	Basic science knowledge all students should know and be able to do

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	Topic: Sun, Energy and Weather <ul style="list-style-type: none"> The sun is the principal source of energy. The physical properties of water change.
Life Science	Topic: Basic Needs of Living Things <ul style="list-style-type: none"> Living things have basic needs, which are met by obtaining materials from the physical environment. Living things survive only in environments that meet their needs.
Physical Science	Topic: Motion and Materials <ul style="list-style-type: none"> Properties of objects and material can change. Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.
Grade 1	Strand Connections: Energy is observed through movement, heating, cooling and the needs of living organisms.

Review level **Yes** it meets the review criteria
Partially meets the review criteria or **undetermined**
No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	The first element focuses on the sun as the principal source of energy. The second statement focuses on properties of water as a liquid and as a solid. Both are clear and concise.
	B. Yes	Grade 1 life science builds on kindergarten life science learning. Content statements are clear and concise.
	C. Yes	Statements focus on properties and movement of objects. Both are clear and concise.

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Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A. Yes	First grade students are familiar with the sun and with water. They are now learning about both from a science perspective. The <i>Model Curriculum Instructional Strategies and Resources</i> section provides useful suggestions for teachers to ensure the strategies and activities used to present and reinforce the new concepts are grade level appropriate.
	B. Yes	Focus is on basic needs and survival of living things based on their environment.
	C. Yes	Fundamental learning of physical science with examples of ways students can observe changes of properties of objects and a variety of ways objects can be moved. <i>Notes 1 and 2</i> In the Model Curriculum provide suggestions to teachers to ensure content and instructional strategies are appropriate.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	This basic learning serves as a foundation for more complex earth and space science concepts.
	B. Yes	This standard provides opportunities for students to make age appropriate career connections with their science learning, which is powerful.
	C. Yes	Students are learning fundamental physical science principles
Does the element support subject matter comprehension ?	A. Yes	Observing the sun and its different positions during the day and observing the changing properties of water through measurements and experimentation using simple technology supports physical science subject matter comprehension.
	B. Yes	An example of an engineering solution using science concepts is for the students to design a birdfeeder and blend of birdseed to attract the most birds. This is providing opportunities for students to put their learning into action, which deepens comprehension and increases retention.
	C. Yes	The elements and application of concepts provide useful suggestions for students to design and construct devices to move at different speeds and in multiple directions for comprehension of physical science principles.

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Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Yes	Promotes understanding of every day occurrences that students observe—the sun in different positions and water in different forms—liquid and solid.
	B. Yes	Students apply their new life science knowledge through class projects that provide opportunities for them to create, collect data and analyze their simple data of bird counts or other life science related projects.
	C. Yes	Promotes knowledge and application opportunities for learning about motion and materials.
Does the element promote lifelong learning?	A. Yes	It provides introduction to inquiry, experimentation and drawing conclusions based on observation and data.
	B. Yes	All basic science knowledge can contribute to lifelong learning.
	C. Yes	All basic science knowledge can contribute to lifelong learning.
Does the element promote the liberal arts tradition?	A. Yes	Science connects with all content areas and helps us understand the world we live in.
	B. Yes	Learning respect for all living things contributes to society and connects with many other content areas, including social studies, environmental science, etc.
	C. Yes	Knowledge about motion and materials are useful in art, music and other content areas.
Does the element promote college and career readiness?	A. Yes	Basic science to serve as a foundation for future more complex learning.
	B. Yes	Basic science to serve as a foundation for future more complex learning.
	C. Yes	Basic science to serve as a foundation for future more complex learning.
Does the element reduce the need for remediation?	A. NA	
	B. NA	
	C. NA	

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Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. Yes	First grade students should know and be able to recognize and describe different seasons and positions of the sun during the day.
	B. Yes	First grade students should know and be able to explain the basic needs of living things and what they need from their environment for survival.
	C. Yes	First grade students should know and be able to explain basic understanding of motion and materials.

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: The Atmosphere</p> <ul style="list-style-type: none"> The atmosphere is made up of air. Water is present in the air. Long-term and short-term weather changes occur due to changes in energy.
Life Science	<p>Topic: Interactions within Habitats</p> <ul style="list-style-type: none"> Living things cause changes on Earth. Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
Physical Science	<p>Topic: Changes in Motion</p> <ul style="list-style-type: none"> Forces change the motion of an object.
Grade 2	<p>Strand Connections: Living and nonliving things may move. A moving object has energy. Air moving is wind and wind can make a windmill turn. Changes in energy and movement can cause change to organisms and the environments in which they live.</p>

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	D. Yes	The ESS standards concerning the atmosphere and water’s presence in the air are clear and concise.
	E. Yes	
	F. Yes	
Is the element grade level appropriate ?	A. Yes	The 2d grade ESS standards build on observable parts of weather, sunlight, air and physical properties of water learned in K and grade 1.
	B. Yes	Moves students along a continuum of learning about the relationships of living things and their environment and how each impacts the other.
	C. Yes	Observing and experimenting with how forces change the motion of an object is grade level appropriate. The Model Curriculum focuses on grade appropriateness by ensuring gravitational and magnetic forces are introduced through observation and experimentation only.

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Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A. Yes	Continues a progression of ESS learning that includes the atmosphere as it relates to weather and water’s presence in the air. This is appropriate content for 2d grade students and encourages them to be observant of their physical environment and develop inquiry thinking skills. The use of simple “mathematics with data to construct reasonable explanations” is an excellent way to integrate math concepts with science concepts and demonstrate how math and science relate to one another in real world context.
	B.	Excellent connection made between living things and changes on earth—then how some living things became extinct b/c the physical environment did not meet their basic needs for life.
	C.	This element promotes hands-on learning opportunities for students to develop and reinforce earlier learning about forces and motion.
Does the element support subject matter comprehension?	A. Yes	This element extends learning of ESS and the <i>Visions Into Practice</i> section provides suggestions for teachers to develop hands-on learning projects for students to create an enclosed aquarium for students to test the “effects of the sun on evaporation and condensation rates and air or water temperature.” These projects support subject matter comprehension and retention.
	B. Yes	
	C. Yes	The hands-on learning experiments and observations of gravitational and magnetic forces support comprehension of forces and motion. And, applying learning with career connections, as presented in the Model Curriculum with transportation-related careers, increases comprehension and shows students how people use science in their jobs.

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Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Yes	Learning about the atmosphere and water in the atmosphere, e.g. clouds, promotes essential ESS essential knowledge.
	B. Yes	If students create ant or worm farms in class and observe them over time, they can see how living things can change the environments where they live.
	C. Yes	
Does the element promote lifelong learning?	A. Yes	Promotes inquiry-based learning skills.
	B. Yes	Promotes inquiry-based learning skills.
	C. Yes	Promotes inquiry-based learning skills.
Does the element promote the liberal arts tradition?	A. Yes	Science is an important component in promoting liberal arts. There are many content areas where one needs to connect new learning or skills with previous learning about the physical environment, e.g. painting seasonal scenes or weather-related scenes.
	B. Yes	
	C. Yes	Forces and motion impact design and outcome of many kinds of projects students will create for projects in other content areas. Learning to apply their physical science knowledge with other content areas will help students integrate and use their science knowledge in new ways and promote the liberal arts tradition.
Does the element promote college and career readiness?	A. Yes	All science learning promotes college and career readiness.
	B. Yes	All science learning promotes college and career readiness.
	C. Yes	All science learning promotes college and career readiness.

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Review Criteria	Review Level	Notes
Does the element reduce the need for remediation?	A. NA	
	B. NA	
	C. NA	
Does the element meet the definition of a standard?	A. Yes	All 2d grade students need to be able to understand and explain ESS topics concerning the atmosphere and water in the atmosphere as they relate to observed and measurable weather changes.
	B. Yes	Second grade students need to be able to observe and explain how living things can change the physical environment where they live.
	C. Yes	An introductory understanding and ability to demonstrate concepts related to forces and motion at grade level appropriateness is expected of 2d grade students.

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Earth’s Resources</p> <ul style="list-style-type: none"> • Earth’s nonliving resources have specific properties. • Earth’s resources can be used for energy. • Some of Earth’s resources are limited.
Life Science	<p>Topic: Behavior, Growth and Changes</p> <ul style="list-style-type: none"> • Offspring resemble their parents and each other. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.
Physical Science	<p>Topic: Matter and Forms of Energy</p> <ul style="list-style-type: none"> • All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties. • Heat, electrical energy, light, sound and magnetic energy are forms of energy.
Grade 3	<p>Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth’s resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.</p>

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A. Yes	3d grade students are developmentally ready to learn about the earth's nonliving resources and energy
	B. Yes	3d grade students are developmentally ready to learn about life cycles of plants and animals and how offspring resemble their parents yet have differences in their traits.
	C. No	This reviewer feels that matter and energy are abstract concepts that would be grade level appropriate for grade 4—not grade 3. Moving all PS content up one grade level would be helpful for student maturity levels and for comprehension of the material.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	This element builds on and connects with previous K-2 ESS learning.
	B. Yes	These three standards introduce 3d grade students to fundamental concepts of heredity and life cycles of plants and animals.
	C. Yes	This abstract content is more appropriate for grade 4 students. Students continue to scaffold their PS learning as additional science concepts—matter and forms of energy-- are added to previously learned science concepts.
Does the element support subject matter comprehension ?	A. Yes	Observing soil and rock characteristics and distinguishing between renewable and nonrenewable resources through investigation supports comprehension.
	B. No	This abstract content is being presented to children who are too young.
	C. Yes	Elements support comprehension of matter and forms of energy—introductory PS concepts.
Does the element promote essential knowledge in the subject ?	A. Yes	This element serves as early conceptual learning to ESS concepts.
	B. Yes	This is a basic introduction to biology—the study of life.
	C. Yes	Serves as introduction to PS concepts

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A. Yes	It is important that students at a young age become knowledgeable concerning what natural resources are and the need to conserve natural resources and use them wisely throughout one's lifetime.
	B. Yes	The respect for and humane treatment of animals needs to be taught to and modeled for children beginning at a young age.
	C. Yes	
Does the element promote the liberal arts tradition ?	A. Yes	
	B. Yes	Knowledge of life science concepts is valuable in many content areas and is important to the quality of life for all people.
	C. Yes	
Does the element promote college and career readiness ?	A. Yes	The career connections with green jobs, energy, transportation and building industry are where job growth is occurring in the 21 st Century. This is valuable information for college and career readiness.
	B. Yes	Biology is a required course for college readiness and acceptance.
	C. Yes	
Does the element reduce the need for remediation ?	A. NA	
	B. NA	
	C. NA	
Does the element meet the definition of a standard ?	A. Yes	All students should know and be able to explain and recognize sources of energy and properties of nonliving resources.
	B. Yes	All students should know and be able to explain and demonstrate competency concerning life cycles and what kinds of similar traits they observed between offspring and their parents.
	C. Yes	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Earth’s Surface</p> <ul style="list-style-type: none"> • Earth’s surface has specific characteristics and landforms that can be identified. • The surface of Earth changes due to weathering. • The surface of Earth changes due to erosion and deposition.
Life Science	<p>Topic: Earth’s Living History</p> <ul style="list-style-type: none"> • Changes in an organism’s environment are sometimes beneficial to its survival and sometimes harmful. • Fossils can be compared to one another and to present day organisms according to their similarities and differences.
Physical Science	<p>Topic: Electricity, Heat and Matter</p> <ul style="list-style-type: none"> • The total amount of matter is conserved when it undergoes a change. • Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 4	<p>Strand Connections: Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy. Heating and cooling affect the weathering of Earth’s surface and Earth’s past environments. The processes that shape Earth’s surface and the fossil evidence found can help decode Earth’s history.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element grade level appropriate?	A. Yes	ES scientific concepts are becoming more in depth and specific. The topic of the earth's surface focuses on the building up and breaking down of the earth's surface. Students through inquiry and investigation discuss and observe the kinds of events that cause changes to the surface of the earth.
	B. Yes	Students compare fossils of living organisms of the past with current day organisms and investigate changes that have occurred in the organisms' environment and determine whether it was (past) or it is (current) harmful or helpful to the organisms' survival.
	C. No	PS concepts scaffold up from concepts learned in K-3. Good progression of introduction of concepts. However, this reviewer feels that the content introduced to third grade children would be more appropriate for grade 4—matter and energy. Moving all of the abstract PS concepts starting with grade 3 to the next grade level would be helpful to children for better comprehension when they have matured by a year.
Does the element promote higher student performance, learning and improved student achievement?	A. Yes	Students connect forces of nature (storms, tree roots breaking up rock) and weathering conditions to changes in the surface of the earth. Students learn these conditions may happen quickly or over a long period of time. This provides students with a broader view of the history of the earth's surface, including fossil evidence from organisms that lived in the past, as well as the day-to-day changes in the earth's surface created by deposition and erosion. Very appropriate learning for grade level.
	B. Yes	Comparing past and current organisms and past and current environmental conditions and how the environment impacts the survival of organisms requires higher order of thinking. When students also have to draw conclusions from their investigations and justify them with supporting evidence, it requires higher thinking/problem solving/decision making skills.
	C. No	PS concepts scaffold up to electricity, heat and matter, more difficult concepts than those presented in K-3. Review recommends the grade 3 content be moved to grade 4 and all PS content be moved up one grade level.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	Students are learning specific ESS concepts and terminology. Teachers are provided with learning activities in the model curriculum that support subject matter comprehension. Through engaging related activities that include student research and developing models of sink holes—then determining the risk of collapse--the Model Curriculum supports engaging learning activities that enhance comprehension and retention of learning.
	B. Yes	Scientific inquiry and investigation, collection of data and analysis of data strongly support subject matter comprehension. (Use appropriate mathematics with data to construct reasonable explanations.)
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	Students are learning specific ESS concepts and terminology.
	B. Yes	<i>Scientific inquiry and investigation and collection of data and data analysis strongly support subject matter comprehension. (Use appropriate mathematics with data to construct reasonable explanations.)</i>
	C. Yes	As students progress to higher grades the PS content builds on previously learned concepts as more in depth with rigorous concepts presented.
Does the element promote lifelong learning ?	A. Yes	
	B. Yes	Earth's Living History scientifically confirms the earth and all organisms on the earth evolve over time, including humans. This kind of knowledge promotes lifelong learning.
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition ?	A. Yes	The concept of geologic time informs consideration of philosophical questions of a person's place in the universe.
	B. Yes	Scientific discoveries of the Earth's living history impacts many other content areas including history, geology and archeology.
	C. Yes	
Does the element promote college and career readiness ?	A. Yes	This grade band theme <i>Interconnections Within Systems</i> presents specific scientific concepts that serve as a foundation for future ESS science learning to go into greater depth.
	B. Yes	
	C. Yes	As students progress from one grade level to the next, they are challenged with more difficult, in depth content. This prepares them for college-level academic expectations.
Does the element reduce the need for remediation ?	A. NA	
	B. NA	
	C. NA	
Does the element meet the definition of a standard ?	A. Yes	
	B. Yes	All students should know and understand the history of living organisms and how they have evolved over time due to changes in the environment and other factors.
	C. Yes	Although all students are expected to know and be able to explain the observable level of conservation of matter and the processes of energy transfer and transformation as they apply to heat and electrical energy, this content may be too difficult for many fourth grade students.

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Cycles and Patterns in the Solar System</p> <ul style="list-style-type: none"> The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. The sun is one of many stars that exist in the universe. Most of the cycles and patterns of motion between the Earth and sun are predictable.
Life Science	<p>Topic: Interactions within Ecosystems</p> <ul style="list-style-type: none"> Organisms perform a variety of roles in an ecosystem. All of the processes that take place within organisms require energy.
Physical Science	<p>Topic: Light, Sound and Motion</p> <ul style="list-style-type: none"> The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. Light and sound are forms of energy that behave in predictable ways.
Grade 5	<p>Strand Connections: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass*. The transfer of energy drives changes in systems, including ecosystems and physical systems.</p>

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	Introduces two concepts together –light and sound—each related with motion
Is the element grade level appropriate ?	A. Yes	Most 5 th grade students like the study of astronomy and are intrigued by the idea of other planets in the Earth’s solar system
	B. Yes	Fifth grade students are studying Life science through the lense of ecosystems—how organisms are a part of food webs for survival. The food webs demonstrate interdependency for food for survival for all organisms. This is grade level appropriate.
	C. Yes	Builds on previous learning about sound and light as they relate to motion.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	Students develop knowledge about why day and night, seasons and average temperature changes occur. Useful learning and grade level appropriate.
	B. Yes	Students are learning a systemic approach to studying life science—the relationships of organisms within ecosystems.
	C. Yes	Students study the properties of light and sound and how they travel, behave and interact when they come in contact with objects. This takes previous learning to a deeper level.
Does the element support subject matter comprehension ?	A. Yes	Models, interactive Websites and investigations in the Model Curriculum provide illustrations for student comprehension of concepts related to cycles and patterns of the Solar system.
	B. Yes	The study of ecosystems is a more complex study of life science than students encountered in earlier grades. The study of ecosystems support earlier learning about plant and animal survival and takes learning to a deeper level .
	C. Yes	Engaging, content-related learning activities such as designing and using a periscope to study reflection of light and creating two different musical instruments to study sound and pitches supports comprehension of the properties of light and sound. These two activities are described in the Model Curriculum.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Yes	Students develop essential knowledge about the Sun, the Earth and celestial bodies that orbit the sun. They develop knowledge about predictable patterns of motion between the Earth and sun.
	B. Yes	
	C. Yes	Through inquiry and investigation the hands-on learning projects in the Model Curriculum promote essential knowledge of light and sound properties.
Does the element promote lifelong learning?	A. Yes	This introduction to astronomy promotes lifelong learning about the Earth and our solar system.
	B. Yes	The study of ecosystems introduces students to viewing individual events/needs as a part of a system. This helps students view the big picture of how the individual “pieces” fit together for survival of organisms—including themselves.
	C. Yes	
Does the element promote the liberal arts tradition?	A. Yes	Any science that helps define man’s place in the universe attempts through liberal arts to further define it.
	B. Yes	Students learn the concept of interdependency
	C. Yes	Students can connect how light and sound impact other content areas including fine arts and music.
Does the element promote college and career readiness?	A. Yes	It promotes knowledge about the Earth upon which we live.
	B. Yes	
	C. Yes	This content—light, sound and motion—moves students one step closer to the study of physics.
Does the element reduce the need for remediation?	A. NA	
	B. NA	
	C. NA	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. Yes	Knowledge about the cycles and patterns in the Solar system and how the Earth is influenced by the sun should be learned by all students.
	B. Yes	All students need to comprehend and be able to explain relationships within ecosystems as they relate to food webs and the need all organisms have for energy to survive.
	C. Yes	All 5 th grade students need comprehension of foundational concepts concerning light, sound and motion.

Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Yes	The study of rocks and minerals is interesting and grade level appropriate for 6 th grade students. Students continue their study of rocks, minerals and soil. The content logically scaffolds up from grades 3-5.
	B. Yes	Students have learned about all objects being composed of matter. Learning about the modern cell theory is the next logical content progression for life science study.
	C. Yes	Students continue their study of matter and motion in grade 6 that builds on concepts studied and learned in grades 3 – 5.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	This standard builds on earlier ESS concepts learned; if teachers integrate common core math standards concerning data concepts with science standards focusing on geologic data that students collect, it promotes higher student performance and achievement. The alignment and integration of math and science standards provide authentic, real-world use of both science and math concepts. More in depth content is presented in grade 6 that builds on learning about rocks, minerals and soil from grades 3 – 5.
	B. Yes	
	C. Yes	The study of matter and motion scaffold up from earlier grades. The reviewer appreciates the integrated presentation of common core standards between science and math as students use mass vs volume graphs which aligns and reinforces 5 th grade common core math standards with 6 th grade science standards.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	<p>The standard and model curriculum, including tasks for students to glean hands-on learning opportunities using ideas presented in sections <i>Demonstrating Science Knowledge and Designing Technological/Engineering Solutions Using Science Concepts</i>, strongly support comprehension of subject matter. This element supports investigation, inquiry-based study of rocks, soil and minerals—very interesting and important learning for 6th grade students.</p> <p>Teachers are provided with rich resources in the <i>Instructional Strategies and Resources</i> area of the Model Curriculum that encourages having students investigate local and statewide soil types and compare them to actual tests of local soil samples. Problem solving activities and interpretation of soil data presents opportunities for deep comprehension and learning.</p>
	B. Yes	This reviewer appreciates that the 6 th grade LS content statements are taught as a larger concept—the basics of modern cell theory.
	C. Yes	In the <i>Visions Into Practice: Classroom Examples</i> of the Model Curriculum, students are to “use empirical evidence to construct an argument and defend a position” concerning testing a hypotheses about “the behavior of three different states of matter in a closed retractable space.” This kind of higher order thinking supports deep learning and comprehension.
Does the element promote essential knowledge in the subject ?	A. Yes	The study and comprehension of soil, rocks and minerals is highly important for building knowledge as it relates to conservation of nonrenewable geologic resources.
	B. Yes	Definitely. This is foundational learning of the function, coordination and roles of cells.
	C. Yes	Requiring students to use higher order thinking skills, e.g. to defend a position or to support conclusions, promotes essential knowledge of physical science.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A. Yes	The model curriculum proposes the idea of inviting content experts into the classroom in person or virtually for students to learn about related Earth Science careers, e.g. geologist, Ag scientist/specialist, environmentalist etc. Connecting content with careers and demonstrating to students how professionals apply this learning in <i>their</i> daily jobs promotes lifelong learning and may influence students to pursue science-related careers.
	B. Yes	This standard includes the study of nonrenewable energy sources, which is highly valuable for lifelong learning.
	C. Yes	Learning these physical science standards and developing the skills of inquiry-based learning requires higher order thinking skills. These skills promote lifelong learning. Employers seek employees who can problem solve, think critically and collect, use and analyze data to support decisions.
Does the element promote the liberal arts tradition ?	A. Yes	When science is integrated with other content areas, it promotes the liberal arts traditions.
	B. Yes	
	C. Yes	The higher order thinking skills required in the Common Core physical science standards can be applied in all subjects, including liberal arts.
Does the element promote college and career readiness ?	A. Yes	The study of rocks, minerals and soil promotes deeper understanding of the earth's formation and demonstrates how minerals and soil are necessary for the survival of all living organisms.
	B. Yes	Biology is a requirement for college. Sixth grade introduces and promotes fundamental concepts of biology.
	C. Yes	
Does the element reduce the need for remediation ?	A. Yes	
	B. Yes	
	C. NA	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. Yes	All students need to know and understand the formation of rocks, the identification and value of minerals and soil.
	B. Yes	Basic learning about cells is necessary in the study of biology.
	C. Yes	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Cycle and Patterns of Earth and the Moon</p> <ul style="list-style-type: none"> • The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere and atmosphere. • Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns. • The atmosphere has different properties at different elevations and contains a mixture of gasses that cycle through the lithosphere, biosphere, hydrosphere and atmosphere. • The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.
Life Science	<p>Topic: Cycles of Matter and Flow of Energy</p> <ul style="list-style-type: none"> • Matter is transferred continuously between one organism to another and between organisms and their physical environments. • In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.
Physical Science	<p>Topic: Conservation of Mass and Energy</p> <ul style="list-style-type: none"> • The properties of matter are determined by the arrangements of atoms. • Energy can be transformed or transferred but is never lost. • Energy can be transferred through a variety of ways.
Grade 7	<p>Strand Connections: Systems can exchange energy and/or matter when interactions occur within systems and between systems. Systems cycle matter and energy in observable and predictable patterns.</p>

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Yes	The ESS 7 th grade standard is more complex than in earlier grades and builds on Grades K- 6 standards related to weather and atmosphere. This standard takes ESS learning to a deeper level, a goal of standards.
	B. Yes	Student learning is scaffolding up as they use prior concepts as the basis for new learning that focuses on the transfer of matter and energy between organisms and energy transfer within the biotic component of ecosystems.
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	These standards are challenging and have built on concepts previously presented and studied in earlier grades. Students have progressed from observing where and in what forms air and water exists to studying the relationship of atmospheric and oceanic currents and climate.
	B. Yes	Students are challenged in the Model Curriculum to research, analyze, anticipate, critique, examine, and explain findings related to the standards. This student application of the standards raises their achievement level.
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	In the Model Curriculum teachers are provided with a wealth of ideas of projects that support deep understanding of the standards. One project idea requires students to design, build and test a buoy that can sample water temperatures or other water qualities in a local water source, collect and analyze data and discuss the results with the class. This kind of independent, hands-on learning supports deep comprehension of subject matter. It also requires students to use their data math common core standards learning and apply it to real world problems. This brings the standards to life for students and demonstrates the relevancy of their learning.
	B. Yes	Definitely. Students are using the standards as a springboard to apply their learning to real life problems and use deep thinking skills to become problem solvers and critical thinkers as they inquire and analyze data like a scientist.
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	These standards promote essential knowledge in ESS.
	B. Yes	These standards challenge students to add new knowledge concerning matter and the flow of energy to existing knowledge they have gleaned in earlier grades about matter and energy.
	C. Yes	
Does the element promote lifelong learning ?	A. Yes	On a daily basis we read and hear about weather patterns, phases of the moon, changes in the atmosphere, changes in water conditions in bodies of water. These standards definitely promote lifelong learning.
	B. Yes	Researching, examining, critiquing, explaining and anticipating are transferrable skills that can be used for lifelong learning and problem solving, in conjunction with the content and concept learning the standards provide.
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote college and career readiness?	A. Yes	Every year the standards build on the standards students studied, applied and learned in earlier grades. This moves students toward deeper learning in ESS each year.
	B. Yes	
	C. Yes	
Does the element reduce the need for remediation?	A. Yes	
	B. Yes	
	C. Yes	
Does the element meet the definition of a standard?	A. Yes	All 7 th grade students need to understand the cycles and patterns of the Earth and Moon.
	B. Yes	All 7 th grade students need to understand cycles of matter and flow of energy transfer within the biotic component of ecosystems.
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Yes	These 8 th grade ESS standards continue to build on learning in prior grades.
	B. Yes	
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	The element promotes students to recall and describe scientific facts, to apply their knowledge and create solutions to practical problems and to use reasoning skills to analyze and apply their knowledge in new situations.
	B. Yes	The Life Science element provides opportunities for students to apply their learning to environmental, economic and world health-related issues using 21 st Century design skills—technology and engineering.
	C.	
Does the element support subject matter comprehension ?	A. Yes	The Model Curriculum assists teachers with ideas for students to apply the ESS standards by conducting research, collecting and analyzing data, and designing and constructing models to support subject matter comprehension.
	B. Yes	The Life Science element supports subject matter comprehension through the opportunity for connections to be made to interesting and pressing 21 st Century world issues. This requires students to research, collect and use data, and draw and defend their conclusions based on the analysis of their scientific data and learning.
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	Students should now possess knowledge concerning the physical features of the earth, geologic processes in the formation of the Earth's surface and composition of the earth's interior.
	B. Yes	
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A. Yes	
	B. Yes	By ensuring students are gaining life science
	C. Yes	
Does the element promote the liberal arts tradition ?	A. Yes	Through the lense of scientific inquiry, students study the formation of the Earth's surface and changes that have occurred to the surface of the Earth over time through the study of historical data and fossils. This learning integrates with and promotes the liberal arts tradition.
	B. Yes	The element promotes opportunities for students to consider, study, debate and defend or question moral and ethical applications of scientific discoveries that cross into other content areas such as philosophy and social sciences.
	C. Yes	
Does the element promote college and career readiness ?	A. Yes	
	B. Yes	The element promotes comparing, designing, analyzing and predicting based on learning gleaned through inquiry. This provides a strong foundation for future learning at the college level.
	C. Yes	
Does the element reduce the need for remediation ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element meet the definition of a standard ?	A. Yes	Every student should know and be able to explain the formation of the Earth's surface, the properties of the Earth's interior, the processes that formed the Earth's surface and changes that have occurred over time to the Earth's surface.
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:
https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Biology Topics	<p>A. Heredity</p> <ul style="list-style-type: none"> • Cellular genetics • Structure and function of DNA in cells • Genetic mechanisms and inheritance • Mutations • Modern genetics <p>B. Evolution</p> <ul style="list-style-type: none"> • Mechanisms <ul style="list-style-type: none"> ▪ Natural selection ▪ Mutation ▪ Genetic drift ▪ Gene flow (immigration, emigration) ▪ Sexual selection ▪ History of Life on Earth • Diversity of Life <ul style="list-style-type: none"> ▪ Speciation and biological classification based on molecular evidence <p>C. Diversity and Interdependence of Life</p> <ul style="list-style-type: none"> • Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms. • Ecosystems <ul style="list-style-type: none"> ▪ Homeostasis ▪ Carrying capacity ▪ Equilibrium and disequilibrium <p>D. Cells</p> <ul style="list-style-type: none"> • Cell structure and function <ul style="list-style-type: none"> ▪ Structure, function and interrelatedness of cell organelle ▪ Eukaryotic cells and prokaryotic cells • Cellular processes <ul style="list-style-type: none"> ▪ Characteristics of life regulated by cellular processes

Review level Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. P	This reviewer believes that teachers may use the topics with sub headings to plan and implement their biology course selecting teaching/learning materials and lab experiences that closely match the topics. Important content can inadvertently be omitted due to use of a narrative format, which is not user friendly to plan an entire course. Students graduating beginning in 2018 are being held accountable to demonstrate proficiency in biology or physical science through end-of-course exams; therefore, it is critically important that teachers instruct all content contained in the standards for these courses. This reviewer feels that a short paragraph introducing each of the four topics followed by an alphanumeric sentence outline of each topic would be more readable and useful in planning and implementing an effective science course.
	B. P	Same
	C. P	Same
	D. P	Same
Als the element grade level appropriate ?	A. Yes	Most HS students enroll in biology their freshman or sophomore year. Heredity is a grade level appropriate, interesting and necessary topic for a HS bio course.
	B. Yes	
	C. Yes	
	D. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A. Yes	This topic provides students with the background knowledge and understanding of heredity to prepare for an AP/college-level biology course.
	B. Yes	
	C. Yes	
	D. Yes	
Does the element support subject matter comprehension?	A. Yes	
	B. Yes	This reviewer believes that the theory of evolution serves as the backbone of biology and that it is critically important students study the theory of evolution in order to understand the study of biology.
	C. Yes	
	D. Yes	
Does the element promote essential knowledge in the subject?	A. Yes	Heredity focuses on the explanation of genetic patterns of inheritance, which builds on MS fundamental learning of inheritance.
	B. Yes	
	C. Yes	
	D. Yes	
Does the element promote lifelong learning?	A. Yes	Learning about heredity promotes lifelong learning that can help one learn more about him/herself and about inherited traits of animals and plants.
	B. Yes	Studying the theory of evolution over time through the work of Mendel, Darwin and Wallace
	C. Yes	
	D. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition ?	A. Yes	This reviewer does not see a connection between the study of Heredity and the liberal arts tradition.
	B. Yes	Same (study of evolution)
	C. Yes	Relatedness between organisms—ecosystems; homeostasis – relationship with psychology
	D. Yes	The study of diversity and interdependence of life promotes the liberal arts tradition.
Does the element promote college and career readiness ?	A. Yes	Prepares students for college-level biology course. It is critically important that high school students are provided guidance and information related to college majors and careers to help them prepare for their adult lives. This reviewer recommends that <i>Career Connections</i> be developed for each HS science topic area to show students that what they are learning in science is directly related with what people need to know and be able to do at advanced levels in careers related with that science topic.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element reduce the need for remediation ?	A. Yes	As suggested in the model curriculum, students use plants to study the transmission of traits. This hands-on learning provides students with an opportunity to observe how offspring inherit traits.
	B. Yes	
	C. Yes	
	D. Yes	
Does the element meet the definition of a standard ?	A. Yes	All high school students should know and be able to describe the five components studied about heredity—cellular genetics; structure and function of DNA in cells; genetic mechanisms and inheritance; mutations; modern genetics
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

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Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning –the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

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¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:
https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

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⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

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Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Structure and Properties of Matter</p> <ul style="list-style-type: none"> • Atomic structure • Periodic Table • Intermolecular chemical bonding • Representing compounds • Quantifying matter • Phases of matter • Intermolecular chemical bonding <p>B. Interactions of Matter</p> <ul style="list-style-type: none"> • Chemical reactions • Gas laws • Stoichiometry • Nuclear Reactions
High School Course	Chemistry

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. P	This reviewer would prefer an alphanumeric sentence outline rather than a narrative. This would help ensure that all content in the standards is instructed. It would be very easy to inadvertently omit planning and instructing some material due to the narrative format.
	B. P	Same
Is the element grade level appropriate ?	A. P	There is clear scaffolding of learning between 8 th grade and high school learning of chemistry.
	B. P	

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A. P	The learning sequence building on past courses and knowledge is very clear and well explained.
	B. P	Building on past knowledge is not as clear as "A"
Does the element support subject matter comprehension?	A. P	<i>Visions in Practice</i> provide experiments that are clearly related to the <i>Content Elaboration and Course Description</i> and support subject matter comprehension.
	B. P	The <i>Visions in Practice</i> does not include many examples for hands on, minds on learning.
Does the element promote essential knowledge in the subject?	A. P	Element provides challenging learning of chemistry.
	B. P	Element provides challenging learning of chemistry.
Does the element promote lifelong learning?	A. P	
	B. P	
Does the element promote the liberal arts tradition?	A. P	Due to the specificity of the content of chemistry, an individual who understands and is interested in the concepts of chemistry is more likely to continue learning in that discipline throughout life.
	B. P	An individual who understands and is interested in the concepts of chemistry is more likely to continue learning in that discipline throughout life.
Does the element promote college and career readiness?	A. P	It is critically important that high school students are provided guidance and information related to college majors and careers to help them prepare for their adult lives. This reviewer recommends that <i>Career Connections</i> be developed for each HS science topic area to show students that what they are learning in science is directly related with what people need to know and be able to do at advanced levels in careers related with that science topic.
	B. P	
Does the element reduce the need for remediation?	A. P	The challenging content definitely reduces the need for science college remediation.
	B. P	Same

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. P	
	B. P	

Ohio Standards Committee Review Form

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Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>Earth Systems: Interconnected Spheres of Earth</p> <ul style="list-style-type: none"> • Biosphere • Atmosphere • Lithosphere • Hydrosphere • Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere <p>Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air and air pollution • Water and water pollution • Soil and land • Wildlife and wilderness <p>Global Environmental Problems and Issues</p> <ul style="list-style-type: none"> • Human population • Potable water quality, use and availability • Climate change • Sustainability • Species depletion and extinction • Air quality • Food production and availability • Deforestation and loss of biodiversity • Waste management (solid and hazardous)
High School Course	Environmental Science

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. P	This reviewer would prefer a sentence outline format rather than a narrative for readability and for planning an environmental science course.
	B. P	Same
	C. P	Same
Is the element grade level appropriate ?	A. Yes	This integrated science course scaffolds and builds on 8 th grade Earth and space science and physical science concepts.
	B. Yes	Same
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	This integrated science course scaffolds and builds on 8 th grade Earth and space science and physical science concepts.
	B. Yes	Same
	C. Yes	
Does the element support subject matter comprehension ?	A. Yes	This integrated science course supports subject matter comprehension
	B. Yes	Same
	C. Yes	Same
Does the element promote essential knowledge in the subject ?	A. Yes	Since this is an integrated science course, the reviewer would like to see examples of experiments/ studies that integrate the content of the three topics that comprise the course. This would demonstrate the relationships of the topics to one another.
	B. Yes	Same
	C. Yes	Same

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A. P	Only for those who are interested in pursuing additional knowledge in highly specific areas of earth systems.
	B. Yes	The topic/element of <i>Earth's Resources</i> are frequently written about in daily newspapers, discussed in daily news and photographed and shown daily on Internet sites—alternate energy, air pollution, water pollution, solid the hazardous waste, wildlife and wilderness management. They are topics that impact the lives of many people and all living things. Therefore, they promote lifelong learning for most people.
	C. Yes	The subtopics included in <i>Global Environmental Problems and Issues</i> are topics frequently written about in daily newspapers, discussed in daily news briefs and photographed and shown daily on Internet sites. This includes human population, climate change, air quality, food production and availability, species depletion and extinction and potable water quality, use and availability. They promote lifelong learning for most people.
Does the element promote the liberal arts tradition ?	A. Yes	This reviewer can't relate the element to liberal arts.
	B. Yes	The subtopics included in <i>Earth's Resources</i> are also topics included in liberal arts courses such as sociology, philosophy, psychology, social studies, environmental science, etc.
	C. Yes	The subtopics included in <i>Global Environmental Problems and Issues</i> are also topics included in liberal arts courses such as sociology, philosophy, psychology, social studies, environmental science.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote college and career readiness ?	A. Yes	Knowledge of Earth’s systems prepares students for college-level science courses. It is critically important that high school students are provided guidance and information related to college majors and careers to help them prepare for their adult lives. This reviewer recommends that <i>Career Connections</i> be developed for each HS science topic area to show students that what they are learning in science is directly related with what people need to know and be able to do at advanced levels in careers related with that science topic.
	B. Yes	Knowledge and understanding of Earth’s Resources is highly valuable knowledge that prepares students for college readiness in numerous subject areas as well as for career readiness and success.
	C. Yes	Knowledge and comprehension of <i>Global Environmental Problems and Issues</i> , is highly valuable knowledge that prepares students for college readiness in numerous subject areas as well as for career readiness and success.
Does the element reduce the need for remediation ?	A. Yes	This is highly valuable content to prepare for college and greatly reduce the need for remediation.
	B. Yes	Same
	C. Yes	Same
Does the element meet the definition of a standard ?	A. Yes	
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

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⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Minerals</p> <ul style="list-style-type: none"> • Atoms and elements • Chemical bonding (ionic, covalent, metallic) • Crystallinity (crystal structure) • Criteria of a mineral (crystalline solid, occurs in nature, inorganic, defined chemical composition) • Prosperities of minerals (hardness, luster, cleavage, streak crystal shape, fluorescence, flammability, density/specific gravity, malleability) <p>B. Igneous, Metamorphic and Sedimentary Rocks</p> <ul style="list-style-type: none"> • Igneous • Metamorphic • Sedimentary <p>C. Earth's History</p> <ul style="list-style-type: none"> • The geologic rock record • Absolute age • Combining relative and absolute age data • The geologic time scale <p>D. Plate Tectonics</p> <ul style="list-style-type: none"> • Internal Earth • Structure of Earth • Historical review • Plate Motion <p>E. Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air • Water • Soil and sediment <p>F. Glacial Geology</p> <ul style="list-style-type: none"> • Glaciers and glaciation
High School Course	Physical Geology

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. P	This reviewer would prefer an alphanumeric sentence outline rather than a narrative. This would help ensure that all content in the standards is instructed. It would be very easy to inadvertently omit planning and instructing some material due to the narrative format.
	B. P	Same
	C. P	Same
	D. P	Same
	E. P	Same
	F. P	Same
Is the element grade level appropriate ?	A. Yes	This element scaffolds from Grade 6-8 Earth & Space study/ investigations of testing and classifying minerals to researching, testing, evaluating and defining minerals in this element/HS course.
	B. Yes	Builds on Grade 6-8 Earth & Space study of rocks and minerals, structure of the Earth, plate tectonics and seismic waves.
	C. Yes	Scaffolds from Grade 6-8 Earth science study of how rocks are formed to HS study of the history of Earth.
	D. Yes	Builds on Grade 6-8 study of plate tectonics to more rigorous HS research and use of data concerning plate tectonics and its history, structure of the Earth and effect on the Earth through movement.
	E. Yes	Builds on related Earth Science concepts from grades 6-8 concepts.
	F. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A. Yes	This element promotes extensive mineral investigation, experimentation and observation using technology. It provides opportunities for students to integrate geology, chemistry, physics and Earth science as a scientist does in hands-on research and investigations.
	B. Yes	This element promotes higher learning through research and study using maps to locate and identify three different kinds of rocks.
	C. Yes	
	D. Yes	The content of the element as well as student tasks presented in <i>Visions Into Practice</i> support improved performance.
	E. Yes	The element content, <i>Career Connections and</i> relevant ideas presented in <i>Visions Into Practice</i> ensure higher student learning and performance.
	F. Yes	Same as E
Does the element support subject matter comprehension?	A. Yes	This element focusing on minerals supports comprehension of the integration of sciences through hands-on, mind-on research and scientific investigation.
	B. Yes	This element promotes subject matter comprehension through linkages with modern technology for Earth exploration to Ohio resources and to college majors and future careers in the fields of energy and geology. This reviewer would like to see examples of these great career connections included in more areas of the standards.
	C. Yes	
	D. Yes	This reviewer would like to see science project ideas that include human and economic consequences of Earth quakes, volcanoes, etc. and how to protect people & property from harm/damage through earth quake/volcano forecasting/predicting as well as through the use of technology, engineering/architectural design/building materials/building site locations, etc.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	E. Yes	This element includes a Career Connection that supports subject matter comprehension. Students are connected with Ohio businesses in designing and building an Eco-House and identifying companies that manufacture qualifying materials. Students conduct career interviews, participate in work place visits. They explore company websites and collect data and information. Great career connection for students!
	F. Yes	
Does the element promote essential knowledge in the subject?	A. Yes	This element strongly promotes subject matter, knowledge through integrating content of different areas of science to provide opportunities for students to discover science through research, use of technology and hands-on learning.
	B. Yes	Interesting ideas are presented for the study of three kinds of rocks and their location and formation.
	C. Yes	
	D. Yes	
	E. Yes	This element is well defined and developed for teachers to successfully instruct the element. It promotes student knowledge of Earth’s resources.
	F. Yes	
Does the element promote lifelong learning?	A. Yes	
	B. Yes	This element promotes lifelong learning by providing student with opportunities to research, inquire and experiment which develops a “questioning mindset.”
	C. Yes	Integrating science learning and providing students with the opportunity to experiment and “discover” science promotes lifelong learning.
	D. Yes	Same as C
	E. Yes	Same as C
	F. Yes	Same as C

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A. Yes	This element and integrated science course demonstrates to students how different areas of science are related to each other and how scientific discoveries impacts their lives.
	B. Yes	Same
	C. Yes	The study of the history of the formation of the Earth has a direct correlation with philosophy and history. The integration of the study of geology with related science areas of chemistry, physics and environmental promotes the liberal arts tradition.
	D. Yes	Same
	E. Yes	Same
	F. Yes	Same
Does the element promote college and career readiness?	A. Yes	This element requires students to research, experiment and evaluate results. This reviewer believes that examples of projects concerning the use of minerals to develop consumer goods is needed to increase understanding of related science careers/businesses and student interest in related STEM careers.
	B. Yes	The high-level content and linkage of learning with Ohio's fossil fuels and improved technology in studying the formation and history of the Earth promotes college and career readiness for STEM careers.
	C. Yes	This element promotes college readiness for history and philosophy and for college/career readiness for STEM science fields.
	D. Yes	It is critically important that high school students are provided guidance and information related to college majors and careers to help them prepare for their adult lives. This reviewer recommends that <i>Career Connections</i> be developed for each HS science topic area to show students that what they are learning in science is directly related with what people need to know and be able to do at advanced levels in careers related with that science topic.
	E. Yes	
	F. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation?	A. Yes	This element definitely reduces the need for remediation.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
	E. Yes	Same
	F. Yes	Same
Does the element meet the definition of a standard?	A. Yes	This challenging study of minerals is valuable for all students.
	B. Yes	The study of the three kinds of rocks, their formation and value is important learning for all high school students.
	C. Yes	Science knowledge and understanding of the formation and history of the Earth is important and valuable knowledge for all students.
	D. Yes	
	E. Yes	
	F. Yes	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

Clear – Easily understood; free from doubt or confusion¹

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Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

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https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

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⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

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Standards Committee Review Form

Standards Committee	Science
Committee Member Name	
Topics	<p>A. Study of Matter</p> <ul style="list-style-type: none"> • Classification of matter • Atoms • Periodic trends of the elements • Bonding and compounds • Reactions of matter <p>B. Energy and Waves</p> <ul style="list-style-type: none"> • Conservation of energy • Transfer and transformation of energy (including work) • Waves • Thermal energy • Electricity <p>C. Forces and Motion</p> <ul style="list-style-type: none"> • Motion • Forces • Dynamics (how forces affect motion) <p>D. The Universe</p> <ul style="list-style-type: none"> • History of the Universe • Galaxy formation • Stars
High School Course	Physical Science

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. P	This reviewer believes that teachers may use the topics with sub headings to plan and implement their biology course selecting teaching/learning materials and lab experiences that closely match the topics. Important content can inadvertently be omitted due to use of a narrative format, which is not user friendly to plan an entire course. Students graduating beginning in 2018 are being held accountable to demonstrate proficiency in biology or physical science through end-of-course exams; therefore, it is critically important that teachers instruct all content contained in the standards for these courses. This reviewer feels that a short paragraph introducing each of the four topics followed by an alphanumeric sentence outline of each topic would be more readable and useful in planning and implementing an effective science course. Examples are given throughout to provide clarity. Separating/bulleting <i>Content Elaboration</i> would be helpful for readability and to help teachers plan curricular and classroom materials needed.
	B. P	Same
	C. P	Same
	D. P	Same
Is the element grade level appropriate ?	A. Yes	However, the subject matter could easily slip to college level.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element promote higher student performance, learning and improved student achievement ?	A. P	If students continue study/interest in the sciences. The subject matter is becoming much more narrow and specific.
	B. P	Same
	C. P	Same
	D. P	Same

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	The element supports subject matter comprehension. However, the <i>Instructional Strategies & Resources</i> examples are not numerous or highly specific. More examples would be helpful.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element promote essential knowledge in the subject ?	A. Yes	The <i>Content Elaboration</i> of the subject matter promotes essential knowledge.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element promote lifelong learning ?	A. P	For those interested in pursuing additional knowledge and current knowledge in physical science.
	B. P	
	C. P	
	D. P	
Does the element promote the liberal arts tradition ?	A. Yes	Promotes the liberal arts tradition in the sciences.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element promote college and career readiness ?	A. Yes	This is high level science for high school students that promotes college and career readiness.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
Does the element reduce the need for remediation ?	A. Yes	This is high level science for high school students. It should greatly reduce the need for college remediation.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

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Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

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Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

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Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

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⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Motion</p> <ul style="list-style-type: none"> • Graph interpretations • Problem solving • Projectiles <p>B. Forces, Momentum and Motion</p> <ul style="list-style-type: none"> • Newton's laws applied to complex problems • Gravitational force and fields • Elastic forces • Friction force (static and kinetic) • Air resistance and drag • Forces in two dimensions • Momentum, impulse and conservation of momentum <p>C. Energy</p> <ul style="list-style-type: none"> • Gravitational potential energy • Energy in springs • Nuclear energy • Work and power • Conservation of energy <p>D. Waves</p> <ul style="list-style-type: none"> • Wave properties • Light phenomena <p>E. Electricity and Magnetism</p> <ul style="list-style-type: none"> • Charging objects (friction, contact and induction) • Coulomb's law • Electric fields and electric potential energy • DC circuits • Magnetic fields and energy • Electromagnetic interactions
High School Course	Physics

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	
Is the element grade level appropriate ?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	
Does the element support subject matter comprehension ?	A. Yes	<i>Visions in Practice</i> provide experiments that are clearly related to the <i>Content Elaboration and Course Description</i>
	B. Yes	The <i>Visions in Practice</i> does not include many examples for hands on, minds on learning.
	C. Yes	
	D. Yes	
	E. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	
Does the element promote the liberal arts tradition?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	
Does the element promote college and career readiness?	A. Yes	It is critically important that high school students are provided guidance and information related to college majors and careers to help them prepare for their adult lives. This reviewer recommends that <i>Career Connections</i> be developed for each HS science topic area to show students that what they are learning in science is directly related with what people need to know and be able to do at advanced levels in careers related with that science topic.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
	E. Yes	Same
Does the element reduce the need for remediation?	A. Yes	This challenging course reduces the need for remediation for physics-related science college courses.
	B. Yes	Same
	C. Yes	Same
	D. Yes	Same
	E. Yes	Same

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. Yes	
	B. Yes	
	C. Yes	
	D. Yes	
	E. Yes	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:
https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
(A) Earth Science	<p>Topic: Daily and Seasonal Changes</p> <ul style="list-style-type: none"> • Weather changes are long-term and short-term. • The moon, sun and stars are visible at different times of the day or night.
(B) Life Science	<p>Topic Physical and Behavioral Traits of Living Things</p> <ul style="list-style-type: none"> • Living things are different from nonliving things, • Living things have physical traits and behaviors which influence their survival
(C) Physical Science	<p>Topic: Properties of Everyday Objects and Materials</p> <ul style="list-style-type: none"> • Objects and material can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound
Kindergarten	<p>Strand Connections: Living and nonliving things have specific physical properties that can be used to sort and classify. The physical properties of air and water are presented as they apply to weather.</p>

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

GENERAL COMMENTS

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	The use of weather and sun, moon, and stars is a great starting point for making scientific observations.
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Partial	Hands on approach is critical at the K-5 grade level. The implementation ideas are too measurement intensive. A cross comparison of math standards indicates children are just learning to count to 100. Using time is not until grade 1. Focus should be on the tools used to make measurements and why making these measurements are important. Exemplified better on p. 20 (sun, moon, stars) than on p. 17 (weather).
	B. Yes	
	C. Yes	Physical science content elaboration does a much better job of clarifying grade appropriate measurement activities that focus on semi-quantitative comparisons and different types of measurement tools, e.g. p. 29.
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element support subject matter comprehension ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote lifelong learning ?	A. Partial	I like the career connection but again concerned about background knowledge. Does a grade K student know what a meteorologist is? However, could be used to talk about different kinds of work needed in a civil society and define some of these terms.
	B. NA	
	C. NA	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A. Yes	
	B. Yes	However, the introduction of the ethical treatment of animals is a slippery slope. It is clearly NOT permitted to be part of any assessment by ORC 3301.079 (H) “. . . shall not allow any question on any achievement or diagnostic assessment . . . to include, be written to promote, or inquire as to individual moral social values or beliefs.” The law is poorly written and should be amended.
	C. Yes	
Does the element promote college and career readiness?	A. NA	
	B. NA	
	C. NA	
Does the element reduce the need for remediation?	A. NA	
	B. No	Definition of Living Things – “include anything that is alive or has ever been alive” on p.22 is wrong. By definition if something is dead it is not alive.
	C. NA	
Does the element meet the definition of a standard?	A. Yes	
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	Topic: Sun, Energy and Weather <ul style="list-style-type: none"> • The sun is the principal source of energy. • The physical properties of water change.
Life Science	Topic: Basic Needs of Living Things <ul style="list-style-type: none"> • Living things have basic needs, which are met by obtaining materials from the physical environment. • Living things survive only in environments that meet their needs.
Physical Science	Topic: Motion and Materials <ul style="list-style-type: none"> • Properties of objects and material can change. • Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.
Grade 1	Strand Connections: Energy is observed through movement, heating, cooling and the needs of living organisms.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Yes	I like the use of weather phenomena to introduce changes in the properties of water. It is ok to limit water to solid and liquid, but as a chemist it seems better to include gas at this stage even though it recommended to wait until grade 2 to introduce the concept of water as a gas.
	B. Yes	
	C.	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	
	B. Yes	On p. 43 the suggestion to observe bird food choices is interesting, but I am not sure teachers would have the observation time needed for a successful implementation. In order to be successful, the teacher would need to also build the feeder suggested in "Demonstration of Science Knowledge". Love the idea of a matching game on p. 47 under "Recalling Accurate Science". This is a great way to get foundational material to stick with students. I still remember my grade 3 and 4 experiences with this.
	C. Yes	Design for ping-pong ball on p. 54 should be expanded to be more inclusive, not just a zig-zag pattern. E. g. "Design, construct, and test a device that will cause a ping-pong ball to move in ways we have discussed – straight, zig-zag, circular, or back and forth."
Does the element support subject matter comprehension ?	A. Yes	
	B. Yes	Suggestion of "Kitchen Magician" from PBS Kids on p.51 is a great teaching tool.
	C. Yes	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote lifelong learning?	A. NA	
	B. NA	
	C. NA	
Does the element promote the liberal arts tradition?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote college and career readiness?	A. NA	
	B. NA	
	C. NA	
Does the element reduce the need for remediation?	A. NA	
	B. NA	
	C. NA	
Does the element meet the definition of a standard?	A. Yes	
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
(A) Earth Science	Topic: The Atmosphere <ul style="list-style-type: none"> • The atmosphere is made up of air. • Water is present in the air. • Long-term and short-term weather changes occur due to changes in energy.
(B) Life Science	Topic: Interactions within Habitats <ul style="list-style-type: none"> • Living things cause changes on Earth. • Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
(C) Physical Science	Topic: Changes in Motion <ul style="list-style-type: none"> • Forces change the motion of an object.
Grade 2	Strand Connections: Living and nonliving things may move. A moving object has energy. Air moving is wind and wind can make a windmill turn. Changes in energy and movement can cause change to organisms and the environments in which they live.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. No	“Living things cause changes on earth” is good. The second element on extinction is neither clear nor concise.
	C. No	The element is concise, but not clear. The comments under Grade 2 Concepts (p72) indicate the potential confusion when teaching this topic. Energy of an object is associated with motion (kinetic energy) or position (potential energy). Force is energy in action upon an object to cause motion or change position.
Is the element grade level appropriate ?	D. No	More appropriate grade level tasks are suggested for this standard.
	E. No	More appropriate grade level tasks are suggested for this standard.
	F. No	More appropriate grade level tasks are suggested for this standard.
Does the element promote higher student performance, learning and improved student achievement ?	G. No	Odd choice of priorities in the model curriculum (p60). Why not memorize the water cycle? Emphasis appears backwards to focus on micro and de-emphasize the macro.
	H. No	Again an odd choice of priorities. Why introduce extinction (and fossils) at grade 2? What about the basic kingdoms of living things? The focus should be on LIFE SCIENCE not dead speculations.
	I. No	Only teachers can promote higher student performance and learning. It will require an exceptional teacher to handle the force/energy issue with 2 nd graders. I expect after trying a couple of times many 2 nd grade teachers will ignore or gloss over this element.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. No	Under Demonstrating Science Knowledge (p61) the idea is to evaporate water to demonstrate pollution. This is WRONG on MANY levels. 1. Natural water has minerals in it that are essential for life, this is not pollution! 2. What defines a pollutant? The environment naturally contains radon and mercury. Need further concepts of concentration, time of exposure, and toxicity. 3. Clearly not grade appropriate. Exercise should be removed or rewritten.
	B. No	
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. No	Suggest to not learn the names of clouds which are relatively easy to observe and put in broad categories but instead learn about pollutant transport which is fraught with nuance at the definition level and complexities way beyond 2 nd grade. Emphasis does not appear to be on “essential knowledge”.
	B. No	Extinction knowledge is not essential at grade 2.
	C. Yes	
Does the element promote lifelong learning ?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote the liberal arts tradition ?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote college and career readiness ?	A. N/A	
	B. N/A	
	C. N/A	
Does the element reduce the need for remediation ?	A. No	Under Demonstrating Science Knowledge (p64) it is suggest to compare averages. How do you talk about an average when you have not learned division? Focus should be on daily weather based measurements and broad observable trends. As presented more likely to bring confusion than clarity.
	B. No	As presented more likely to bring confusion than clarity
	C. No	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A.	
	B.	
	C.	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
(A) Earth Science	<p>Topic: Earth's Resources</p> <ul style="list-style-type: none"> • Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.
(B) Life Science	<p>Topic: Behavior, Growth and Changes</p> <ul style="list-style-type: none"> • Offspring resemble their parents and each other. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.
(C) Physical Science	<p>Topic: Matter and Forms of Energy</p> <ul style="list-style-type: none"> • All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties. • Heat, electrical energy, light, sound and magnetic energy are forms of energy.
Grade 3	<p>Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth's resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. Yes	
Is the element grade level appropriate ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Partially	Treatment of second content statement is unbalanced on p81 (2/4 for non-renewable and 4/4 for renewable). Coal is still the number one source (67%) of energy for the production of electricity in OH. Possible topics could be overview of coal mining strategies past, present, and future or new clean coal technologies being using by utilities. Fracking is HUGE for Ohio and the nation. Natural gas is abundant and the cleanest carbon-based energy source delivering more energy with the lowest CO2 emissions. With all the hype against fracking it would be nice to present a summary of the research. See Chemical & Engineering News Sept. 24, 2014 p. 24 and journals cited Annu. Rev. Environ. Resour. 2014, DOI:10.1146/annurevenviron-031113-144051 and Proc. Nat. Acad. Sci. USA 2014, DOI:10.1073/pnas.1322107111. NEED website looks like a great resource.
	B. Yes	
	C. Yes	
Does the element support subject matter comprehension ?	A. Partially	Content elaboration on limited earth's resources is distorted. What is "the science behind the conservation of resources"? and the statement "Reducing or limiting the use and/or waste of resources should be emphasized (rather than concentrating only on recycling of resources)." Stark county has done a great job on increased recycling in the area but we still have a long way to go. If we are to maintain our high standard of living, more and better recycling is the primary avenue to achieve this. Implicit in the elaboration is recycling should be de-emphasized which appears ill-conceived.
	B. Partially	p. 87 Smithsonian statement is well intended but generally not appropriate for the classroom setting. For example, putting a guinea pig in a cage with an exercise wheel and saying that allows the animal "control or choice over their environment" seems a bit disingenuous. Project Wild is a great choice.
	C. Yes	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Partially	p.84 Engineering Solutions is not grade level appropriate.
	B. Yes	
	C. Yes	
Does the element promote lifelong learning?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote the liberal arts tradition?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote college and career readiness?	D. N/A	
	E. N/A	
	F. N/A	
Does the element reduce the need for remediation?	G.	
	H.	
	I.	
Does the element meet the definition of a standard?	J.	
	K.	
	L.	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Earth’s Surface</p> <ul style="list-style-type: none"> • Earth’s surface has specific characteristics and landforms that can be identified. • The surface of Earth changes due to weathering. • The surface of Earth changes due to erosion and deposition.
Life Science	<p>Topic: Earth’s Living History</p> <ul style="list-style-type: none"> • Changes in an organism’s environment are sometimes beneficial to its survival and sometimes harmful. • Fossils can be compared to one another and to present day organisms according to their similarities and differences.
Physical Science	<p>Topic: Electricity, Heat and Matter</p> <ul style="list-style-type: none"> • The total amount of matter is conserved when it undergoes a change. • Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 4	<p>Strand Connections: Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy. Heating and cooling affect the weathering of Earth’s surface and Earth’s past environments. The processes that shape Earth’s surface and the fossil evidence found can help decode Earth’s history.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. No	p121. Plenty to classify with living organisms that can be readily observed rather than speculated about from fossils, especially at grade level 4. I find the statement “most types of organisms that have lived on Earth no longer exist” to be false. What is meant by type? Certainly in the higher taxa of Linneaus most “types” still exist. Even in the most specific use of the term “types” to mean species my research indicates some controversy over the numbers but even in this case highly depends on the definition of a species and assumptions about the fossil record.
	C. Yes	
Is the element grade level appropriate ?	A. Partially	Engineering elements on p. 108 and 112 appear higher than grade 4 level. Suggest to replace or add to engineering element on p. 115 with a snow fence study.
	B. No	Fossil record reference under content elaboration on p117 does not appear necessary at this grade level.
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Yes	
	B. Yes	good activities on p118 Despite the misguided content statement the exercises on p. 122 are very good.
	C. Yes	
Does the element support subject matter comprehension ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote essential knowledge in the subject ?	A. Yes	
	B. No	see above comments
	C. Yes	
Does the element promote lifelong learning ?	A. n/a	
	B. n/a	
	C. n/a	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A. n/a	
	B. n/a	
	C. n/a	
Does the element promote college and career readiness?	A. n/a	
	B. n/a	
	C. n/a	
Does the element reduce the need for remediation?	A.	
	B.	
	C.	
Does the element meet the definition of a standard?	A.	
	B.	
	C.	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Cycles and Patterns in the Solar System</p> <ul style="list-style-type: none"> The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. The sun is one of many stars that exist in the universe. Most of the cycles and patterns of motion between the Earth and sun are predictable.
Life Science	<p>Topic: Interactions within Ecosystems</p> <ul style="list-style-type: none"> Organisms perform a variety of roles in an ecosystem. All of the processes that take place within organisms require energy.
Physical Science	<p>Topic: Light, Sound and Motion</p> <ul style="list-style-type: none"> The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. Light and sound are forms of energy that behave in predictable ways.
Grade 5	<p>Strand Connections: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass*. The transfer of energy drives changes in systems, including ecosystems and physical systems.</p>

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. yes	Planets revolve around the sun in SLIGHTLY elliptical (or better nearly circular) orbits.
	B. yes	
	C. yes	
Is the element grade level appropriate ?	A. yes	
	B. yes	
	C. yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. yes	
	B. yes	
	C. yes	
Does the element support subject matter comprehension ?	A. yes	
	B. yes	
	C. yes	
Does the element promote essential knowledge in the subject ?	A. yes	
	B. yes	
	C. yes	
Does the element promote lifelong learning ?	A. yes	
	B. yes	
	C. yes	
Does the element promote the liberal arts tradition ?	A. n/a	
	B. n/a	
	C. n/a	
Does the element promote college and career readiness ?	A. n/a	
	B. n/a	
	C. n/a	
Does the element reduce the need for remediation ?	A. yes	
	B. yes	
	C. yes	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A.	
	B.	
	C.	

Ohio Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. Yes	
	B. Yes	
	C. No	On p. 191 thermal energy is defined as molecules in motion, but on p. 196 it states kinetic and potential energy should be introduced at the macroscopic level. This is confusing. Re-emphasizes my point there appears to be too much material “covered” in this grade level. As a chemist I love the attempt to introduce KMT and connect to observable properties, but this can wait to a 8 th grade Physical Science as noted on p. 196.
Is the element grade level appropriate ?	A. Partially	Require the memorizing of over 20 rock types. Appears to be too much for this grade level. Focus should be on the rock cycle.
	B. Yes	
	C. Partially	He balloon exercise on p. 189 seems above grade level. Great exercise for advanced students and to provide a challenge, but not sure math skills of average 6 th grader are up for this challenge.
Does the element promote higher student performance, learning and improved student achievement ?	A. Partially.	Would like to see more connection to geology applications like coal, oil and gas exploration, the use of minerals for fertilizers, rare earths for magnet technology, lithium for batteries, etc.
	B. B. Yes	
	C. C. Yes	
Does the element support subject matter comprehension ?	A. Yes	Would like to see greater emphasis on recycling.
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A. Partially	<p>On p.167 the use of geologic history is quite speculative and is not observable science. Other areas of current applications that form the basis of modern society are more important as noted above.</p> <p>On p.170 the exercise on sandbag composition is interesting but secondary (i.e. protecting property and life). Would like to see additional exercises concerning soil types for growing different crops which would be a primary application (i.e. sustaining life).</p> <p>Engineering and demonstrations on p. 173 are a repeat of p. 170. Plenty of other important applications in agriculture and mining as noted above.</p>
	B. Partially	<p>Content statement says "All cells come from pre-existing cells." Should explicitly include Pasteur's Law of Biogenesis.</p> <p>Engineering and demonstrations on p. 185 are a repeat of p. 182. How about investigating the cause(s) of algae blooms, their effects, and preventative actions that might be taken. What benefits are expected? What would these action cost? How would local economy be affected? Are the actions worth the cost? Defend you answers.</p>
	C. Yes	
Does the element promote lifelong learning?	A. Yes	
	B. Partially	<p>A way to promote life-long learning would be to add a component to engineering design that includes a cost analysis to implement the technology, e.g. on p. 176.</p> <p>Advising against using a splint test (p. 182) is not promoting lifelong learning.</p>
	C. Yes	
Does the element promote the liberal arts tradition?	A. N/A	
	B. N/A	
	C. N/A	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote college and career readiness?	A. N/A	
	B. N/A	
	C. N/A	
Does the element reduce the need for remediation?	D. N/A	
	E. N/A	
	F. N/A	
Does the element meet the definition of a standard?	G.	
	H.	
	I.	

Ohio Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	more and more background and illustrative examples must be assumed by the teacher as grade levels progress higher
	B. No	ditto Open systems are introduced on p218 without reference to isolated and closed systems which are introduced later on p225 and p228.
	C. No	ditto Under “Recalling Accurate Science” only a closed systems is identified on p230. The entire treatment of the basic concept of different types of systems is disjointed and has poor pedagogy.
Is the element grade level appropriate ?	A. Yes	
	B. Yes	
	C. Yes	
Does the element promote higher student performance, learning and improved student achievement ?	A. Partially	<p>Many examples using the hydrologic cycle are negative. On p.205 there is specific mention of contaminant transport, but no balance to nutrient transport. Likewise on p.206 there is a negative example bias; (acid rain, erosion, mine drainage, mercury contamination) but no mention of nutrients for plants as the foundation of the food chain, or delta formation for the support of wildlife, or fresh water supplies to support life and civilization.</p> <p>Resources listed on p.207 are generally good with a lot of information, projects, and games for a variety of ages and learning styles. However, there is a bent toward alignment with national based standards like Common Core and NGSS.</p> <p>Buoy data suggestions on p.210 are interesting, but students will generally need some guidance from teachers on how to parse and use. Resource suggestions on p.211 are interesting but include dead links and sites are teachers may need guidance to access raw data.</p> <p>Suggest to include www.radon.com with resources on p.213.</p>
	B. Yes	
	C. Yes	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A. Yes	
	B. No	The content statement on biomes on p220 is correct, but is described incorrectly and used incorrectly under Content Elaboration. Biomes are DEFINED on the basis of both biotic and abiotic factors.
	C. Partially	Treatment of pH scale is too cursory. Should clearly indicate acidity has a huge range and thus a logarithmic scale based on factors of 10x is used. Thus use of bubbles with content statement “the properties of matter are determined by the arrangement of atoms” is definitely not using a basic chemistry building block, but a much more advanced view point. Why not use tensile or shear strength of minerals (or elements) and correlate it to cell type, e.g. the three basic cubic structures of atomic arrangement. This seems more directly related to other material that has already been introduced.
Does the element promote essential knowledge in the subject ?	A. Yes	
	B. Yes	
	C. Partially	Would like to see an additional analysis challenge added to first law discussion on p229. Do an analysis on the energy balance of a 100 mL beaker of water being heated by a hot plate at 1 min., 10 min., and 60 min. on high heat setting. Use of waves on p233 is good. Greater emphasis should be placed on using sound waves as a concrete example of wave properties which may be used to understand the behavior of all other types of waves.
Does the element promote lifelong learning ?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote the liberal arts tradition ?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote college and career readiness ?	A. N/A	
	B. N/A	
	C. N/A	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation?	A. N/A	
	B. N/A	
	C. N/A	
Does the element meet the definition of a standard?	A.	
	B.	
	C.	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Biology Topics	<p>Heredity</p> <ul style="list-style-type: none"> • Cellular genetics • Structure and function of DNA in cells • Genetic mechanisms and inheritance • Mutations • Modern genetics <p>Evolution</p> <ul style="list-style-type: none"> • Mechanisms <ul style="list-style-type: none"> ▪ Natural selection ▪ Mutation ▪ Genetic drift ▪ Gene flow (immigration, emigration) ▪ Sexual selection • History of Life on Earth • Diversity of Life <ul style="list-style-type: none"> ▪ Speciation and biological classification based on molecular evidence <p>Diversity and Interdependence of Life</p> <ul style="list-style-type: none"> • Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms. • Ecosystems <ul style="list-style-type: none"> ▪ Homeostasis ▪ Carrying capacity ▪ Equilibrium and disequilibrium <p>Cells</p> <ul style="list-style-type: none"> • Cell structure and function <ul style="list-style-type: none"> ▪ Structure, function and interrelatedness of cell organelle ▪ Eukaryotic cells and prokaryotic cells • Cellular processes <ul style="list-style-type: none"> ▪ Characteristics of life regulated by cellular processes

Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

The use of content statements (i.e. cover this content) versus content objectives (i.e. know or demonstrate this content) is now clearly leading to confusion in OH science standards. In K-8 the weakness of the former method was easier to gloss over. I believe this was a natural consequence due to the introductory level of the content. However, at the high school level, where students need to prepare for college content and/or entering the workforce with all the associated complexities, the weaknesses of the content statement approach are coming into focus. Content statements have been reduced to a short phrase. Brevity is the essence of clarity, so this is great. However, in the content elaborations there is a lack of direction to teach the content as noted above. I understand the greatest freedom for teachers will be found in a model like this, a short list of content items, with the teacher having the greatest latitude to develop a course in the way they deem best to convey this content to their students. However; without content objectives, that clearly delineate what a student is specifically expected to know or demonstrate, we are actually going back decades. While I am not fond of all the benchmarking rubrics and content subsections of the previous science standards at least they clearly defined expectations for teachers and students. It seems to me there must be better middle ground between an overly prescriptive approach and a here's the list do whatever approach. Personally, I prefer the GREATEST ACADEMIC FREEDOM, but understand in our current educational environment of burdensome oversight, going back to the 1960's is not a good idea either.

All topics need content objectives and a content vocabulary list.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	In the content elaboration for Heredity on p.289 the following statement is problematic, “An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm or have little or no effect on the offspring’s success in its environment.” The first sentence is clearly true. Although the second sentence is technically true it is disingenuous. The topic is clearly the role of genetic mutations as harmful, neutral, or beneficial. Numerous studies on HUMAN genetics indicate nearly all mutations are harmful or neutral (e.g. see John Sanford, Genetic Entropy). There are literally thousands of diseases associated with human genetic mutations including many (possibly a majority) of cancers. Thus, the original statement is technically true, but scientifically misleading. Good projects for Visions Into Practice on p.289.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	B. No	<p>Most of the basic science of evolution is good; for example the focus on mutation, natural selection, and the Hardy-Weinberg law. These are based on observation and microevolutionary adaptation to the environment. The primary problem is the extension of these ideas to the concept of descent with modification which implies macroevolutionary changes over supposed long periods of time of earth history. An example descent with modification that has been observed: wolves to dogs, dingos, and coyotes. "Although a high degree of morphological variation is present among the 400-plus breeds of dogs, the most widespread and accepted view, based mainly on morphological studies, places only one species, the wolf (<i>Canis lupus</i>), as the wild progenitor of domestic dogs." Kaoru Tsuda, et. al <i>J. Mol. Evol.</i> 1997,45,229 This is microevolution observational science. Further, the genetic analysis presented in this paper further supports the wolf origins of domestic dogs. An example of descent with modification not observed: insectivores to miacids to canis. This is macroevolutionary historical science. Highly speculative and hypothetical. What purpose is there to telling these kinds of stories? Why not stick to better grounded observational science that does not depend on historical interpretations of unobserved past events? Based on fossil evidence Coelacanths with their lobed fins were thought to be a transitional form from fish to amphibians. Stories were told of how the coelacanth used their lobed fins to mimic walking and climb out of the ocean onto land eventually evolving into amphibians. With the discovery of modern schools of coelacanth off the southern coast of Africa and Southeast Asia we now can observe these creatures in their natural habitat. Do we see lobed fin coelacanths ever using these appendages for "walking"? NO. The only observed use of the lobed fins is for water locomotion control, not land motion, even on the ocean floor. Certainly there is enough good observational science material that we can completely avoid telling these kinds of misleading wishful thinking stories. (review continued on below)</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C. No	<p>Basic science concepts are generally very good except as noted previously with ventures into speculative historical science and potential problems with the improper use of molecular data.</p> <p>Population growth models are an excellent way to introduce mathematical rigor to biological concepts.</p> <p>No section D provided throughout for section on Cells</p> <p>Again, basic science is very good except for the excursion into historical science. In this case it significantly detracts from the material presented. The primary purpose appears to be to push the issue of origins which is religious/philosophical in nature. Recommend removal of this portion (paragraph 2 p.295). For example, where did the first cell come from? How did single cell systems develop into complex multicellular systems and eventually humans? Where did the information come from (panspermia)? If DNA codes for proteins and proteins (enzymes) are required for homeostasis which came first? etc .</p>
<p>Is the element grade level appropriate?</p>	A.	
	B.	<p>The use of molecular sequence data is suggested at the bottom of the first column on p.291. This is most beneficial if one compares specific exon sequences like those of hemoglobin or cytochrome c where there are ways to consistently align the genetic data across species. However, when molecular sequence data is used to make comparisons between entire genomes of species (or large portions thereof) the methods are specious at best. For example in chimp vs. human DNA comparisons many times indels are omitted from the study! (e.g. <i>Nature</i> 437:69–87, 2005) By definition these are differences between the genomes. Even worse, large sections of the genomes are ignored because of alignment issues between the species' genomes. Again, investigators go on their merry way and do not count these differences.</p> <p>As a scientist seeking the truth I find the whole practice appalling. Certainly we can do better in Ohio science classrooms! (e.g. <i>Nature</i> 463:536–539, 2010)</p>
	C.	
<p>Does the element promote higher student performance, learning and improved student achievement?</p>	A.	
	B.	
	C.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A.	
	B.	
	C.	
Does the element promote essential knowledge in the subject ?	A.	
	B.	
	C.	
Does the element promote lifelong learning ?	A.	
	B.	
	C.	
Does the element promote the liberal arts tradition ?	A.	
	B.	
	C.	
Does the element promote college and career readiness ?	A.	
	B.	
	C.	
Does the element reduce the need for remediation ?	A.	
	B.	
	C.	
Does the element meet the definition of a standard ?	A. NO	
	B. NO	
	C. NO	

Ohio Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Physical Earth</p> <ul style="list-style-type: none"> • The composition and properties of Earth’s interior are identified by the behavior of seismic waves. • Earth’s crust consists of major and minor tectonic plates that move relative to each other. • A combination of constructive and destructive geologic processes formed Earth’s surface. • Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.
Life Science	<p>Topic: Species and Reproduction</p> <ul style="list-style-type: none"> • Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species. • Reproduction is necessary for the continuation of every species. • The characteristics of an organism are a result of inherited traits received from parent(s).
Physical Science	<p>Topic: Forces and Motion</p> <ul style="list-style-type: none"> • Forces between objects act when the objects are in direct contact or when they are not touching. • Forces have magnitude and direction. • There are different types of potential energy.
Grade 8	<p>Strand Connections: Systems can be described and understood by analysis of the interaction of their components. Energy, forces and motion combine to change the physical features of the Earth. The changes of the physical Earth and the species that have lived on Earth are found in the rock record. For species to continue, reproduction must be successful.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. partially	The latter elements bring in historical science which are non-reproducible and highly speculative. Suggest elimination of these speculative elements with greater focus on operational science concepts. pp.252 and 253 are out of place, should be with Life Science pp.258 and 259.
	B. No	On p.254 the use of the term “transitional form” is incorrect. Did anyone look at the linked definition? In addition, the link uses the classic horse evolutionary tree which has been shown to be a misinterpretation of the fossil record (see L. Sunderland, Darwin’s Enigma, 1984).
	C.	
Is the element grade level appropriate ?	A. partially	The use of seismic waves to describe the composition of the earth is good operational science. PASCO has a sound wave generator software package that is an excellent resource for demonstrating various wave properties (e.g. amplitude, frequency, overtones, and interference) that students can hear and thus experience. I like the plate boundary exercise suggested on p.245. This is good, data based, operational science. I do not like the use of speculative past movement of plates (p.244) which is non-reproducible historical science.
	B. B.	
	C. C.	

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
<p>Does the element promote higher student performance, learning and improved student achievement?</p>	A. No	<p>Discussion of the fourth element uses the term “absolute age” of the earth. This demonstrates a serious lack in understanding the assumptions and problems of interpreting historical based data in regards to earth history.</p>
	B. B. No	<p>On p.255 interpreting and communicating science and recalling accurate science embrace the standard view of Steno and Hutton about sedimentary deposits. However, this fails to account for hydrologic conditions. What is accepted as a general principle for layer formation is only applicable to still or very slow moving waters. More recent experimental studies by J. Walther and G. Berthault and conducted in the 20th century indicate a more general principle of sedimentary layer formation under changing hydrologic conditions. These studies show simultaneous formation of layers in moving water with concurrent particle sorting phenomena occurring. I can demonstrate this general principle easily in one minute.</p> <p>Standard approach also fails to address the many examples of polystrate fossils that transverse numerous layers that were supposedly formed over millions of years. Again, this is historical science that is filled with assumptions and speculations. Time would be better spent focusing on operational science.</p>
	C.	

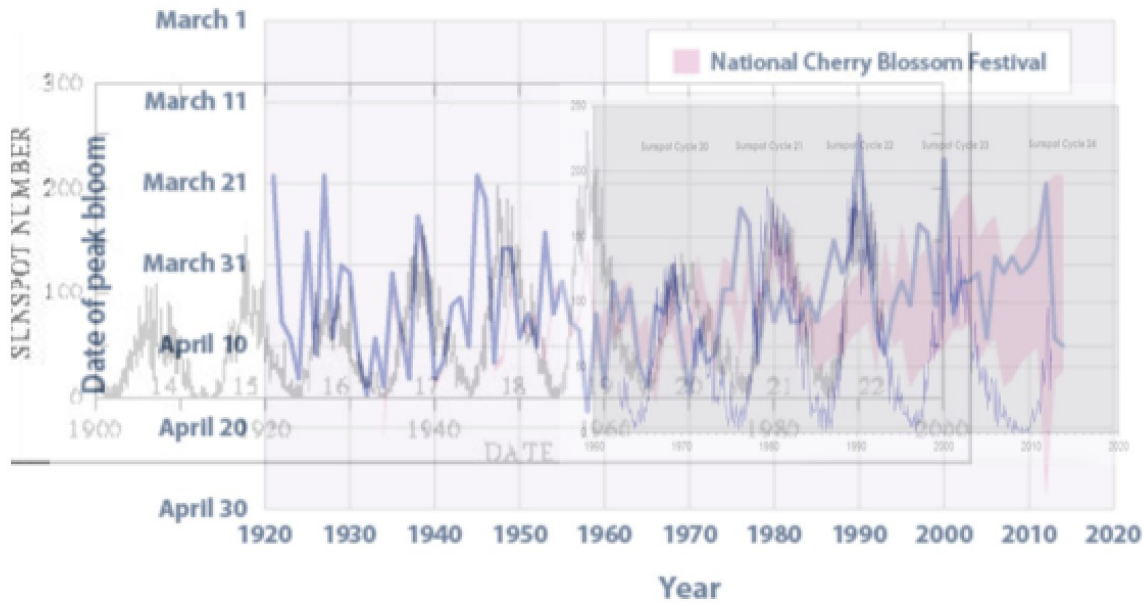
Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes														
<p>Does the element support subject matter comprehension?</p>	A.	<p>Accurate science on p. 250 is misleading. Students should definitely understand something about radioactive dating techniques, however any indication of shortcomings is overlooked. There are a number of unprovable assumptions associated with applying these kinds of dating techniques. The two most problematic are (1) initial conditions are known and (2) there has been no significant inflow or outflow of material over vast periods of time. (The latter is in direct contradiction to the above-mentioned plate tectonic history exercise.)</p> <p>In addition, discordant results concerning the hypothesized age of the earth will likely be completely overlooked. Here's a compilation from the literature on earth age dates using various radiometric techniques:</p> <table style="margin-left: 20px;"> <tr> <td>U-Pb</td> <td>1.0 – 1.8 Gy</td> </tr> <tr> <td>Fission Track</td> <td>0.5 Gy</td> </tr> <tr> <td>Rb-Sr</td> <td>8.75 Gy</td> </tr> <tr> <td>K-Ar</td> <td>4.8-5.2 Gy</td> </tr> <tr> <td>Re-Os</td> <td>11.0 Gy</td> </tr> <tr> <td>Sm-Nd</td> <td>5.19 Gy</td> </tr> <tr> <td>Pb-Pb</td> <td>4.5-4.6 Gy (accepted)</td> </tr> </table> <p>This last date is not even based on rocks of terrestrial origin, but from asteroids. Granted, the non-terrestrial rocks have great conformity in their dates but now we are making an assumption on top of an assumption to arrive at this date. Will this all be explained at the 8th grade level, or ANY level in the American education system?</p>	U-Pb	1.0 – 1.8 Gy	Fission Track	0.5 Gy	Rb-Sr	8.75 Gy	K-Ar	4.8-5.2 Gy	Re-Os	11.0 Gy	Sm-Nd	5.19 Gy	Pb-Pb	4.5-4.6 Gy (accepted)
	U-Pb	1.0 – 1.8 Gy														
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B.																
C.																

Ohio Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	On p.251 use of USGS website for background information is useful, for example http://pubs.usgs.gov/gip/geotime/age.html Here's a quote from the first line "So far scientists have not found a way to determine the exact age of the Earth directly from Earth rocks because Earth's oldest rocks have been recycled and destroyed by the process of plate tectonics." At least the assumption basis is admitted up front. In addition on p.251 the use of the EPA climate change website appears to be promoting viewpoint discrimination concerning climate change. See my attached overlapping plots of cherry blossom data from this site with sunspot activity since 1920.
	B.	On p.261 the use of designer dogs is a good area of study. How many dog varieties have developed since the Egyptians domesticated <i>Canis lupus</i> ?
	C.	
Does the element promote lifelong learning?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote the liberal arts tradition?	A. N/A	
	B. N/A	
	C. N/A	
Does the element promote college and career readiness?	A. N/A	
	B. N/A	
	C. N/A	
Does the element reduce the need for remediation?	A. N/A	
	B. N/A	
	C. N/A	
Does the element meet the definition of a standard?	D.	
	E.	
	F.	

Ohio Standards Committee Review Form



Explanation

Thick blue line is Date of peak bloom vs. year for National Cherry Blossom Festival in Washington, D.C.

Black line is the sunspot activity from 1900 – 1995. Additional superposed lower blue line is sunspot activity from 1960 – 2013.

Strong correlation is observed in early years. Anti-correlation is observed around 1960, likely due to complex interplay of various positive and negative feedback cycles. Another region of correlation is observed following the 1960's period. Then a developing anti-correlation trend appears to be forming in the current decade.

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

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Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

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⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards ommittee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Structure and Properties of Matter</p> <ul style="list-style-type: none"> • Atomic structure • Periodic Table • Intermolecular chemical bonding • Representing compounds • Quantifying matter • Phases of matter • Intermolecular chemical bonding <p>B. Interactions of Matter</p> <ul style="list-style-type: none"> • Chemical reactions • Gas laws • Stoichiometry • Nuclear Reactions
High School Course	Chemistry

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Content standards contain two parts, A and B. Review sheets contain nine parts, A thru I.
 Content elaboration in the standards contain two parts and eleven sub---parts (seven and four).

All topics need content objectives and a content vocabulary list.

Standards ommittee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise?	A. No	<p>Atomic Structure Overall a good summary of the most important concepts of general chemistry. Good use of historical development of the atom, but the hyperlink is outdated. It should be: http://wayback.archive-it.org/3635/20130725072120/http://library.thinkquest.org/19662/high/eng/index.html. However, each section suffers from a lack of clearly defined learning objectives. Use of quantum theory should be limited at this level, which appears to be the intent of the content elaboration on Atomic Structure.</p> <p>Periodic Table Looks like a college prep course. Is there an option to teach chemistry (as well as physics and biology) at two different levels? I taught the non-majors general science course for approximately 15 years at the college level. If the goal is to help create a scientifically literate general population then this course is more of a hinderance than a help. Only $\frac{1}{3}$ of U.S. young adults 25-29 have a college degree. Suggest a focus on Lewis dot structures and VSEPR theory rather than quantum based electron configurations.</p> <p>Intramolecular Chemical Bonding Again, very college course oriented. No need to beat to death electronegativity at the high school level. Super important for a chemist, but not a high school graduate. One can teach ionic bonds, multiple (covalent) bonds, isomers, chirality, saturated/unsaturated molecules, and hydrogen bonding all without resorting to electron configurations or electronegativities. Focus at the high school level should be applications of chemistry.</p> <p>Representing Compounds This section appears to be at the right level for a high school chemistry class. I would add a section on basic organic nomenclature.</p> <p>Quantifying Matter Again, appears to be at the right level for high school chemistry.</p> <p>Phases of Matter Recommend removing plasmas and Bose-Einstein condensates out of the general curriculum and make available for an optional advanced exercise for those students that have an extended interest.</p>
	B.	<p>Intermolecular Chemical Bonding Clearly one of the most important topics in chemistry as evidenced by the print space taken. Also one of the two most difficult topics in the college general chemistry sequence (the other is kinetics). The detail provided here is better suited to an AP level course. Recommend using a couple of basic examples here like a heating curve through phase changes and gas behavior; and a couple of more complex real-world examples like chloride ion channels and vitamin solubility.</p> <p>Chemical Reactions Appears to consist of an abundance of material including: reaction types, kinetics, equilibrium, thermodynamics, and acid-base chemistry. Too much material at too high a level for non-AP high school chemistry course.</p> <p>Gas Laws</p>

Standards ommittee Review Form

Review Criteria	Review Level	Notes
		<p>Appropriate material and level for general high school chemistry class. Suggest introducing earlier, especially before Intermolecular Chemical Bonding because of connection with KMT, phases, and intermolecular forces.</p> <p>Stoichiometry</p> <p>Good level for material suggested. Agree, molality and normality are better in a more advanced course.</p>
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Is the element grade level appropriate?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the Element promote higher student performance, learning and improved student achievement?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	

Standards ommittee Review Form

Review Criteria	Review Level	Notes
Does the Element support subject matter comprehension?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
	Does the Element promote essential knowledge in the subject?	A.
B.		
C.		
D.		
E.		
F.		
G.		
H.		
I.		
Does the element promote lifelong learning?		A.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	

Standards ommittee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element promote college and career readiness?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element reduce the need for remediation?	A.	
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	

Standards ommittee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. NO	
	B. NO	
	C. NO	
	D. NO	
	E. NO	
	F. NO	
	G. NO	
	H. NO	
	I. NO	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

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⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

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¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>Earth Systems: Interconnected Spheres of Earth</p> <ul style="list-style-type: none"> • Biosphere • Atmosphere • Lithosphere • Hydrosphere • Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere <p>Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air and air pollution • Water and water pollution • Soil and land • Wildlife and wilderness <p>Global Environmental Problems and Issues</p> <ul style="list-style-type: none"> • Human population • Potable water quality, use and availability • Climate change • Sustainability • Species depletion and extinction • Air quality • Food production and availability • Deforestation and loss of biodiversity • Waste management (solid and hazardous)
High School Course	Environmental Science

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

All topics need content objectives and a content vocabulary list.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	<p>Topic needs content objectives and a content vocabulary list. Earth Systems content elaboration on p.308 lacks specific content objectives. Difference between climate and global climate is not clearly specified. You appear to mean local microclimates, regional climate, and global climate. I am pretty sure the use of historical climate change is distorted. The emphasis should be on what we have been able to observe through human history; satellite data beginning last half of twentieth century, weather records from bodies like the American Meteorological Society since the late 1800's, and various eyewitness accounts over the past few thousand years. These are part of observational science. Prior to this time frame the information is speculative historical science.</p> <p>The use of the hydrologic cycle and water transport phenomena are good.</p> <p>The section on Earth Systems under Cognitive Demands states "This section provides definitions for Ohio's science cognitive demands . . ." and then fails to list any definitions?</p> <p>he Visions Into Practice section is quite good overall. A good variety of challenging exercises is suggested. As noted earlier my concern is the couple of exercises that rely on climatic effects in past eons and extinct species. Interpretations of climatic records which go beyond recorded human history are especially fraught with large uncertainties and speculations. This is especially true with ice core data which is one of the primary sources of this type of information. Instead of repeating myself please see comments on Physical Geology – Glacial Geology. Some good resources found in Instructional Strategies and Resources section like Byrd Polar Research and Project Wet.</p>
	B. No	
	C. No	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	A.	<p>(cont. from above)</p> <p>But I found this on the National Academies of Science resource web page: “However, as our planet enters a period of changing climate never before experienced in recorded human history . . .”</p> <p>REALLY? On the face of it this claim is ridiculous. Tell this to the people of Greenland from the 1500’s as they went into the little ice age and starved to death. And this from the NAS. Wow.</p> <p>NSTA position paper is full of distortions and should be dropped as a recommended resource or balance added to the discussion (e.g. http://creation.com/contemporary-suppression-of-the-theistic-worldview). Many, if not most, American parents would not be supportive of these practices of censorship and indoctrination in our public schools.</p>
	B.	<p>The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands “and then fails to list any definitions. (again)</p> <p>A number of good examples are given under Vision Into Practice on pp.311-312.</p> <p>Under Instructional Strategies and Resources the Risk Assessment material is a great resource. While it is overly simplistic to reach a wider range of students it is a great starting point and one of the most important topics in addressing potential issues in chemical use, food, medicine, and the environment.</p> <p>NSTA SciPacks may be very good but you need to buy it before you can really review it. I understand these resources are not free to develop, but I think there may be a better way to balance out the financial issues vs. the review issues before purchasing.</p>
	C.	<p>The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands. . . “and then fails to list any definitions. (again)</p> <p>The following on p.313 is a dead link: http://www.csun.edu/~ml727939/coursework/690/Miha’s_misconceptionreport.doc</p> <p>Good Visions Into Practice exercises and additional supporting material, especially that associated with Risk Assessment.</p>
Does the element meet the definition of a standard?	A. NO	
	B. NO	
	C. NO	

Ohio Standards Committee Review Form

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⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Minerals</p> <ul style="list-style-type: none"> • Atoms and elements • Chemical bonding (ionic, covalent, metallic) • Crystallinity (crystal structure) • Criteria of a mineral (crystalline solid, occurs innature, inorganic, defined chemical composition) • Properties of minerals (hardness, luster, cleavage, streak crystal shape, fluorescence, flammability, density/specific gravity, malleability) <p>B. Igneous, Metamorphic and Sedimentary Rocks</p> <ul style="list-style-type: none"> • Igneous • Metamorphic • Sedimentary <p>C. Earth’s History</p> <ul style="list-style-type: none"> • The geologic rock record • Absolute age • Combining relative and absolute age data • The geologic time scale <p>D. Plate Tectonics</p> <ul style="list-style-type: none"> • Internal Earth • Structure of Earth • Historical review • Plate Motion <p>E. Earth’s Resources</p> <ul style="list-style-type: none"> • Energy resources • Air • Water • Soil and sediment <p>F. Glacial Geology</p> <ul style="list-style-type: none"> • Glaciers and glaciation
High School Course	Physical Geology

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

All topics need content objectives and a content vocabulary list.

Similar issues as in Chemistry Course. Amount and type of information covered is at a college prep. level and should be broken into a basic and AP offering. Basic offering should not just be Physical Science.

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	Generally good except for lack of content objectives and vocabulary list. The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ”and then fails to list any definitions. (again)
	B. No	As noted above, may be too much material based on the suggested course content outline. This section on Igneous, Metamorphic, and Sedimentary Rocks appears it could easily fill a 9-week semester. Included is the topic: “The processes and environmental conditions that lead to fossil fuel formation.” Interesting to include but we still do not know the origin of oil. Is it biogenic or abiogenic in origin? Good arguments exist on both sides. We can produce crude oil from biogenic origins in the lab with heat and pressure in a matter of hours. Patent literature indicates petrified wood may also be generated in days under the right conditions (US 4,612,050). Similar work is in the literature on oil. I think it is a great topic to include, since it illustrates the rich debate associated with good science. More clarity on the biogenic/abiogenic debate would be helpful. The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again)
	C.	
	D.	
	E.	
	F.	
	A.	
	B.	
	C. No	Earth History as noted previously is non-reproducible historical science. To be clear, I am not suggesting we should not study these issues. On the contrary we do so all the time in fields like forensic science and fraud investigations. However, these areas are much more speculative and prone to bias. As I noted earlier, to claim we have a known absolute age of the earth and know it is actually true with any degree of certainty is unlikely. The assumptions associated with radioactive dating are

Standards Committee Review Form

Review Criteria	Review Level	Notes
		<p>UNPROVEABLE. Not a good foundation. There are numerous other ways to estimate the age of the earth; a few examples include the He content of the atmosphere, sedimentation rates, and the recession rate of the moon. These all give different ages, and some reflect a much younger age. After studying this area for decades I have come to the conclusion, if you say you absolutely know the age of the earth (1) you have an unknown bias, (2) you have a bias but are ignoring it, or (3) you have not studied a wide enough range of data. It appears to me the primary reason to push an absolute age of the earth into Ohio science classrooms is to promote a secular humanist worldview because the science is weak and a wider view of determined ages are very discordant. This portion of the Physical Geology course could be removed or reduced to give more time to cover the vast array of other topics built on firmer observational science like Bowen's Reaction Series or Seismic Waves.</p>
	D. No	<p>See comments on radioactive dating above.</p> <p>Earthquake analysis is an excellent example of observational geophysical science that we should be promoting.</p> <p>The section under Cognitive Demands states "This section provides definitions for Ohio's science cognitive demands . . ." and then fails to list any definitions. (again)</p>
	E. No	<p>Resource Availability (Earth's Resources is improper use of the possessive form.)</p> <p>Should specifically include economic cost-benefit analysis of resource utilization. Only environmental impact is specifically mentioned which is rather unbalanced. The whole purpose for using the resources available is to benefit human beings and better our standard of living. Of course there are environmental impacts, for example trees once stood where my house is located. Having a house for me and my family is better for our well-being than a half acre plot of land with trees on it. (BTW we chose to keep about $\frac{1}{3}$ of our lot wooded and wild.)</p> <p>All examples of study material and projects, except possibly one, are negative; mud run-off, water run-off, thermal pollution, particulate matter pollution, and desertification. How about some balance? For example, all of the six primary air quality pollutants (CO, PM10, NOx, SOx, VOCs, and Pb) have been DECREASING for over 40 years. Same story with U.S. water quality.</p> <p>The section under Cognitive Demands states "This section provides definitions for Ohio's science cognitive demands . . ." and then fails to list any definitions. (again)</p>
	F. No	<p>Glacial Geology is a content area filled with inconsistencies and unfounded speculations.</p> <p>1. At the website given numerous times for misconceptions_ http://serc.carleton.edu/NAGTWorkshops/intro/misconception_list.html it</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
		<p>is implied that ice caps are not normal over the standard time frame of earth history however there is alarm from some concerning melting ice caps and rising oceans. Is the earth is just returning to its normal state after the little ice age?</p> <p>2. The recommended EPA website http://www.epa.gov/climatechange/basics/ makes the “bold” statement “climate change is happening”. Really? A circle is round too!</p> <p>3. Ice core data are particularly troublesome in their interpretation. Actual known data points exist that rely on far fewer assumptions and paints a much different picture of ice core data. On July 14, 1942 a squadron of 6 --- P38's and 2 --- B17's was abandoned on Greenland. On August 1, 1992 a P38 was recovered from a burial depth of 268 ft. of ice. Granted this is the Northern hemisphere, but it is known, well-established historical data. Question: how long would it take to build a 2 km layer of Antarctic ice? Assumption: similar conditions in Antarctica as in Greenland. Answer: 1280 years. (NOT 300,000 years as assumed by standard methodology!) This would be a minimum lower bound since this assumes a linear relationship and does not account for compression of lower layers by upper layers over time. Data on snow compaction indicate a maximum density increase of 5x due to the above compression effect. Thus, the upper bound in time would be 5x greater or 6400 years. Both numbers are definitely wrong, but the predicted number is BETWEEN these two bounds based on a very reasonable extrapolation of well-established ice layer data. http://p38assn.org/glacierng/index.htm</p> <p>4. Numerous other difficulties arise: What is the optimum temperature of the earth? How would you determine this? What is the role of water in the atmosphere ? How is water vapor treated in climate models? I can't trust the weather prediction 5 days from now, how can I trust the climate prediction 50 years from now? This section should be dropped from the high school curriculum due to its speculative and specious historical science foundations.</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
	F. No	<p>Glacial Geology is a content area filled with inconsistencies and unfounded speculations.</p> <p>5. At the website given numerous times for misconceptions_ http://serc.carleton.edu/NAGTWorkshops/intro/misconception_list.html it is implied that ice caps are not normal over the standard time frame of earth history however there is alarm from some concerning melting ice caps and rising oceans. Is the earth is just returning to its normal state after the little ice age?</p> <p>6. The recommended EPA website_ http://www.epa.gov/climatechange/basics/ makes the “bold” statement “climate change is happening”. Really? A circle is round too!</p> <p>7. Ice core data are particularly troublesome in their interpretation. Actual known data points exist that rely on far fewer assumptions and paints a much different picture of ice core data. On July 14, 1942 a squadron of 6 --- P38’s and 2 --- B17’s was abandoned on Greenland. On August 1, 1992 a P38 was recovered from a burial depth of 268 ft. of ice. Granted this is the Northern hemisphere, but it is known, well-established historical data. Question: how long would it take to build a 2 km layer of Antarctic ice? Assumption: similar conditions in Antarctica as in Greenland. Answer: 1280 years. (NOT 300,000 years as assumed by standard methodology!) This would be a minimum lower bound since this assumes a linear relationship and does not account for compression of lower layers by upper layers over time. Data on snow compaction indicate a maximum density increase of 5x due to the above compression effect. Thus, the upper bound in time would be 5x greater or 6400 years. Both numbers are definitely wrong, but the predicted number is BETWEEN these two bounds based on a very reasonable extrapolation of well-established ice layer data. http://p38assn.org/glaciergirl/index.htm</p> <p>8. Numerous other difficulties arise: What is the optimum temperature of the earth? How would you determine this? What is the role of water in the atmosphere? How is water vapor treated in climate models? I can’t trust the weather prediction 5 days from now, how can I trust the climate prediction 50 years from now?</p> <p>This section should be dropped from the high school curriculum due to its speculative and specious historical science foundations.</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A. NO	
	B. NO	
	C. NO	
	D. NO	
	E. NO	
	F. NO	

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Standards Committee Review Form

Standards Committee	Science
Committee Member Name	
Topics	<p>A. Study of Matter</p> <ul style="list-style-type: none"> • Classification of matter • Atoms • Periodic trends of the elements • Bonding and compounds • Reactions of matter. <p>B. Energy and Waves</p> <ul style="list-style-type: none"> • Conservation of energy • Transfer and transformation of energy (including work) • Waves • Thermal energy • Electricity <p>C. Forces and Motion</p> <ul style="list-style-type: none"> • Motion • Forces • Dynamics (how forces affect motion) <p>D. The Universe</p> <ul style="list-style-type: none"> • History of the Universe • Galaxy formation • Stars
High School Course	Physical Science

Review level **Yes** it meets the review criteria

Partially meets the review criteria or **undetermined** **No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	<p>On p.277 the use of T vs. t curves to model phase changes is a good idea. However, the explanation based on intermolecular forces just appears. In my experience intermolecular forces is one of the most difficult concepts for college chemistry students to fully understand. However, IMF's is also one of the MOST important to get. There is a good foundation for IMF introduced in K-8, but here there is a lack of building a bridge between the foundation knowledge and the new material.</p> <p>In contrast, I love the use of mass vs. Volume graph to talk about density.</p> <p>Content elaboration on Atoms on p.277 is lacking direction. For example, appear to want to cover basic atomic structure and isotopes without the experimental details.</p> <p>Under Periodic Trends there appear to be three concepts required (periodicity, element families, and ionic formulas) but in the course content only the first two are listed. Another place where content objectives would be clearer than content statements.</p> <p>Under Bonding and Compounds ionic charges are mentioned with no reference to even a simple shell model of atomic structure. Previously, under Atoms no specific models of atomic structure were mentioned or elaborated on. It is up to the teacher to fill in the gaps. That's great for academic freedom, but may cause problems for a physical science teacher that is not a chemist. Further, there is a great discussion concerning variations in bond type, but no specifics are given in content objectives. Introducing Pauling electronegativity differences as a predictor of ionic vs. covalent character in a chemical bond is not grade appropriate.</p> <p>Reactions of Matter on p.278 would also benefit from a content objectives list. Nuclear chemistry portion of Reactions of Matter would also benefit from further content objectives list. Concerned about amount of content included on Study of Matter portion of the Physical Science class.</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
	B. No	<p>Energy and Waves gives a great Cliff Notes content summary but lacks the clarity of a content objectives list.</p> <p>The Waves section would benefit from introducing a required vocabulary list; for example modes of transmission, bands of the spectrum, and characteristic physical properties.</p> <p>Doppler shift can be explained using diagrams? REALLY? There are numerous better ways to approach this using sound waves, videos, and demonstrations.</p> <p>All remaining topics need content objectives and content vocabulary list.</p> <p>Use of quantitative measurements done with only one reference to SI units in the entire standards?! (p.283)</p>
	C. No	All remaining topics need content objectives and content vocabulary list.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	D. No	<p>Too heavy an emphasis on highly speculative historical science rather than experimental observational science. Brings in the philosophy and religion of origins. Are other views of origins going to be treated equally in the classroom?</p> <p>In addition to the philosophical issues unnecessarily imposed upon the classroom here are a few problems with Big Bang cosmology. (1) The work of Halten Arp indicates a plethora of red-shift anomalies, in particular between visually connected quasars and galaxies with up to 10x difference in their red-shifts. (2) COBE observations of CMB indicate great uniformity (in background temperature). However, Big Bang theory predicts INITIAL large differences which require communication via radiation to reach equilibrium. Known light-time-distance parameters do not match observations (the horizon problem). (3) Big Bang predicts homogeneous distribution of matter but we primarily observe clusters of galaxies and clusters of clusters of galaxies (i.e. superclusters). (e.g. see George Smoot, Wrinkles in Time) (4) There is a fine-tuning of the physical constants of matter and energy in the universe which suggest design, not randomness; the so-called Anthropic Principle. (e.g. see William Dembski, The Design Inference)</p>
Is the element grade level appropriate ?	A.	
	B.	
	C.	
	D.	
Does the element promote higher student performance, learning and improved student achievement ?	A.	<p>Visions Into Practice on p.278 have a tenuous relationship with the content material presented in the chemistry section. Here's a couple of suggestions (1) study the use of density and density gradients in industrial and analytical separations. Include flumes, floatation techniques, and centrifuge applications. (2) study the reactivity and uses of group 17 elements in (a) water purification and (b) chemical synthesis applications.</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
	B.	
	C.	
	D.	
Does the element support subject matter comprehension ?	A.	
	B.	
	C.	
	D.	
Does the element promote essential knowledge in the subject ?	A.	
	B.	
	C.	
	D.	
Does the element promote lifelong learning ?	A.	
	B.	
	C.	
	D.	
Does the element promote the liberal arts tradition ?	A.	
	B.	
	C.	
	D.	
Does the element promote college and career readiness ?	A.	
	B.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	
	D.	
Does the element reduce the need for remediation?	A.	
	B.	
	C.	
	D.	
Does the element meet the definition of a standard?	A. NO	See below.
	B. NO	See below.
	C. NO	See below.
	D. NO	See below.

The use of content statements (i.e. cover this content) versus content objectives (i.e. know or demonstrate this content) is now clearly leading to confusion in OH science standards. In K-8 the weakness of the former method was easier to gloss over. I believe this was a natural consequence due to the introductory level of the content. However, at the high school level, where students need to prepare for college content and/or entering the workforce with all the associated complexities, the weaknesses of the content statement approach are coming into focus. Content statements have been reduced to a short phrase. Brevity is the essence of clarity, so this is great. However, in the content elaborations there is a lack of direction to teach the content as noted above. I understand the greatest freedom for teachers will be found in a model like this, a short list of content items, with the teacher having the greatest latitude to develop a course in the way they deem best to convey this content to their students. However; without content objectives, that clearly delineate what a student is specifically expected to know or demonstrate, we are actually going back decades. While I am not fond of all the benchmarking rubrics and content subsections of the previous science standards at least they clearly defined expectations for teachers and students. It seems to me there must be better middle ground between an overly prescriptive approach and a here's the list do whatever approach. Personally, I prefer the GREATEST ACADEMIC FREEDOM, but understand in our current educational environment of burdensome oversight, going back to the 1960's is not a good idea either.

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Motion</p> <ul style="list-style-type: none"> • Graph interpretations • Problem solving • Projectiles <p>B. Forces, Momentum and Motion</p> <ul style="list-style-type: none"> • Newton's laws applied to complex problems • Gravitational force and fields • Elastic forces • Friction force (static and kinetic) • Air resistance and drag • Forces in two dimensions • Momentum, impulse and conservation of momentum <p>C. Energy</p> <ul style="list-style-type: none"> • Gravitational potential energy • Energy in springs • Nuclear energy • Work and power • Conservation of energy <p>D. Waves</p> <ul style="list-style-type: none"> • Wave properties • Light phenomena <p>E. Electricity and Magnetism</p> <ul style="list-style-type: none"> • Charging objects (friction, contact and induction) • Coulomb's law • Electric fields and electric potential energy • DC circuits • Magnetic fields and energy • Electromagnetic interactions
High School Course	Physics

Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

All topics need content objectives and a content vocabulary list.

Similar issues as in Chemistry Course. Amount and type of information covered is at a college prep. level and should be broken into a basic and AP offering.

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A. No	Equation on p.332 in Problem Solving did not translate into pdf. The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again) Good focus on operational science materail.
	B.	The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again)
	C.	The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again)
	D.	
	E.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	A.	
	B.	
	C.	
	D.	The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again)
	E.	The section under Cognitive Demands states “This section provides definitions for Ohio’s science cognitive demands . . . ” and then fails to list any definitions. (again)
	A.	
	B.	
	C.	
	D.	
	E.	
	A.	
	B.	
	C.	
	D.	
	E.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	A.	
	B.	
	C.	
	D.	
	E.	
	A.	
	B.	
	C.	
	D.	
	E.	
Does the element meet the definition of a standard?	A. NO	
	B. NO	
	C. NO	
	D. NO	
	E. NO	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Daily and Seasonal Changes</p> <ul style="list-style-type: none"> • Weather changes are long-term and short-term. • The moon, sun and stars are visible at different times of the day or night.
Life Science	<p>Topic Physical and Behavioral Traits of Living Things</p> <ul style="list-style-type: none"> • Living things are different from nonliving things, • Living things have physical traits and behaviors which influence their survival
Physical Science	<p>Topic: Properties of Everyday Objects and Materials</p> <ul style="list-style-type: none"> • Objects and material can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound
Kindergarten	Strand Connections: Living and nonliving things have specific physical properties that can be used to sort and classify. The physical properties of air and water are presented as they apply to weather.

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
<p>Is the element clear and concise? See notes please.</p>	A. ESS	<ul style="list-style-type: none"> • Weather changes are long-term and short-term. • The moon, sun and stars are visible at different times of the day or night. <ol style="list-style-type: none"> 1. Page 16; remove reference to nonstandard tools; include - The measurements collected must be age appropriate. The example of the dowel demonstrates use of a nonstandard tool. 2. On page 15, the topic statements that are bulleted should mention seasons. 3. P. 19. The content statement says: The observable shape of the moon changes in size very slowly throughout the each day of every month. This seems to imply that students will see changes in the moon shape from one day to the next. I wonder if this is the intent of this content statement? Changes over the month make sense; daily changes maybe not.
	B. LIFE	<p>Living things are different from nonliving things. The elaboration of the statement needs editing.</p> <ol style="list-style-type: none"> 1. I wonder about including things that have ever been alive as living. This seems to include dead things. Is this the intent of the writers? I don't find this clear and concise. 2. "There are somewhat different kinds in different places" – needs a stronger noun to open the sentence to make this clear. <p>Living things have physical traits and behaviors which influence their survival</p> <ol style="list-style-type: none"> 1. The content statement is clear and concise. <p>The inclusion of ethical treatment of animals information is a strong element. Be clear that this statement is indicated as a guideline to teachers. In the case of classroom pets, the document is not clear about whether this is part of student learning (ethical treatment of pets) or a note to teachers to model this behavior.</p>

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C. PS	<ul style="list-style-type: none"> • Objects and material can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound <p>The content statements seem clear and concise.</p>
Is the element grade level appropriate ?	A. ESS	Yes, these seem grade level appropriate.
	B. LIFE	Yes, these seem grade level appropriate.
	B. PS	Yes, these seem grade level appropriate.
Does the element promote higher student performance, learning and improved student achievement ?	A.	The element introduces kindergarteners to the weather and sun, moon, and stars. Not sure how anyone can know if this will promote higher student performance and improved student achievement. If teachers find time in their day to include, science, I think student achievement in science will improve.
	B.	The element encourages learning through different learning modes including inquiry activities and measurements. These multiple representations may promote higher student performance.
	C.	Designing, creating, using, and representing difference between properties of materials and sound making devices will promote higher student performance.
Does the element support subject matter comprehension ?	A.	Yes, this seems like an appropriate place to introduce students to ESS.
	B.	Living and nonliving and structure of organisms seems appropriate.
	C.	Starting with properties of materials and objects introduces students to categorization and the variety of stuff in the natural world. Looking specifically at the nature of music or sound making develops this idea by linking the structure of the objects to the sounds they produce.,
Does the element promote essential knowledge in the subject ?	A.	Yes, seasons and the universe are definitely essential knowledge for students.
	B.	Yes.
	C.	Yes
Does the element promote lifelong learning ?	A.	Developing an interest in the weather and the universe could promote lifelong learning.
	B.	Interesting students in living and nonliving things could promote lifelong learning.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	Hope so. I hope that kindergarten teachers find the idea of properties of objects and materials interesting enough to get their kids excited about this. Music, I think, will receive more attention in the kindergarten classroom than properties.
Does the element promote the liberal arts tradition?	A.	Yes.
	B.	Rich supporting materials for this element.
	C.	I like that a variety of example lessons promote many different aspects.
Does the element promote college and career readiness?	A.	Hard to say. Seems like an appropriate start for this topic.
	B.	Hard to say. Seems like an appropriate start for this topic.
	C.	Hard to say. Seems like an appropriate start for this topic.
Does the element reduce the need for remediation?	A.	Cannot say.
	B.	Cannot say.
	C.	Cannot say.
Does the element meet the definition of a standard?	A.	Yes,
	B.	Yes.
	C.	Yes.

Ohio Standards Committee Review Form

Standards Committee (Science)	Karen Irving
Committee Member Name	
Earth Science	Topic: Sun, Energy and Weather <ul style="list-style-type: none"> • The sun is the principal source of energy. • The physical properties of water change.
Life Science	Topic: Basic Needs of Living Things <ul style="list-style-type: none"> • Living things have basic needs, which are met by obtaining materials from the physical environment. • Living things survive only in environments that meet their needs.
Physical Science	Topic: Motion and Materials <ul style="list-style-type: none"> • Properties of objects and material can change. • Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.
Grade 1	Strand Connections: Energy is observed through movement, heating, cooling and the needs of living organisms.

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
<p>Is the element clear and concise?</p>	<p>A. ESS</p>	<p>Topic: Sun, Energy and Weather</p> <ul style="list-style-type: none"> The sun is the principal source of energy. The physical properties of water change. <p>Neither of these statements meets the standard of clear and concise.</p> <p>The first one should say:</p> <ul style="list-style-type: none"> The sun is the principal source of energy on earth. <p>The second statements might say:</p> <ul style="list-style-type: none"> All substances can be identified by their properties, characteristics that are used to identify them. Water can exist in different states, solid, liquid and gas. The composition of water remains the same in each state. Water has physical properties such as color, melting point, boiling point, odor, and taste.
	<p>B. Life</p>	<p>Topic: Basic Needs of Living Things</p> <ul style="list-style-type: none"> Living things have basic needs, which are met by obtaining materials from the physical environment. Living things survive only in environments that meet their needs. <p>These statements do not meet this standard. The statements seem to imply that the environment actively works to meet the needs of the living things.</p> <ul style="list-style-type: none"> Living things have basic needs. Living things meet their basic needs through interaction with their environment. Living things survive in environments when the environment has everything they need to live.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C. PS	<p>Topic: Motion and Materials</p> <ul style="list-style-type: none"> Properties of objects and materials can change. Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth. <p>See minor editing suggestions – material should read materials.</p> <p>Include citations for all misconceptions included See page 55.</p>
Is the element grade level appropriate?	A.	<ol style="list-style-type: none"> p. 37 The Interpreting and communicating science concepts seems to imply that first graders are reading thermometers. Perhaps digital thermometers are intended here? Wonder about the age appropriateness of this activity. p. 40 Demonstrating science knowledge; What would happen when liquid water gets into rocks or if water boils and then freezes? This statement is unclear. The expression ‘gets into’ is problematic. Pairing a question about water freezing in rocks with water boiling and freezing is confusing. This needs clarification for teachers to better understand.
	B.	Yes,
	C.	I like the inclusion of force and motion in the first-grade standards. I think the standards introduce these ideas in a grade appropriate way.
Does the element promote higher student performance, learning and improved student achievement?	A.	The visions into practice examples include a variety of strategies that encourage students to engage with the content. Research shows that high levels of classroom engagement lead to improved student achievement.
	B.	A rich array of classroom strategies is presented in the standards document.
	C.	The
Does the element support subject matter comprehension?	A.	
	B.	
	C.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	Yes, the role of the sun and water are important elements in our lives.
	B.	Yes.
	C.	
Does the element promote lifelong learning?	A.	Hope so.
	B.	Hope so.
	C.	Hope so.
Does the element promote the liberal arts tradition?	A.	yes
	B.	Yes – rich array of lessons with connections to other fields is provided. 55
	C.	
Does the element promote college and career readiness?	A.	Hope so
	B.	Hope so
	C.	Hope so
Does the element reduce the need for remediation?	A.	Don't know
	B.	Don't know
	C.	Don't know
Does the element meet the definition of a standard?	A.	yes
	B.	yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 2
Committee Member Name	Karen Irving
Earth Science	<p>Topic: The Atmosphere</p> <ul style="list-style-type: none"> • The atmosphere is made up of air. • Water is present in the air. • Long-term and short-term weather changes occur due to changes in energy.
Life Science	<p>Topic: Interactions within Habitats</p> <ul style="list-style-type: none"> • Living things cause changes on Earth. • Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
Physical Science	<p>Topic: Changes in Motion</p> <ul style="list-style-type: none"> • Forces change the motion of an object.
Grade 2	Strand Connections: Living and nonliving things may move. A moving object has energy. Air moving is wind and wind can make a windmill turn. Changes in energy and movement can cause change to organisms and the environments in which they live.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	<p>Topic: The Atmosphere</p> <ul style="list-style-type: none"> The atmosphere is made up of air. Water is present in the air. Long-term and short-term weather changes occur due to changes in energy. <p>NO</p> <p>I do not think these statements meet the review criteria. My issue is with the phrasing of the statements and the vocabulary chosen to express the ideas.</p> <p>The phrase used in the content elaboration is stronger: Weather is the result of energy changes. Short-term and long-term weather changes occur on earth. Water is found on earth as solid, liquid, and gas.</p>
	B.	<p>Topic: Interactions within Habitats</p> <ul style="list-style-type: none"> Living things cause changes on Earth. Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today. <p>NO.</p> <p>I do not think the phrasing of these statements is strong. The second statement is particularly weak. Use of the word disappeared implies magic.</p> <p>Living things function and interact with their physical environment. Some plants and animals that once lived on Earth are extinct.</p>
	C.	Forces change the motion of an object. Yes, this statement is clear and concise.
Is the element grade level appropriate ?	A.	No. The concepts are okay. But the wording needs to be changed.
	B.	No. The concepts are okay. But the wording needs to be changed.
	C.	yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	No. The concepts are okay. But the wording needs to be changed.
	B.	No. The concepts are okay. But the wording needs to be changed.
	C.	yes
Does the element support subject matter comprehension ?	A.	No. The concepts are okay. But the wording needs to be changed.
	B.	No. The concepts are okay. But the wording needs to be changed.

Review Criteria	Review Level	Notes
	C.	yes
Does the element promote essential knowledge in the subject?	A.	No. The concepts are okay. But the wording needs to be changed.
	B.	No. The concepts are okay. But the wording needs to be changed.
	C.	yes
Does the element promote lifelong learning?	A.	Not as worded.
	B.	Not as worded.
	C.	Impossible to tell
Does the element promote the liberal arts tradition?	A.	maybe
	B.	maybe
	C.	maybe
Does the element promote college and career readiness?	A.	Not as worded.
	B.	Not as worded.
	C.	Impossible to tell
Does the element reduce the need for remediation?	A.	Impossible to tell
	B.	Impossible to tell
	C.	Impossible to tell
Does the element meet the definition of a standard?	A.	Not as is. Wording changes are needed.
	B.	Not as is. Wording changes are needed.
	C.	yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 3
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Earth's Resources</p> <ul style="list-style-type: none"> • Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.
Life Science	<p>Topic: Behavior, Growth and Changes</p> <ul style="list-style-type: none"> • Offspring resemble their parents and each other. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.
Physical Science	<p>Topic: Matter and Forms of Energy</p> <ul style="list-style-type: none"> • All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties. • Heat, electrical energy, light, sound and magnetic energy are forms of energy.
Grade 3	<p>Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth's resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	<p>No, the element is not clear and concise.</p> <p>Earth Science – The second statement is not well phrased. The Earth’s resources can be used for energy. This seems to imply that energy is a substance. The statement that substances contain energy also seems to imply energy is a form of matter.</p> <p>Seems like the foundation for students to understand energy is missing. Students need to understand that energy can be transferred in a variety of ways and between different objects. Light, sound, and heat are all forms of energy.</p>
	B.	<p>Topic: Behavior, Growth and Changes These elements are ok.</p>
	C.	<p>No, this element is not clear and concise.</p> <p>Topic: Matter and Forms of Energy Substance has a specific meaning in chemistry. An element or compound is called a substance. I am not sure why the first statement in this element includes objects and substances.</p> <ul style="list-style-type: none"> Matter exists in different states, each of which has different properties. <p>Does the word each refer to the states or to matter? The last statement is okay.</p>
Is the element grade level appropriate ?	A.	yes
	B.	yes
	C.	yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	No, not as stated.
	B.	Yes
	C.	No, not as stated.

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A.	No, not as stated.
	B.	yes
	C.	No, not as stated.
Does the element promote essential knowledge in the subject ?	A.	No, not as stated.
	B.	yes
	C.	No, not as stated.
Does the element promote lifelong learning ?	A.	No, not as stated.
	B.	No way to know
	C.	No, not as stated.
Does the element promote the liberal arts tradition ?	A.	yes
	B.	yes
	C.	yes
Does the element promote college and career readiness ?	A.	Don't know
	B.	Don't know
	C.	Don't know
Does the element reduce the need for remediation ?	A.	No way to know
	B.	No way to know
	C.	No way to know
Does the element meet the definition of a standard ?	A.	No, not as stated.
	B.	Yes
	C.	No, not as stated.

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 4
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Earth's Surface</p> <ul style="list-style-type: none"> • Earth's surface has specific characteristics and landforms that can be identified. • The surface of Earth changes due to weathering. • The surface of Earth changes due to erosion and deposition.
Life Science	<p>Topic: Earth's Living History</p> <ul style="list-style-type: none"> • Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful. • Fossils can be compared to one another and to present day organisms according to their similarities and differences.
Physical Science	<p>Topic: Electricity, Heat and Matter</p> <ul style="list-style-type: none"> • The total amount of matter is conserved when it undergoes a change. • Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 4	<p>Strand Connections: Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy. Heating and cooling affect the weathering of Earth's surface and Earth's past environments. The processes that shape Earth's surface and the fossil evidence found can help decode Earth's history.</p>

Review level **Yes** it meets the review criteria
Partially meets the review criteria or **undetermined No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Yes
	B.	yes
	C.	<p>No, this statement is not clear and concise.</p> <p>This statement may be misleading. The changes suggested here are physical changes – solution formation, change in shape, or change in state.</p> <p>My issue is that conservation of matter applies to chemical and physical changes, but not to nuclear changes.</p> <p>Taken out of context of the content elaboration, this statement will receive criticism.</p> <p>The statement might be reworded to read:</p> <p>When objects break into smaller pieces, dissolve, or change state, the total amount of matter is conserved.</p>
Is the element grade level appropriate ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element promote higher student performance, learning and improved student achievement ?	A.	Cannot say
	B.	Cannot say
	C.	No, not as stated.
Does the element support subject matter comprehension ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element promote essential knowledge in the subject ?	A.	yes
	B.	yes
	C.	No, not as stated.

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element promote the liberal arts tradition ?	A.	yes
	B.	yes
	C.	yes
Does the element promote college and career readiness ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element reduce the need for remediation ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element meet the definition of a standard ?	A.	yes
	B.	yes
	C.	No, not as stated.

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 5
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Cycles and Patterns in the Solar System</p> <ul style="list-style-type: none"> The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. The sun is one of many stars that exist in the universe. Most of the cycles and patterns of motion between the Earth and sun are predictable.
Life Science	<p>Topic: Interactions within Ecosystems</p> <ul style="list-style-type: none"> Organisms perform a variety of roles in an ecosystem. All of the processes that take place within organisms require energy.
Physical Science	<p>Topic: Light, Sound and Motion</p> <ul style="list-style-type: none"> The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. Light and sound are forms of energy that behave in predictable ways.
Grade 5	Strand Connections: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass*. The transfer of energy drives changes in systems, including ecosystems and physical systems.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	This statement is partially acceptable. I would separate each statement into a distinct bullet. Don't know why the first element includes two statements. Otherwise, this is fine.
	B.	yes
	C.	No, This statement is not clear and concise as written. If the teacher is not going to use the word mass in teaching this element, then mass should not be included as part of the element. The words amount of matter can be substituted for mass in the statement. The amount of change in movement of an object is based on the amount of matter in the object and the amount of force exerted.
Is the element grade level appropriate ?	A.	Partially, see above.
	B.	yes
	C.	No, not as written.
Does the element promote higher student performance, learning and improved student achievement ?	A.	Not as stated. With rewording
	B.	yes
	C.	No, not as written.
Does the element support subject matter comprehension ?	A.	Not as stated. With rewording
	B.	yes
	C.	No, not as written.
Does the element promote essential knowledge in the subject ?	A.	Not as stated. With rewording
	B.	yes
	C.	No, not as written.
Does the element promote lifelong learning ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element promote the liberal arts tradition ?	A.	yes
	B.	yes

Review Criteria	Review Level	Notes
	C.	yes
Does the element promote college and career readiness ?	A.	Not as stated. With rewording
	B.	yes
	C.	No, not as written.
Does the element reduce the need for remediation ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element meet the definition of a standard ?	A.	Not as stated. With rewording
	B.	yes
	C.	No, not as written.

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 6
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Rocks, Minerals and Soil</p> <ul style="list-style-type: none"> • Minerals have specific, quantifiable properties. • Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification. • Igneous, metamorphic and sedimentary rocks form in different ways. • Soil is unconsolidated material that contains nutrient matter and weathered rock. • Rocks, minerals and soils have common and practical uses.
Life Science	<p>Topic: Cellular to Multicellular</p> <ul style="list-style-type: none"> • Cells are the fundamental unit of life. • All cells come from pre-existing cells. • Cells carry on specific functions that sustain life. • Living system at all levels of organization demonstrate the complementary nature of structure and function.
Physical Science	<p>Topic: Matter and Motion</p> <ul style="list-style-type: none"> • All matter is made up of small particles called atoms. • Changes of state are explained by a model of matter composed of atom and/or molecules that are in motion. • There are two categories of energy: kinetic and potential. • An object's motion can be described by its speed and the direction in which it is moving.
Grade 6	Strand Connections: All matter is made of small particles called atoms. The properties of matter are based on the order and organization of atoms and molecules. Cells, minerals, rocks and soil are all examples of matter.

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	yes
	B.	yes
	C.	No, this element is not clear and concise. Topic: Matter and Motion <ul style="list-style-type: none"> ☐ All matter is made up of small particles called atoms. ☐ Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion. ☐ There are two categories of energy: kinetic and potential. ☐ Energy can be described as kinetic or potential. <ul style="list-style-type: none"> • An object's motion can be described by its speed and the direction in which it is moving. NOTE: I think that some might argue for many more than two categories of energy. For example, they might mention nuclear energy, solar energy, heat energy, light energy, chemical energy.
Is the element grade level appropriate ?	A.	yes
	B.	yes
	C.	No, not as written.
Does the element promote higher student performance, learning and improved student achievement ?	A.	yes
	B.	yes
	C.	No, not as written.
Does the element support subject matter comprehension ?	A.	Yes
	B.	yes
	C.	No, not as written.

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	yes
	B.	yes
	C.	No, not as written.
Does the element promote lifelong learning?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element promote the liberal arts tradition?	A.	yes
	B.	yes
	C.	yes
Does the element promote college and career readiness?	A.	yes
	B.	yes
	C.	No, not as written.
Does the element reduce the need for remediation?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element meet the definition of a standard?	A.	yes
	B.	yes
	C.	No, not as written.

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 7
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Cycle and Patterns of Earth and the Moon</p> <ul style="list-style-type: none"> • The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere and atmosphere. • Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns. • The atmosphere has different properties at different elevations and contains a mixture of gasses that cycle through the lithosphere, biosphere, hydrosphere and atmosphere. • The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.
Life Science	<p>Topic: Cycles of Matter and Flow of Energy</p> <ul style="list-style-type: none"> • Matter is transferred continuously between one organism to another and between organisms and their physical environments. • In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.
Physical Science	<p>Topic: Conservation of Mass and Energy</p> <ul style="list-style-type: none"> • The properties of matter are determined by the arrangements of atoms. • Energy can be transformed or transferred but is never lost. • Energy can be transferred through a variety of ways.
Grade 7	Strand Connections: Systems can exchange energy and/or matter when interactions occur within systems and between systems. Systems cycle matter and energy in observable and predictable patterns.

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	yes
	B.	<p>Not acceptable.</p> <p>Topic: Cycles of Matter and Flow of Energy</p> <ul style="list-style-type: none"> Matter is transferred continuously between one organism to another and between organisms and their physical environments. In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors. <p>This is a better statement – taken from the AAAS Benchmarks.</p> <p>The Living Environment: Flow of Matter and Energy</p> <p>Grades 6-8, page 120</p> <p>Over a long time, matter is transferred from one organism to another repeatedly and between organisms and their physical environment. As in all material systems, the total amount of matter remains constant, even though its form and location change. *</p>
	C.	yes
Is the element grade level appropriate ?	A.	yes
	B.	No, not as worded.
	C.	yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	yes
	B.	No, not as worded.
	C.	yes
Does the element support subject matter comprehension ?	A.	yes
	B.	No, not as worded.
	C.	yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	yes
	B.	No, not as worded.
	C.	yes
Does the element promote lifelong learning?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element promote the liberal arts tradition?	A.	yes
	B.	yes
	C.	yes
Does the element promote college and career readiness?	A.	yes
	B.	No, not as worded.
	C.	yes
Does the element reduce the need for remediation?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element meet the definition of a standard?	A.	yes
	B.	No, not as worded.
	C.	yes

- http://www.project2061.org/publications/rsi/online/COMPARE/NRC/BSL2NRC/CH5/B_NRC299.HTM

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status: https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	Karen Irving
Biology Topics	<p>Heredity</p> <ul style="list-style-type: none"> • Cellular genetics • Structure and function of DNA in cells • Genetic mechanisms and inheritance • Mutations • Modern genetics <p>Evolution</p> <ul style="list-style-type: none"> • Mechanisms <ul style="list-style-type: none"> ▪ Natural selection ▪ Mutation ▪ Genetic drift ▪ Gene flow (immigration, emigration) ▪ Sexual selection ▪ History of Life on Earth • Diversity of Life <ul style="list-style-type: none"> ▪ Speciation and biological classification based on molecular evidence <p>Diversity and Interdependence of Life</p> <ul style="list-style-type: none"> • Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms. • Ecosystems <ul style="list-style-type: none"> ▪ Homeostasis ▪ Carrying capacity ▪ Equilibrium and disequilibrium <p>Cells</p> <ul style="list-style-type: none"> • Cell structure and function <ul style="list-style-type: none"> ▪ Structure, function and interrelatedness of cell organelle ▪ Eukaryotic cells and prokaryotic cells • Cellular processes <ul style="list-style-type: none"> ▪ Characteristics of life regulated by cellular processes

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	The element is not concise.
	B.	The element is not concise.
	C.	The element is not concise.
Is the element grade level appropriate ?	A.	Yes, the element is grade level appropriate.
	B.	Yes, the element is grade level appropriate.
	C.	Yes, the element is grade level appropriate.
Does the element promote higher student performance, learning and improved student achievement ?	A.	Higher and improved compared to which standard? Not sure how to respond to this question. The content of the standard seems mostly appropriate for high school.
	B.	
	C.	
Does the element support subject matter comprehension ?	A.	Yes
	B.	
	C.	
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	
	C.	
Does the element promote lifelong learning ?	A.	Impossible to say.
	B.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	
Does the element promote the liberal arts tradition ?	A.	Science is an important element in the liberal arts tradition
	B.	
	C.	
Does the element promote college and career readiness ?	A.	Science is an important topic for college and career readiness. Life science is an important course for students in Ohio as preparation for careers in health care fields and engineering.
	B.	
	C.	
Does the element reduce the need for remediation ?	A.	Impossible to say.
	B.	
	C.	
Does the element meet the definition of a standard ?	A.	No, this element does not meet the definition of a standard. This element is presented in narrative form as a summary of main topics or ideas that a teacher should introduce during the course. Levels of attainment are not indicated. Only topics are indicated.
	B.	
	C.	

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 8
Committee Member Name	Karen Irving
Earth Science	<p>Topic: Physical Earth</p> <ul style="list-style-type: none"> • The composition and properties of Earth’s interior are identified by the behavior of seismic waves. • Earth’s crust consists of major and minor tectonic plates that move relative to each other. • A combination of constructive and destructive geologic processes formed Earth’s surface. • Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.
Life Science	<p>Topic: Species and Reproduction</p> <ul style="list-style-type: none"> • Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species. • Reproduction is necessary for the continuation of every species. • The characteristics of an organism are a result of inherited traits received from parent(s).
Physical Science	<p>Topic: Forces and Motion</p> <ul style="list-style-type: none"> • Forces between objects act when the objects are in direct contact or when they are not touching. • Forces have magnitude and direction. • There are different types of potential energy.
Grade 8	Strand Connections: Systems can be described and understood by analysis of the interaction of their components. Energy, forces and motion combine to change the physical features of the Earth. The changes of the physical Earth and the species that have lived on Earth are found in the rock record. For species to continue, reproduction must be successful.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	yes
	B.	yes
	C.	<p>No, the element is not clear and concise as worded.</p> <ul style="list-style-type: none"> Forces between objects act when the objects are in direct contract or when they are not touching. Forces have magnitude and direction. There are different types of potential energy. <p>The first statement is confusing. Suggested rewording:</p> <ul style="list-style-type: none"> Some forces between objects act when the objects are in direct contact. Some forces between objects act when objects are not touching each other. Forces have magnitude and direction. Some types of potential energy include magnetic, electrical, or gravitational.
Is the element grade level appropriate ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element promote higher student performance, learning and improved student achievement ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element support subject matter comprehension ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element promote essential knowledge in the subject ?	A.	yes
	B.	yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	No, not as stated.
Does the element promote lifelong learning ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element promote the liberal arts tradition ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element promote college and career readiness ?	A.	yes
	B.	yes
	C.	No, not as stated.
Does the element reduce the need for remediation ?	A.	Cannot say
	B.	Cannot say
	C.	Cannot say
Does the element meet the definition of a standard ?	A.	yes
	B.	yes
	C.	No, not as stated.

Ohio Standards Committee Review Form

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Definitions

Clear – Easily understood; free from doubt or confusion¹

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Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning –the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

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³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

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⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

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¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	Karen Irving
Topics	<p>A. Structure and Properties of Matter</p> <ul style="list-style-type: none"> • Atomic structure • Periodic Table • Intermolecular chemical bonding • Representing compounds • Quantifying matter • Phases of matter • Intermolecular chemical bonding <p>B. Interactions of Matter</p> <ul style="list-style-type: none"> • Chemical reactions • Gas laws • Stoichiometry • Nuclear Reactions
High School Course	Chemistry

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	The element is not concise.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Is the element grade level appropriate ?	A.	Mostly. See text for comments.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element promote higher student performance, learning and improved student achievement ?	A.	Impossible to know. Student achievement involves much more than a listing of topics. The element provides a guide for content to include in a high school chemistry course.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
	Does the element support subject matter comprehension?	A.
B.		
C.		
D.		
E.		
F.		
G.		
H.		
I.		
Does the element promote essential knowledge in the subject?	A.	Mostly. See text for additional comments.
	B.	
	C.	
	D.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element promote lifelong learning ?	A.	Impossible to tell.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element promote the liberal arts tradition ?	A.	The element promotes the study of science, one part of the liberal arts tradition.
	B.	
	C.	
	D.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element promote college and career readiness?	A.	Science is an important topic for college and career readiness. Chemistry is a key subject for study in medicine and engineering. See text for comments about specific parts of the element.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	
Does the element reduce the need for remediation?	A.	Impossible to tell.
	B.	
	C.	
	D.	
	E.	
	F.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	G.	
	H.	
	I.	
Does the element meet the definition of a standard?	A.	No, the element does not meet the definition of a standard. The element is a description of content or topics that would help guide a chemistry teacher in preparing a course syllabus. Levels of attainments are not mentioned. The narrative form of the element is different from the bulleted list format of the K-8 standards statements.
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
	I.	

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Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:
https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	Karen Irving
Topics	<p>Earth Systems: Interconnected Spheres of Earth</p> <ul style="list-style-type: none"> • Biosphere • Atmosphere • Lithosphere • Hydrosphere • Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere <p>Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air and air pollution • Water and water pollution • Soil and land • Wildlife and wilderness <p>Global Environmental Problems and Issues</p> <ul style="list-style-type: none"> • Human population • Potable water quality, use and availability • Climate change • Sustainability • Species depletion and extinction • Air quality • Food production and availability • Deforestation and loss of biodiversity • Waste management (solid and hazardous)
High School Course	Environmental Science

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	The element is not concise.
	B.	
	C.	
Is the element grade level appropriate ?	A.	Yes.
	B.	
	C.	
Does the element promote higher student performance, learning and improved student achievement ?	A.	Impossible to tell. Student achievement depends on much more than a set of standards.
	B.	
	C.	
Does the element support subject matter comprehension ?	A.	Yes, mostly.
	B.	
	C.	
Does the element promote essential knowledge in the subject ?	A.	Yes, mostly.
	B.	
	C.	
Does the element promote lifelong learning ?	A.	Impossible to tell.
	B.	
	C.	
Does the element promote the liberal arts tradition ?	A.	The element promotes the study of science, one part of the liberal arts tradition.
	B.	
	C.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote college and career readiness ?	A.	Science is an important element of college and career readiness.
	B.	
	C.	
Does the element reduce the need for remediation ?	A.	Impossible to tell.
	B.	
	C.	
Does the element meet the definition of a standard ?	A.	No, the element does not meet the definition of a standard. The element is a description of content or topics that would help guide an environmental science teacher in preparing a course syllabus. Levels of attainments are not mentioned. The narrative form of the element is different from the bulleted list format of the K-8 standards statements.
	B.	
	C.	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	
Topics	<p>A. Minerals</p> <ul style="list-style-type: none"> • Atoms and elements • Chemical bonding (ionic, covalent, metallic) • Crystallinity (crystal structure) • Criteria of a mineral (crystalline solid, occurs in nature, inorganic, defined chemical composition) • Properties of minerals (hardness, luster, cleavage, streak, crystal shape, fluorescence, flammability, density/specific gravity, malleability) <p>B. Igneous, Metamorphic and Sedimentary Rocks</p> <ul style="list-style-type: none"> • Igneous • Metamorphic • Sedimentary <p>C. Earth's History</p> <ul style="list-style-type: none"> • The geologic rock record • Absolute age • Combining relative and absolute age data • The geologic time scale <p>D. Plate Tectonics</p> <ul style="list-style-type: none"> • Internal Earth • Structure of Earth • Historical review • Plate Motion <p>E. Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air • Water • Soil and sediment <p>F. Glacial Geology</p> <ul style="list-style-type: none"> • Glaciers and glaciation
High School Course	Physical Geology

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise?	A.	No, the element is not concise.
	B.	
	C.	
	D.	
	E.	
	F.	
Is the element grade level appropriate?	A.	Yes.
	B.	
	C.	
	D.	
	E.	
	F.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.	Difficult to say. The question asks about higher performance and improved achievement without providing a reference point.
	B.	
	C.	
	D.	
	E.	
	F.	
Does the element support subject matter comprehension?	A.	Yes.
	B.	
	C.	
	D.	
	E.	
	F.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	
	C.	
	D.	
	E.	
	F.	
Does the element promote lifelong learning?	A.	Difficult to say.
	B.	
	C.	
	D.	
	E.	
	F.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A.	Science is an important part of the liberal arts tradition.
	B.	
	C.	
	D.	
	E.	
	F.	
Does the element promote college and career readiness?	A.	Science is an important element in college and career readiness.
	B.	
	C.	
	D.	
	E.	
	F.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation ?	A.	Difficult to say.
	B.	
	C.	
	D.	
	E.	
	F.	
Does the element meet the definition of a standard ?	A.	No, the element does not meet the definition of a standard. The element is a description of content or topics that would help guide a geology teacher in preparing a course syllabus. Levels of attainments are not mentioned. The narrative form of the element is different from the bulleted list format of the K-8 standards statements.
	B.	
	C.	
	D.	
	E.	

Ohio Standards Committee Review Form

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Definitions

Clear – Easily understood; free from doubt or confusion¹

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Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

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⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

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⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

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Standards Committee Review Form

Standards Committee	Science
Committee Member Name	Karen Irving
Topics	<p>A. Study of Matter</p> <ul style="list-style-type: none"> • Classification of matter • Atoms • Periodic trends of the elements • Bonding and compounds • Reactions of matter. <p>B. Energy and Waves</p> <ul style="list-style-type: none"> • Conservation of energy • Transfer and transformation of energy (including work) • Waves • Thermal energy • Electricity <p>C. Forces and Motion</p> <ul style="list-style-type: none"> • Motion • Forces • Dynamics (how forces affect motion) <p>D. The Universe</p> <ul style="list-style-type: none"> • History of the Universe • Galaxy formation • Stars
High School Course	Physical Science

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	<p>Not concise.</p> <p>This is a text book, not a set of standards.</p> <p>Acids and bases are often included in 9th grade physical science.</p> <p>I am surprised to see the line spectra of the elements included in the ninth grade curriculum.</p> <p>Under Bonding and Compounds: First sentence is confusing. Rephrase to improve clarity.</p> <p>Under reactions of matter: Rephrase this clause: While chemical changes involve changes in the electrons... While chemical change involves changes in bonding patterns involving electrons.... I am not sure that the electrons themselves are changed as a result of the new bonding patterns.</p> <p>The topic of radioactivity is included in the content elaboration. While I agree that this is a very important topic, I think acids and bases are more important for more students.</p> <p>Minimal Visions into Practice ideas provided Minimal Instructional strategies and resources are provided.</p> <p>Many online simulations are available to support the topics presented in this section that could be added to the classroom portals section.</p>
	B.	See text for comments.
	C.	
	D.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A.	Yes
	B.	
	C.	
	D.	
Does the element promote higher student performance, learning and improved student achievement ?	A.	Difficult to judge. The question does not indicate the comparison standard. Higher student performance than what?
	B.	
	C.	
	D.	
Does the element support subject matter comprehension ?	A.	Mostly. See comments regarding specific statements.
	B.	
	C.	
	D.	
Does the element promote essential knowledge in the subject ?	A.	Mostly. See comments regarding specific statements.
	B.	
	C.	
	D.	
Does the element promote lifelong learning ?	A.	Impossible to tell.
	B.	
	C.	
	D.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition ?	A.	Science is an important part of the liberal arts tradition
	B.	
	C.	
	D.	
Does the element promote college and career readiness ?	A.	Science is an important topic for college and career readiness. The physical sciences are important gateway courses for study in engineering and health care.
	B.	
	C.	
	D.	
Does the element reduce the need for remediation ?	A.	Difficult to judge.
	B.	
	C.	
	D.	
Does the element meet the definition of a standard ?	A.	No, this element does not meet the definition of a standard. This element is presented in narrative form as a summary of main topics or ideas that a teacher should introduce during the course. Levels of attainment are not indicated. Only topics are indicated.
	B.	
	C.	
	D.	

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

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Standards Committee Review Form

Standards Committee (Science)	
Committee Member Name	Karen Irving
Topics	<p>A. Motion</p> <ul style="list-style-type: none"> • Graph interpretations • Problem solving • Projectiles <p>B. Forces, Momentum and Motion</p> <ul style="list-style-type: none"> • Newton’s laws applied to complex problems • Gravitational force and fields • Elastic forces • Friction force (static and kinetic) • Air resistance and drag • Forces in two dimensions • Momentum, impulse and conservation of momentum <p>C. Energy</p> <ul style="list-style-type: none"> • Gravitational potential energy • Energy in springs • Nuclear energy • Work and power • Conservation of energy <p>D. Waves</p> <ul style="list-style-type: none"> • Wave properties • Light phenomena <p>E. Electricity and Magnetism</p> <ul style="list-style-type: none"> • Charging objects (friction, contact and induction) • Coulomb’s law • Electric fields and electric potential energy • DC circuits • Magnetic fields and energy • Electromagnetic interactions
High School Course	Physics

Review level **Yes** it meets the review criteria

Standards Committee Review Form

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	No, the element is not concise.
	B.	
	C.	
	D.	
	E.	
Is the element grade level appropriate ?	A.	Yes.
	B.	
	C.	
	D.	
	E.	
Does the element promote higher student performance, learning and improved student achievement ?	A.	Difficult to say. A reference achievement level is needed and even then, the ability of a standard to promote performance is questionable. Certainly a standard can provide a reference for what a student should know and be able to do after completing a course of study.
	B.	
	C.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	D.	
	E.	
Does the element support subject matter comprehension ?	A.	Yes. See text for comments.
	B.	
	C.	
	D.	
	E.	
Does the element promote essential knowledge in the subject ?	A.	Partially. The element should include the electromagnetic spectrum and a deeper treatment of sound.
	B.	
	C.	
	D.	
	E.	
Does the element promote lifelong learning ?	A.	Difficult to say.
	B.	
	C.	
	D.	
	E.	
Does the element promote the liberal arts tradition ?	A.	Yes. Science is a key element in the liberal arts tradition.
	B.	
	C.	

Standards Committee Review Form

Review Criteria	Review Level	Notes
	D.	
	E.	
Does the element promote college and career readiness ?	A.	Physics is a key course in preparation for engineering and higher level STEM study.
	B.	
	C.	
	D.	
	E.	
Does the element reduce the need for remediation ?	A.	Difficult to predict.
	B.	
	C.	
	D.	
	E.	
Does the element meet the definition of a standard ?	A.	No, the element does not meet the definition of a standard. The element is a description of content or topics that would help guide a physics teacher in preparing a course syllabus. Levels of attainments are not mentioned. The narrative form of the element is different from the bulleted list format of the K-8 standards statements.
	B.	
	C.	
	D.	
	E.	

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Standards Committee (Science)	
Committee Member Name	
Earth Science	Topic: Daily and Seasonal Changes <ul style="list-style-type: none"> Weather changes are long-term and short-term. The moon, sun and stars are visible at different times of the day or night.
Life Science	Topic Physical and Behavioral Traits of Living Things <ul style="list-style-type: none"> Living things are different from nonliving things, Living things have physical traits and behaviors which influence their survival
Physical Science	Topic: Properties of Everyday Objects and Materials <ul style="list-style-type: none"> Objects and material can be sorted and described by their properties. Some objects and materials can be made to vibrate to produce sound
Kindergarten	Strand Connections: Living and nonliving things have specific physical properties that can be used to sort and classify. The physical properties of air and water are presented as they apply to weather.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.Weather changes. Yes B. moon yes	Both are clear and concise when relating to the teacher. However, the terms are not concise for kindergarten students
	B.Difference in living things-yes Differences in traits of living things-yes	
	C.Sorting-yes Vibrate-yes	
Is the element grade level appropriate ?	A.WeatherPartially Moon partially	Weather-I'm not sure that kindergarten students can do the type of labs that you are asking. Moon: I question whether kindergartners can again do the labs that are required.
	B.Living things-yes Physical traits -yes	
	C.Sorting-partial Vibrate-partial	Evaluating the design of objects-a little intense for kindergarten Design and make an instrument?- not sure this is grade appropriate

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.N.A.	
	B.N.A.	
	C.N.A.	
Does the element support subject matter comprehension?	A.Yes Yes	
	B. Yes Yes	I am concerned with the technology use for poor districts
	C.Yes Yes	
Does the element promote essential knowledge in the subject?	A. yes yes	I am concerned that the standards application and knowledge are too much for kindergarten
	B. Partial Partial	Both statements do not necessarily include the essential knowledge in the statement so I believe they are somewhat incomplete
	C. Partial Partial	The standards do not necessarily incorporate the essential knowledge but statements. The essential knowledge, I believe, is the responsibility of the individual teacher.
Does the element promote lifelong learning?	A.yes yes	
	B.yes yes	It promotes it, yes, but does not include the fact that all students have different tastes and they should be able to decline lifelong learning in any area that they are not interested in.
	C. yes yes	
Does the element promote the liberal arts tradition?	A.N.A	
	B.N.A.	
	C. N.A.	
Does the element promote college and career readiness?	A.N.A	
	B.N.A.	
	C. N.A.	
Does the element reduce the need for remediation?	A.Weather-no Moon-no	The standard as stated does not reduce the need for remediation
	B.N.A	
	C. N.A	
Does the element meet the definition of a standard?	AWeather-no Moon-no	To me these are statements and not standards
	B.no no	To me there really are no standards but statements of facts.
	C. No No	

Standards Committee (Science)	
Committee Member Name	
Earth Science	Topic: Sun, Energy and Weather <ul style="list-style-type: none"> The sun is the principal source of energy. The physical properties of water change.
Life Science	Topic: Basic Needs of Living Things <ul style="list-style-type: none"> Living things have basic needs, which are met by obtaining materials from the physical environment. Living things survive only in environments that meet their needs.
Physical Science	Topic: Motion and Materials <ul style="list-style-type: none"> Properties of objects and material can change. Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.
Grade 1	Strand Connections: Energy is observed through movement, heating, cooling and the needs of living organisms.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.The sun the principle source of energy; YES Properties of water can change: YES	This is a broad statement that opens the educational door for so much learning. Physical properties statement about water: might be difficult to explain to 1st graders as well as graphing at this age.

Review Criteria	Review Level	Notes
	<p>B. Living things have basic needs. YES. Surviving in specific environment statement. PARTIAL</p>	<p>As I read the statements no one can disagree that they are not good statements. My concern is the expectations that the vision into classroom : classroom examples are at times to advanced for this grade level. Ex. Explain, draw, journal and photograph what happens to local living and non-living environments over the course of the year. 1st grade?</p>
	<p>C. Materials can change: YES Objects can be moved in a variety of ways. PARTIAL</p>	<p>Good teaching opportunities</p> <p>This statement, I feel, is to vague relating it to the vision in the classroom activities. Design, construct and test a device that causes a ping pong ball to move in a zig-zag pattern? Again is this realistic in 1st grade?</p>
<p>Is the element grade level appropriate?</p>	<p>A.The sun statement:YES Properties of water can change: YES</p>	<p>Again, the statements are grade level appropriate but my concern is the visions into practice activities not being grade level appropriate.</p>
	<p>B.Living things have basic needs: YES Living things survival in environments that meet their needs.YES</p>	<p>Statements are grade appropriate but again my concern is vision into practice and career connections not being grade appropriate.</p>
	<p>C.Properties of objects can change. YES Objects can be moved in a variety of ways: YES</p>	<p>Like the building of a boat idea</p>

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.Partial Partial	Some good ideas with inquiry based learning. Again I am concerned with the tests being given to test their knowledge that they are grade appropriate so to answer the question at hand is really not possible without seeing the evaluation tool.
	B.Partial Partial	Same as above
	C.Partial Partial	Same as above
Does the element support subject matter comprehension?	A.Partial Partial	Again, I am at the mercy of the teacher teaching these concepts because the statement does not really include absolutes in the standard.
	B. Partial Partial	Same as above
	C.Partial Partial	Same as above
Does the element promote essential knowledge in the subject?	A.Partial Partial	Based on the definition of promoting essential knowledge in the subject in our handouts the statements only partially promote essential knowledge. Higher education, career and adult life?
	B.Partial Partial	Same as above
	C.Partial Partial	Same as above.
Does the element promote lifelong learning?	A.Partial Partial	The statements do promote lifelong learning if students are interested in that topic. We cannot predict or control what a student wants to learn life-long we can only teach in such a way that it is intriguing to them
	B.Partial Partial	Same as above
	C.Partial Partial	Same as above.
Does the element promote the liberal arts tradition?	A.Partial Partial	The science standards are science standards, and are a part of a liberal arts education, one component of it.
	B.Partial Partial	Same as above

Review Criteria	Review Level	Notes
	C.Partial Partial	Same as above
Does the element promote college and career readiness ?	A.NA NA	My opinion is that it's too early to tell. However, any learning will help prepare students for college(academic learning)
	B. NA NA	Same as above
	C. NA NA	Same as above
Does the element reduce the need for remediation ?	A.NA NA	Remediation is both a collective class room possibility or an individual possibility so to me to evaluate these statements as to help reduce the need for remediation? No
	B.NA NA	Same as above
	C.NA NA	Same as above
Does the element meet the definition of a standard ?	A.No No	I believe that these are statements and not a standard.
	B.No No	Same as above
	C.No No	Same as above

Standards Committee (Science)	
Committee Member Name	
Earth Science	Topic: The Atmosphere <ul style="list-style-type: none"> The atmosphere is made up of air. Water is present in the air. Long-term and short-term weather changes occur due to changes in energy.
Life Science	Topic: Interactions within Habitats <ul style="list-style-type: none"> Living things cause changes on Earth. Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
Physical Science	Topic: Changes in Motion <ul style="list-style-type: none"> Forces change the motion of an object.
Grade 2	Strand Connections: Living and nonliving things may move. A moving object has energy. Air moving is wind and wind can make a windmill turn. Changes in energy and movement can cause change to organisms and the environments in which they live.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.1.Atmosphere made of air-yes 2.Water is in the air-yes 3.Weather changes occur due to energy changes-partial	<ol style="list-style-type: none"> Like to see air taught as a mixture Good Good

Review Criteria	Review Level	Notes
	B.1.Living things cause changes on earth-yes 2.Some living things have disappeared from earth-yes	The activities that support these statements seem good. I do see an agenda developing about environmental issues
	C.1.Forces change the motion of an object-yes	This seems rather inconsistent, however with the theme established in Earth and Space and Life Science
Is the element grade level appropriate?	A.1.Atmosphere is made of air-yes 2. Water is present in the air-yes 3.Weather changes occur due to energy changes.-yes	1,2,3 all 3 are grade level appropriate
	B.1-yes 2-yes	
	C.1.Forces change the motion of an object-yes	
Does the element promote higher student performance, learning and improved student achievement?	A.1-partial 2-partial 3-partial	This is difficult to determine without seeing the evaluation tool.
	B.1-partial 2-partial	Same as above
	C.1-partial	Same as above
Does the element support subject matter comprehension?	A.1-partial 2-partial 3.partial	These statements somewhat promote subject matter comprehension.
	B.1-partial 2-partial	Again, depends upon the instructor as to comprehension.
	C.1-partial	

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.1-yes 2-yes 3-yes	Air leading to weather seems relevant.
	B.1-yes 2-yes	
	C.1-yes	
Does the element promote lifelong learning?	A.1-yes 2-yes 3-yes	
	B.1-yes 2-yes	
	C.1-yes	
Does the element promote the liberal arts tradition?	A.1-partial 2-partial 3-partial	Science is 1 component of liberal arts education
	B.1-partial 2-partial	Same as above
	C.1-partial	Same as above
Does the element promote college and career readiness?	A.1-NA 2-NA 3-NA	
	B.1-NA 2-NA	
	C.1-NA	
Does the element reduce the need for remediation?	A.1-NA 2-NA 3-NA	
	B.1-NA 2-NA	
	C.1-NA	
Does the element meet the definition of a standard?	A.1-no 2-no 3-no	By the rubric definition the element does not meet the definition
	B.1-no 2-no	Same as above
	C.1-no	Same as above

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Earth's Resources</p> <ul style="list-style-type: none"> • Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.
Life Science	<p>Topic: Behavior, Growth and Changes</p> <ul style="list-style-type: none"> • Offspring resemble their parents and each other. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.
Physical Science	<p>Topic: Matter and Forms of Energy</p> <ul style="list-style-type: none"> • All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties. • Heat, electrical energy, light, sound and magnetic energy are forms of energy.
Grade 3	<p>Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth's resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	<p>A.1.Earths nonliving resources have specific properties; Yes</p> <p>2.Earths resources can be used for energy. Yes</p> <p>3.Some of earth's resources are limited.</p>	<p>1.I feel as if some of the activities suggested are to complex for 3rd grade. Much depends upon if the teacher does some of the work as demonstrations or expects the students to prepare the work.</p> <p>3. I'm concerned about the environmental agenda I see developing as in Biology. The agenda of the standards seem to minimize a more well-rounded content in all areas of science.</p>
	<p>B.1.Offspring resemble their parents and each other. Yes.</p> <p>2.Individuals of the same kind differ to their traits and sometimes the differences give individuals an advantage. Yes</p> <p>3.Plants and animals have life cycles that are part of their adaptations for survival. yes</p>	

Review Criteria	Review Level	Notes
	C.1.All objects and substances in the natural world are composed of matter. Yes. 2.Matter exists in different states, each of which has different properties. Yes 3.Heat,electrical energy light,sound,and magnetic energy are forms of energy. partial	3.The element is ok but as I read the interpreting and communicating science concepts the statement Explain how warm water can cause motion or create change is pretty vague for a 3rd grader.
Is the element grade level appropriate?	A.1.yes 2.yes 3.yes	1. Same as above in A1 3.Same as above in A1
	B.1.yes 2.yes 3.yes	Same as above in A1
	C.1.yes 2.yes 3.yes	Same as above in A1
Does the element promote higher student performance, learning and improved student achievement?	A.1.partial 2.partial 3.partial	This review criteria seems to be misplaced in my mind. All content, to me, will promote this in some manner but not realized until later in the educational process. Also, without seeing the evaluation tool this statement cannot be completed.
	B.1.partial 2.partial 3.partial	Same as above
	C.1.partial 2.partial 3.partial	Same as above

Review Criteria	Review Level	Notes
Does the element support subject matter comprehension ?	A.1.yes 2.yes 3.yes	More importantly, the element, to be taught requires subject matter comprehension, so rather than say that it supports comprehension it promotes it and is necessary to teach the element.
	B.1.yes 2.yes 3.yes	Same as above
	C.1.yes 2.yes 3.yes	Same as above
Does the element promote essential knowledge in the subject ?	A.1.yes 2.yes 3.yes	1. The broad definition of essential knowledge stated could be answered as yes for any educational theme. The essential knowledge, to me, is not really spelled out in the standards. 3. Same as above
	B.1.yes 2.yes 3.yes	Same as above
	C.1.yes 2.yes 3.yes	Same as above
Does the element promote lifelong learning ?	A.1.partial 2.partial 3.partial	1. Most all content in science, in my mind can promote lifelong learning. Much depends upon the students interests.
	B.1.partial 2.partial 3.partial	Same as above
	C.1.partial 2.partial 3.partial	
Does the element promote the liberal arts tradition ?	A.1.partial 2.Partial 3.partial	1. I do not quite understand on how to review the content statement based on the definition of a liberal arts tradition so that is why I responded with partial. All k-12 education is liberal arts because the student is learning many different areas of content.
	B.1.partial 2.partial 3.partial	Same as above
	C.1.partial 2.partial 3.partial	Same as above

Review Criteria	Review Level	Notes
Does the element promote college and career readiness?	A.1.partial 2.partial 3.partial	The process of 12-13 yrs of education collectively should promote college and career readiness so any single part of that process would be partial in this promotion.
	B.1.partial 2.partial 3.partial	Same as above
	C.1.partial 2.partial 3.partial	Same as above
Does the element reduce the need for remediation?	A.1.N.A. 2.N.A. 3.N.A.	
	B.1.N.A. 2.N.A. 3.N.A.	
	C.1.N.A. 2.N.A. 3.N.A.	
Does the element meet the definition of a standard?	A.1.No 2.No 3.No	1. Again, the definition of a standard as given states the attainment regarded as a goal or measure of adequacy and skills expected to know so the element by state definition is not a standard.
	B.1.No 2.No 3.No	Same as above.
	C.1.No 2.No 3.No	Same as above

Standards Committee (Science)	
Committee Member Name	
<p>Earth Science</p> <p>Life Science</p> <p>Physical Science</p>	<p>Topic: Earth's Surface</p> <ul style="list-style-type: none"> • Earth's surface has specific characteristics and landforms that can be identified. • The surface of Earth changes due to weathering. • The surface of Earth changes due to erosion and deposition. <p>Topic: Earth's Living History</p> <ul style="list-style-type: none"> • Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful. • Fossils can be compared to one another and to present day organisms according to their similarities and differences. <p>Topic: Electricity, Heat and Matter</p> <ul style="list-style-type: none"> • The total amount of matter is conserved when it undergoes a change. • Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 4	<p>Strand Connections: Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy. Heating and cooling affect the weathering of Earth's surface and Earth's past environments. The processes that shape Earth's surface and the fossil evidence found can help decode Earth's history.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	<p>A.1. Earth's surface has specific characteristics and landforms that can be identified Yes</p> <p>A-2 The surface of the earth changes due to weathering yes</p> <p>A-3 The surface of the earth changes due to erosion and deposition. partial</p>	<p>A-3 This statement seems to be out of place or a repeat of statement A2. There are 3 types of weathering and the above statement should, I believe, refer to the fact that that erosion and deposition are a type of weathering called mechanical weathering. The other 2 types could have been introduced: chemical and biological weathering.</p>

Review Criteria	Review Level	Notes
	<p>B.1-Changes in an organisms environment are sometimes beneficial to its survival and sometimes harmful Yes</p> <p>B-2: Fossils can be compared to one another and to present day organisms according to their similarities and differences. Yes</p>	
	<p>C.1-The total amount of matter is conserved when it undergoes a change. Yes</p> <p>C.2-Energy can be transformed from one form to another or can be transferred from one location to another. partial</p>	<p>C.2-This statement as is clear and concise, but as the statement is expanded to include electricity the connection does not flow.</p>

Review Criteria	Review Level	Notes
Is the element grade level appropriate?	A.1.yes A.2.yes A.3.yes	
	B.1-yes B.2-yes	
	C.1-yes C.2-yes	
Does the element promote higher student performance, learning and improved student achievement?	A.1.partial A.2.partial A.3.partial	A1-Again, difficult to predict the future success without seeing the evaluation tool.
	B.1-partial B.2-partial	Same as A-1
	C.1-partrial C.2-partial	Same as A-1
Does the element support subject matter comprehension?	A.1-yes A.2-yes A.3-yes	
	B.1-yes B.2-yes	
	C.1-yes C.2-yes	
Does the element promote essential knowledge in the subject?	A.1-partial A.2-partial A.3-partial.	A1-The definition in the list include"skills and knowledge that are deemed to be essential in leading to success in school, higher education, careers and adult life." By this definition only partial.
	B.1-partial B.2-partial	Same as above
	C.1-partial C.2-partial	Same as above
Does the element promote lifelong learning?	A.1-partial A.2-partial A.3-partial	A.1 Again, by" definition ongoing, voluntary, self motivated pursuit of knowledge" This can only be reviewed as partial.
	B.1-partial B.2-partial	Same as A-1
	C.1-partial C.2-partial	Same as A-1
Does the element promote the liberal arts tradition?	A.1-partial A.2-partial A.3-partial	
	B.1-partial B.2-partial	

Review Criteria	Review Level	Notes
	C.1-partial C.2-partial	
Does the element promote college and career readiness ?	A.1-N.A. A.2-N.A. A.3-N.A.	
	B.1-N.A. B.2-N.A.	
	C.1-N.A. C.2-N.A.	
Does the element reduce the need for remediation ?	A.1-N.A. A.2-N.A. A.3-N.A.	
	B.1-N.A. B.2-N.A.	
	C.1-N.A. C.2-N.A.	
Does the element meet the definition of a standard ?	A.1-no A.2-no A.3-no	
	B.1-no B.2-no	
	C.1-no C.2-no	

Standards Committee (Science)	
Committee Member Name	
Earth Science	<p>Topic: Cycles and Patterns in the Solar System</p> <ul style="list-style-type: none"> • The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. • The sun is one of many stars that exist in the universe. • Most of the cycles and patterns of motion between the Earth and sun are predictable.
Life Science	<p>Topic: Interactions within Ecosystems</p> <ul style="list-style-type: none"> • Organisms perform a variety of roles in an ecosystem. • All of the processes that take place within organisms require energy.
Physical Science	<p>Topic: Light, Sound and Motion</p> <ul style="list-style-type: none"> • The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. • Light and sound are forms of energy that behave in predictable ways.
Grade 5	<p>Strand Connections: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass*. The transfer of energy drives changes in systems, including ecosystems and physical systems.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
<p>Is the element clear and concise?</p>	<p>A.1-The solar system includes the sun,and all the celestial bodies that orbit the sun.Each planet has unique characteristics. YES A.2-The sun is one of many stars that exist in the universe. YES A.3-Most of the cycles and patterns of motion between the Earth and sun are predictable. YES</p>	
	<p>B.1-Organisms perform a variety of roles in an ecosystem. Yes B.2-All the processes that take place within organisms require energy. Yes</p>	<p>These statements, to me, are establishing a common theme in the life sciences of environmental issues which I do not necessarily disagree with but if this theme continues throughout the upper levels the students are being denied a full understanding of the Biological Sciences and being fed an environmental agenda that they should have the freedom to disagree with.</p>

Review Criteria	Review Level	Notes
	C.1-The amount of change in movement of an object is based on the mass of the object and the amount of force exerted. Yes C.2-Light and sound are forms of energy that behave in predictable ways. Yes	
Is the element grade level appropriate?	A.1-yes A.2-yes. A.3-yes	
	B.1-yes B.2-yes	
	C.1-yes C.2-partial	C.2- I believe that light and sound taught together is confusing to 5 th graders. There is so much to do in both concepts. Also, the idea of developing a mirror system to represent a periscope seems a bit much for a 5 th grader.
Does the element promote higher student performance, learning and improved student achievement?	A.1-partial A.2-partial A.3-partial	To me this review criteria is to broad to say yes to again without seeing the evaluation tools.
	B.1-partial B.2-partial	Same as above
	C.1-partial C.2-partial	
Does the element support subject matter comprehension?	A.1-yes A.2-yes A.3-yes	
	B.1-yes B.2-yes	
	C.1-yes C.2-yes	

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject ?	A.1-partial A.2-partial A.3-partial	
	B.1-partial B.2-partial	
	C.1-partial C.2-partial	
Does the element promote lifelong learning ?	A.1-partial A.2-partial A.3-partial	
	B.1-partial B.2-partial	
	C.1-partial C.2-partial	
Does the element promote the liberal arts tradition ?	A.1-partial A.2-partial A.3-partial	
	B.1-partial B.2-partial	
	C.1-partial C.2-partial	
Does the element promote college and career readiness ?	A.1-partial A.2-partial A.3-partial	This review criteria is part of a whole. It is difficult to evaluate this criteria at this young age.
	B.1-partial B.2-partial	
	C.1-partial C.2-partial	
Does the element reduce the need for remediation ?	A.1-N.A. A.2-N.A. A.3-N.A.	
	B.1-N.A. B.2-N.A.	
	C.1-N.A. C.2-N.A.	
Does the element meet the definition of a standard ?	A.1-no A.2-no A.3-no	
	B.1-No B.2-No	
	C.1-No C.2-No	

Review level **Yes** it meets the review criteria
Partially meets the review criteria or **undetermined**
No it does not meet the review criteria

Review Criteria	Review Level	Notes
<p>Is the element clear and concise?</p>	<p>A.1-minerals have specific quantifiable properties. Yes A.2-Igneous, metamorphic, and sedimentary rocks have unique characteristics that can be used for identification and/or classification. Yes A.3-Igneous, metamorphic, and sedimentary rocks form in different ways. Yes A.4- Soil is unconsolidated material that contains nutrient matter and weathered rock. No. A.5- Rocks, minerals, and soils have common and practical uses. Yes</p>	<p>These statements basically refer to similar ideas or concepts, especially A1 andA2. The way the rocks form determine their unique characteristics.</p> <p>A.4- Unconsolidated material? Nutrient matter? Not clear and concise for 6th grade</p>

Review Criteria	Review Level	Notes
	<p>B.1- Cells are the fundamental unit of life. Yes</p> <p>B.2-All cells come from preexisting cells. Yes</p> <p>B.3-Cells carry on specific functions that sustain life. Yes</p> <p>B.4-Living systems at all levels of organization demonstrate the complimentary nature of structure and function. Partial</p>	<p>B.4- This statement is too complex in the way it's worded, not in its content. Also, I believe it would be appropriate to introduce taxonomy and how Biologists use structure and function to classify living organisms.</p>
	<p>C.1- All matter is made up of small particles called atoms. Yes.</p> <p>C.2- Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion. Yes.</p> <p>C.3- There are 2 categories of energy: kinetic and potential. Yes.</p> <p>C.4- An objects motion can be described by its speed and the direction in which its moving. Partial</p>	<p>C.2- Visions into practice demonstrating science and designing elements. To me they are difficult to connect with the statement. Other activities would be more reasonable.</p> <p>C.4- This statement is not very clear for 6th graders to comprehend.</p>

Review Criteria	Review Level	Notes
Is the element grade level appropriate?	A.1-yes A.2-yes A.3-yes A.4-yes. A.5-yes	A.1 When looking at the Lake Erie simulation it seems to advanced for 5 th grade. A.2 What is the best rock to neutralize acidic soil. The standards have not taught acids and bases yet. A.3 Make a geologic map of the local community seems above this grade level. A.4- The concept yes, but the way its worded, no
	B.1-yes B.2-yes B.3-yes B.4-partial	
	C.1partial C.2-partial C.3-yes C.4-partial	C.1- Again, some of the visions into practice activities are to advanced. Evaluating the ratio of helium to air in party balloons and devising a claim referencing the behavior of molecules for the most cost efficient and/or highest performance? C.4-This statement referring to velocity and the way it is explained is again only partially grade level appropriate.
Does the element promote higher student performance, learning and improved student achievement?	A.1-partial A.2-partial A.3-partial A.4-partial A.5-partial	
	B.1-partial B.2-partial B.3-partial B.4-partial	
	C.1- partial C.2-partial C.3-partial C.4-partial	
Does the element support subject matter comprehension?	A.1-yes A.2-yes A.3-yes A.4-yes A.5-yes	

Review Criteria	Review Level	Notes
	B.1-yes B.2-yes B.3-yes. B.4-yes	B.2- Again there are more applications of cells than environmental. I don't see how all cells coming from preexisting cells best relates to the cleaning of the environment. Why not begin to discuss tissue cloning using how cells come from pre-existing to help burn patients. B.4- The visions into the classroom activities are too advanced for 6 th grade. Rate of respiration in yeast cells? Maximum release of carbon dioxide? Testing bread for effectiveness of a cell leavening agent?
	C.1- yes C.2-yes C.3-yes C.4-yes	
Does the element promote essential knowledge in the subject?	A.1-yes A.2-yes A.3-yes A.4-yes A.5-yes	
	B.1-yes B.2-yes B.3-yes B.4-yes	
	C.1- yes C.2-yes C.3-yes C.4-yes	
Does the element promote lifelong learning?	A.1-partial A.2-partial A.3-partial A.4-partial A.5-partial	
	B.1-partial B.2-partial B.3-partial B.4-partial	
	C.1- partial C.2-partial C.3-partial C.4-partial	

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A.1-partial A.2-partial A.3-partial A.4-partial A.5-partial	
	B.1-partial B.2-partial B.3-partial B.4-partial	
	C.1-partial C.2-partial C.3-partial c.4-partial	
	Does the element promote college and career readiness?	A.1-partial A.2-partial A.3-partial A.4-partial A.5-partial
B.1-partial B.2-partial B.3-partial B.4partial		
C.1-partial C.2-partial C.3-partial C.4-partial		
Does the element reduce the need for remediation?	A.1-N.A. A.2-N.A. A.3-N.A. A.4-N.A. A.5-N.A.	
	B.1-N.A. B.2-N.A. B.3-N.A. B.4-N.A.	
	C.1-N.A. C.2-N.A. C.3-N.A. C.4-N.A.	

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A.1-no	
	A.2-no	
	A.3-no	
	A.4-no	
	A.5-no	
	B.1-No	
	B.2-No	
	B.3-No	
	B.4-No	
	C.1-No	
	C.2-No	
	C.3-No	
C.4-No		

Review Criteria	Review Level	Notes
Is the element clear and concise ?	<p>A-1 The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, Hydrosphere and atmosphere. Yes</p> <p>A-2 Thermal energy transfers in the ocean and the atmosphere contributes to the formation of currents, which influence global climate patterns. Partially</p> <p>A-3 The atmosphere has different properties at different elevations and contains a mixture of gases that cycle through the lithosphere, biosphere, hydrosphere and atmosphere. Yes</p> <p>A-4 The relative patterns of motion and positions of the earth, moon, and sun cause solar and lunar eclipses, tides and phases of the moon. Yes</p>	<p>A-2 I feel this element jumps around to much. Keep the relationship of thermal energy and the ocean in the ocean in this element. Global climate patterns is important but I feel the element is introducing currents and thermal energy. Global climate patterns should be included in another element.</p>

Review Criteria	Review Level	Notes
	<p>B-1 Matter is transferred continuously between one organism to another and between organisms and their physical environments. Partially</p> <p>B-2 In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors. Partially</p>	<p>B-1 I disagree with at least not reviewing food webs and including them here.</p> <p>B-2 Introducing biomes now to me seems out of place. Earlier grades introduced the cell and sequentially the levels of organization do not immediately jump to biomes. Cells form tissue, tissue forms organs, organs form organ systems, organ systems form organisms, organisms form populations, populations form communities, communities form biomes, all biomes are then part of the biosphere. Seems more logical to follow the biological sequence in the life sciences.</p>
	<p>C-1 The properties of matter are determined by the arrangement of atoms. Partially</p> <p>C-2 Energy can be transformed or transferred but is never lost.</p> <p>C-3 Energy can be transferred through a variety of ways. Partially</p>	<p>C-1 In reviewing the ideas for teaching this element I see no reference to drawing atoms since atomic structure is so abstract using atomic models would help. To me, the understanding of atomic structure is necessary to understand arrangement of atoms.</p> <p>C-3 Clear and concise? This element is too vague and leads to way to much content at this level for the concept of energy. To go from mechanical to waves to heat to electricity and currents? Combine this with Earth and space elements and Life science elements I believe is too much.</p>
<p>Is the element grade level appropriate?</p>	<p>A-1 Yes A-2 Yes A-3 Yes A-4 Yes</p>	<p>As stated previously I believe that there is too much content for this grade. These individual elements are grade appropriate but taking all science elements I believe is not grade level appropriate.</p>

Review Criteria	Review Level	Notes
	B-1 Yes B-2 Yes	
	C-1 Yes C-2 Yes C-3 Yes	
Does the element promote higher student performance, learning and improved student achievement?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes	
	B-1 Yes B-2 Yes	
	C-1 Yes C-2 Yes C-3 Yes	
Does the element support subject matter comprehension?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes	
	B-1 Yes B-2 Yes	
	C-1 Yes C-2 Yes C-3 Yes	
Does the element promote essential knowledge in the subject?	A-1 Partially A-2 Partially A-3 Partially A-4 Partially	Based on the definition of this evaluation piece it is difficult to evaluate.
	B-1 Partially B-2 Partially	
	C-1 Partially C-2 Partially C-3 Partially	
Does the element promote lifelong learning?	A-3 Partially A-2 Partially A-3 Partially A-4 Partially	
	B-1 Partially B-2 Partially	
	C-1 Partially C-2 Partially C-3 Partially	

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A-1 Partially A-2 Partially A-3 Partially A-4 Partially	Again, per definition of this review criteria it is difficult to evaluate for just 1 school year.
	B-1 Partially B-2 Partially	
	C-1 Partially C-2 Partially C-3 Partially	
Does the element promote college and career readiness?	A-1 Partially A-2 Partially A-3 Partially A-4 Partially	Again, per definition of this review criteria it is difficult to evaluate for just 1 school year.
	B-1 Partially B-2 Partially	
	C-1 Partially C-2 Partially C-3 Partially	
Does the element reduce the need for remediation?	A-1 No A-2 No A-3 No A-4 No	I believe that each year content in science is evolving and as that happens it seems to eliminate a lot of core content which is required for college. Ex. High School Biology per new revised standards has little or none on the Biological kingdoms and college Biology is filled with that so the student might need remediation.
	B-1 No B-2 No	
	C-1 No C-2 No C-3 No	
Does the element meet the definition of a standard?	A-1 No A-2 No A-3 No A-4 No	These elements are not constructed as standards but as statements
	B-1 No B-2 No	
	C-1 No C-2 No C-3 No	

Review Criteria	Review Level	Notes
Is the element clear and concise ?	<p>A-1 The composition and properties of Earth's interior are identified by the behavior of seismic waves. Partially</p> <p>A-2 Earth's crust consists of major and minor tectonic plates that move relative to each other. Yes</p> <p>A-3 A combination of constructive and destructive processes formed Earth's surface. Partially</p> <p>A-4 Evidence of the dynamic changes of the Earth's surface through time is found in the geologic record. Partially</p>	<p>A-1 This element is a statement that I believe is not very clear and concise. My reasoning is that it does not truly elaborate on what should be taught. Composition? Properties?</p> <p>A-3 and A-4 are in my opinion are not clear and concise. Again they are too vague.</p>

Review Criteria	Review Level	Notes
	<p>B-1 Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species. Partially B-2 Reproduction is necessary for the continuation of every species. Yes B-3 The characteristics of an organism are a result of inherited traits received from parents Yes</p>	<p>B-1 The fossil record does have very limited examples of transitional species so this statement is only partially clear and concise. If it was not still debated we would not need Punctuated Equilibrium as a theory explaining species variation. The first segment of the statement is clear and concise but the second part is not. Also, the designing/technological piece is totally out of place. GMO's impact on the environment?</p>

Review Criteria	Review Level	Notes
	C-1 Forces between objects act when the objects are in direct contact or when they are not touching. Partially C-2 Forces have magnitude and direction. Partially C-3 There are different types of potential energy. Partially	<p>C-1 Should add to the statement-and these forces are invisible and sometimes so small of a force you cannot without special equipment feel or sense it but sometimes the forces can be noticeable.</p> <p>C-3 Again I feel this statement is too broad. Elastic potential? Chemical, gravitational, Electrical and magnetic potential in 8th grade?</p>
Is the element grade level appropriate?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes	
	B-1 Yes B-2 Yes B-3 Yes	
	C-1 Partially C-2 No C-3 Partially	
Does the element promote higher student performance, learning and improved student achievement?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes	
	B-1 Yes B-2 Yes B-3 Yes	
	C-1 Yes C-2 Yes C-3 Yes	

Review Criteria	Review Level	Notes		
Does the element support subject matter comprehension?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes			
	B-1 Yes B-2 Yes B-3 Yes			
	C-1 Yes C-2 Yes C-3 Yes			
	Does the element promote essential knowledge in the subject?	A-1 Yes A-2 Yes A-3 Yes A-4 Yes		
		B-1 Yes B-2 Yes B-3 Yes		
		C-1 Yes C-2 Yes C-3 Yes		
		Does the element promote lifelong learning?	A-1 Partially A-2 Partially A-3 Partially A-4 Partially	
			B-1 Partially B-2 Partially B-3 Partially	
			C-1 Partially C-2 Partially C-3 Partially	
Does the element promote the liberal arts tradition?			A-1 Partially A-2 Partially A-3 Partially A-4 Partially	
			B-1 Partially B-2 Partially B-3 Partially	
			C-1 Partially C-2 Partially C-3 Partially	
	Does the element promote college and career readiness?		A-1 Partially A-2 Partially A-3 Partially A-4 Partially	

Review Criteria	Review Level	Notes
	B-1 Partially B-2 Partially B-3 Partially	
	C-1 Partially C-2 Partially C-3 Partially	
Does the element reduce the need for remediation?	A-1 N.A. A-2 N.A. A-3 N.A. A-4 N.A.	
	B-1 N.A. B-2 N.A. B-3 N.A.	
	C-1 N.A. C-2 N.A. C-3 N.A.	
Does the element meet the definition of a standard?	A-1 No A-2 No A-3 No A-4 No	
	B-1 No B-2 No B-3 No	
	C-1 No C-2 No C-3 No	

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

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Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:

https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

<p>Standards Committee (Science)</p>	
<p>Committee Member Name</p>	
<p>Biology Topics</p>	<p>Heredity</p> <ul style="list-style-type: none"> • Cellular genetics • Structure and function of DNA in cells • Genetic mechanisms and inheritance • Mutations • Modern genetics <p>Evolution</p> <ul style="list-style-type: none"> • Mechanisms <ul style="list-style-type: none"> ▪ Natural selection ▪ Mutation ▪ Genetic drift ▪ Gene flow (immigration, emigration) ▪ Sexual selection ▪ History of Life on Earth • Diversity of Life <ul style="list-style-type: none"> ▪ Speciation and biological classification based on molecular evidence <p>Diversity and Interdependence of Life</p> <ul style="list-style-type: none"> • Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms. • Ecosystems <ul style="list-style-type: none"> ▪ Homeostasis ▪ Carrying capacity ▪ Equilibrium and disequilibrium <p>Cells</p> <ul style="list-style-type: none"> • Cell structure and function <ul style="list-style-type: none"> ▪ Structure, function and interrelatedness of cell organelle ▪ Eukaryotic cells and prokaryotic cells • Cellular processes <ul style="list-style-type: none"> ▪ Characteristics of life regulated by cellular processes

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
<p>Is the element clear and concise?</p>	<p>A-1 Life is specified by genomes. Yes A-2 Genes are segments of DNA material and determine the sequence of amino acids in a protein Yes A-3 An altered gene may be passed on to every cell that develops from it and the results are varying. Yes. A-4 Gamete mutations can be passed on to offspring. Yes. A-5 Genes code for proteins. Yes. A-6 Many body cells in an individual can be very different from one another. Partially</p>	<p>All of these statements are either yes or partially, but I believe that there are so many missing components to the content elaboration: heredity. I realize that Mendelian Genetics has previously been taught at lower levels but my personal experience in teaching Biology is that students need the whole picture, and by that I mean that a proper review of Mendelian genetics would be advised. This would help the element to be more clear and concise.</p> <p>A-3 seems to be somewhat out of place without 1st studying the details of a cell. I recommend placing the topic of cells before heredity.</p> <p>A-6 This would be more clear and concise if the cell anatomy and physiology were already studied.</p>

Review Criteria	Review Level	Notes
	<p>B-1 Basic concept of evolution is that the earth's present day species descended from earlier, common ancestral species. Yes</p> <p>B-2 Natural Selection is used to describe the process by which traits become more or less common in a population due to consistent environmental effects. Yes</p> <p>B-3 Hardy-Weinberg's law is used to explain gene frequency patterns in a population. Yes.</p> <p>B-4 Modern ideas about evolution provide a natural explanation for the diversity of life on earth/represented in the fossil record/similarities in existing species/modern molecular evidence. Yes</p> <p>B-5 Evolution is the descent with modification of different lineages from common ancestors. Partially</p> <p>B-6 Different phenotypes result from new combinations of existing genes or from mutations of genes in reproductive cells. Yes</p> <p>B-7 Populations evolve over time. Partially</p> <p>B-8 Evolution is the consequence of the interaction potential for a population to increase</p>	<p>This content elaboration "evolution" has several statements that would, again, be more clear and concise if there was include a brief history of the theory of evolution.</p> <p>B-5 This statement is confusing.</p> <p>B-6 This statement assumes that the student understands what a phenotype is and the heredity section does not include phenotype. Phenotypes are usually related to punnett squares which the standards say not to teach in this class.</p> <p>B-8 is just a confusing statement.</p>

Review Criteria	Review Level	Notes
	<p>C-1 Some ecosystems can be reasonably persistent for long periods of time. Yes</p> <p>C-2 Ecosystems tend to have fluctuations around a state of rough equilibrium. Partially.</p> <p>C-3 Ecosystems always change as geologic or biological conditions vary Partially</p> <p>C-4 Classification systems are frameworks developed by scientists for describing the diversity of organisms and indication degree of relatedness between organisms.</p>	<p>C-2 Confusing, rough equilibrium?</p> <p>C-4 Classification is a system to organize living things into 6 kingdoms thus making it easier to study living organisms.</p> <p>C-6 seems out of place</p>

Review Criteria	Review Level	Notes
Is the element grade level appropriate?	A-1 through A-6. Yes	
	B-1 through B-8. Yes	
	C-1 through C-8. Yes. C-9 on logistical growth. No D-1 through D-11. Yes	C-9 Logistical growth is difficult for non honors biology students.
	Does the element promote higher student performance, learning and improved student achievement?	A-1 through A-6. Yes
B-1 through B-8. Yes		
C-1 through C-8. Yes. D-1 through D-11. Yes		
Does the element support subject matter comprehension?		A-1 through A-6. Yes
	B-1 through B-8. Yes	
	C-1 through C-8. Yes. D-1 through D-11	
	Does the element promote essential knowledge in the subject?	A-1 through A-6. Yes
B-1 through B-8. Yes		
C-1 through C-8. Yes. D-1 through D-11. Yes		
Does the element promote lifelong learning?		A-1 through A-6 Partially
	B-1 through B-8 Partially	
	C-1 through C-8. Partially	
	D-1 through D-8. Partially	
Does the element promote the liberal arts tradition?	A-1-through A-6 Partially	

Review Criteria	Review Level	Notes
	B-1 through B-8 Partially	
	C-1 through C-8. Partially D-1 through D-11 Partially	
Does the element promote college and career readiness ?	A-1 through A-6 Yes	
	B-1 through B-8 Yes	
	C-1 through C-8 Yes D-1 through D-11 Yes	
Does the element reduce the need for remediation ?	A-1 through A-6 Partially	I personally believe that these standards, however good as they may be, are not inclusive enough for students to be prepared for college level Biology. Where is an in-depth study of the 6 Biological kingdoms? How about lab skills such as dissection and lab practicals? Ask any current college Biology student if they need to understand how to prepare for not only dissection but the all important lab practical. College Biology still includes many lab practicals. Also, college biology includes much material on the 6 Biological kingdoms and if a student is not prepared they will need remediation.
	B-1 through B-8 Partially	
	C-1 through C-8 Partially D-1 through D-11 Partially	
Does the element meet the definition of a standard ?	A-1 through A-6 No	These elements are statements, not a standard by the definition given us.
	B-1 through B-8. No	These are statements not standards per definition.
	C-1 through C-8. No D-1 through D-11. No	Same as above.

Ohio Standards Committee Review Form

Ohio Revised Code 3301.079 (I)(2)(a)

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Standards Committee Review Form

Standards Committee (Science)	Kindergarten
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Daily and Seasonal Changes</p> <ul style="list-style-type: none"> • Weather changes are long-term and short-term. • The moon, sun and stars are visible at different times of the day or night.
Life Science	<p>Topic Physical and Behavioral Traits of Living Things</p> <ul style="list-style-type: none"> • Living things are different from nonliving things, • Living things have physical traits and behaviors which influence their survival
Physical Science	<p>Topic: Properties of Everyday Objects and Materials</p> <ul style="list-style-type: none"> • Objects and material can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound
Kindergarten	Strand Connections: Living and nonliving things have specific physical properties that can be used to sort and classify. The physical properties of air and water are presented as they apply to weather.

Review level **Yes** it meets the review criteria
Partially meets the review criteria or **undetermined**
No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Yes
	B.	LS P 22- confusion about "or has ever been alive"
	C.	PS Yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A.	Yes SP/ stars, not starts
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	undetermined
	B.	undetermined
	C.	undetermined
Does the element promote college and career readiness ?	A.	undetermined
	B.	undetermined
	C.	unetermined

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation?	A.	undetermined
	B.	undetermined
	C.	undetermined
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 1
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Sun, Energy and Weather</p> <ul style="list-style-type: none"> The sun is the principal source of energy. The physical properties of water change.
Life Science	<p>Topic: Basic Needs of Living Things</p> <ul style="list-style-type: none"> Living things have basic needs, which are met by obtaining materials from the physical environment. Living things survive only in environments that meet their needs.
Physical Science	<p>Topic: Motion and Materials</p> <ul style="list-style-type: none"> Properties of objects and material can change. Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.
Grade 1	Strand Connections: Energy is observed through movement, heating, cooling and the needs of living organisms.

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Yes/Clear
	B.	LS Yes/Clear
	C.	PS Yes/Clear
Is the element grade level appropriate ?	A.	ESS Yes/ should include "water vapor", solid, liquid, & gas at this level.
	B.	LS Yes/OK
	C.	PS Yes/OK

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element promote college and career readiness?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element reduce the need for remediation?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element meet the definition of a standard?	A.	ESS Yes
	B.	LS Yes
	C.	PS Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 2
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: The Atmosphere</p> <ul style="list-style-type: none"> The atmosphere is made up of air. Water is present in the air. Long-term and short-term weather changes occur due to changes in energy.
Life Science	<p>Topic: Interactions within Habitats</p> <ul style="list-style-type: none"> Living things cause changes on Earth. Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
Physical Science	<p>Topic: Changes in Motion</p> <ul style="list-style-type: none"> Forces change the motion of an object.
Grade 2	Strand Connections: Living and nonliving things may move. A moving object has energy. Air moving is wind and wind can make a windmill turn. Changes in energy and movement can cause change to organisms and the environments in which they live.

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Yes
	B.	LS p.69-Content Statement, clarify “something like others that are alive today” Grade 2 Concepts-line 1 , add “be” Should say something about how activities of humans have resulted in extinctions.
	C.	PS Yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element promote college and career readiness ?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 3
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Earth's Resources</p> <ul style="list-style-type: none"> • Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.
Life Science	<p>Topic: Behavior, Growth and Changes</p> <ul style="list-style-type: none"> • Offspring resemble their parents and each other. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.
Physical Science	<p>Topic: Matter and Forms of Energy</p> <ul style="list-style-type: none"> • All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties. • Heat, electrical energy, light, sound and magnetic energy are forms of energy.
Grade 3	<p>Strand Connections: Matter is what makes up all substances on Earth. Matter has specific properties and exists in different states. Earth's resources are made of matter. Matter can be used by living things and can be used for the energy they contain. There are many different forms of energy. Each living component of an ecosystem is composed of matter and uses energy.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS P 77 Use products of weathering in place of pieces of rock. P80-define fossil fuels.
	B.	P 86 –“transfer information from one generation, characteristics may be a better word than information.
	C.	PS Under Content Statement, strike “most’
Is the element grade level appropriate ?	A.	ESS Yes
	B.	LS Yes
	C.	PS yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Undetermined

Standards Committee Review Form

Review Criteria	Review Level	Notes
	B.	Undetermined
	C.	Undetermined
Does the element promote college and career readiness ?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element reduce the need for remediation ?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
Does the element meet the definition of a standard ?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 4
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Earth’s Surface</p> <ul style="list-style-type: none"> • Earth’s surface has specific characteristics and landforms that can be identified. • The surface of Earth changes due to weathering. • The surface of Earth changes due to erosion and deposition.
Life Science	<p>Topic: Earth’s Living History</p> <ul style="list-style-type: none"> • Changes in an organism’s environment are sometimes beneficial to its survival and sometimes harmful. • Fossils can be compared to one another and to present day organisms according to their similarities and differences.
Physical Science	<p>Topic: Electricity, Heat and Matter</p> <ul style="list-style-type: none"> • The total amount of matter is conserved when it undergoes a change. • Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 4	<p>Strand Connections: Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy. Heating and cooling affect the weathering of Earth’s surface and Earth’s past environments. The processes that shape Earth’s surface and the fossil evidence found can help decode Earth’s history.</p>

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Pp 111 & 114 – combine Content Statements to say Weathering, Erosion & Deposition. Introduce Physical and Chemical Weathering.
	B.	LS Partially – p 121 change “most “ to many.

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	PS Yes
Is the element grade level appropriate?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote college and career readiness?	A.	undetermined
	B.	undetermined

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	undetermined
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 5
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Cycles and Patterns in the Solar System</p> <ul style="list-style-type: none"> The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. The sun is one of many stars that exist in the universe. Most of the cycles and patterns of motion between the Earth and sun are predictable.
Life Science	<p>Topic: Interactions within Ecosystems</p> <ul style="list-style-type: none"> Organisms perform a variety of roles in an ecosystem. All of the processes that take place within organisms require energy.
Physical Science	<p>Topic: Light, Sound and Motion</p> <ul style="list-style-type: none"> The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. Light and sound are forms of energy that behave in predictable ways.
Grade 5	Strand Connections: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass*. The transfer of energy drives changes in systems, including ecosystems and physical systems.

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Yes/good
	B.	LS Yes
	C.	PS Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Partially
	B.	Partially
	C.	Partially

Standards Committee Review Form

Review Criteria	Review Level	Notes
Does the element promote college and career readiness ?	A.	Partially
	B.	Partially
	C.	Partially
Does the element reduce the need for remediation ?	A.	undetermined
	B.	undetermined
	C.	undetermined
Does the element meet the definition of a standard ?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 6
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Rocks, Minerals and Soil</p> <ul style="list-style-type: none"> • Minerals have specific, quantifiable properties. • Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification. • Igneous, metamorphic and sedimentary rocks form in different ways. • Soil is unconsolidated material that contains nutrient matter and weathered rock. • Rocks, minerals and soils have common and practical uses.
Life Science	<p>Topic: Cellular to Multicellular</p> <ul style="list-style-type: none"> • Cells are the fundamental unit of life. • All cells come from pre-existing cells. • Cells carry on specific functions that sustain life. • Living system at all levels of organization demonstrate the complementary nature of structure and function.
Physical Science	<p>Topic: Matter and Motion</p> <ul style="list-style-type: none"> • All matter is made up of small particles called atoms. • Changes of state are explained by a model of matter composed of atom and/or molecules that are in motion. • There are two categories of energy: kinetic and potential. • An object's motion can be described by its speed and the direction in which it is moving.
Grade 6	Strand Connections: All matter is made of small particles called atoms. The properties of matter are based on the order and organization of atoms and molecules. Cells, minerals, rocks and soil are all examples of matter.

Standards Committee Review Form

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS P 159 – What is nutrient matter? P 161 chalk is not a mineral. P 163 strike “must” in several statements under Grade 6 Concepts. Should may be a better word.
	B.	LS Yes
	C.	PS Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	Yes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote college and career readiness?	A.	undetermined
	B.	undetermined
	C.	undetermined
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 7
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Cycle and Patterns of Earth and the Moon</p> <ul style="list-style-type: none"> • The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere and atmosphere. • Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns. • The atmosphere has different properties at different elevations and contains a mixture of gasses that cycle through the lithosphere, biosphere, hydrosphere and atmosphere. • The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.
Life Science	<p>Topic: Cycles of Matter and Flow of Energy</p> <ul style="list-style-type: none"> • Matter is transferred continuously between one organism to another and between organisms and their physical environments. • In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.
Physical Science	<p>Topic: Conservation of Mass and Energy</p> <ul style="list-style-type: none"> • The properties of matter are determined by the arrangements of atoms. • Energy can be transformed or transferred but is never lost. • Energy can be transferred through a variety of ways.
Grade 7	<p>Strand Connections: Systems can exchange energy and/or matter when interactions occur within systems and between systems. Systems cycle matter and energy in observable and predictable patterns.</p>

Review level **Yes** it meets the review criteria
 Partially meets the review criteria or **undetermined**
 No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS Yes/good
	B.	LS P 219 Ethanol "may be" in place of "is" used
	C.	Yes Pp 228 & 233 Heading should be Physical Science (PS) not ESS
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Yes
	B.	Yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	Yes
Does the element promote college and career readiness?	A.	Yes
	B.	Yes
	C.	Yes
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Standards Committee Review Form

Standards Committee (Science)	Grade 8
Committee Member Name	Russ Utgard
Earth Science	<p>Topic: Physical Earth</p> <ul style="list-style-type: none"> • The composition and properties of Earth’s interior are identified by the behavior of seismic waves. • Earth’s crust consists of major and minor tectonic plates that move relative to each other. • A combination of constructive and destructive geologic processes formed Earth’s surface. • Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.
Life Science	<p>Topic: Species and Reproduction</p> <ul style="list-style-type: none"> • Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species. • Reproduction is necessary for the continuation of every species. • The characteristics of an organism are a result of inherited traits received from parent(s).
Physical Science	<p>Topic: Forces and Motion</p> <ul style="list-style-type: none"> • Forces between objects act when the objects are in direct contact or when they are not touching. • Forces have magnitude and direction. • There are different types of potential energy.
Grade 8	<p>Strand Connections: Systems can be described and understood by analysis of the interaction of their components. Energy, forces and motion combine to change the physical features of the Earth. The changes of the physical Earth and the species that have lived on Earth are found in the rock record. For species to continue, reproduction must be successful.</p>

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Standards Committee Review Form

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	ESS P 243 Under Grade 8 Concepts remove “the present” & “must” from the first line.
	B.	LS Yes
	C.	PS Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Yes
	B.	Yes

Standards Committee Review Form

Review Criteria	Review Level	Notes
	C.	Yes
Does the element promote college and career readiness?	A.	Yes
	B.	Yes
	C.	Yes
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Revised Code 3301.079 (I)(2)(a)

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Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status: https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Heredity</p> <ul style="list-style-type: none"> • Cellular genetics • Structure and function of DNA in cells • Genetic mechanisms and inheritance • Mutations • Modern genetics <p>B. Evolution</p> <ul style="list-style-type: none"> • Mechanisms <ul style="list-style-type: none"> ▪ Natural selection ▪ Mutation ▪ Genetic drift ▪ Gene flow (immigration, emigration) ▪ Sexual selection ▪ History of Life on Earth • Diversity of Life <ul style="list-style-type: none"> ▪ Speciation and biological classification based on molecular evidence <p>C. Diversity and Interdependence of Life</p> <ul style="list-style-type: none"> • Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms. • Ecosystems <ul style="list-style-type: none"> ▪ Homeostasis ▪ Carrying capacity ▪ Equilibrium and disequilibrium <p>D. Cells</p> <ul style="list-style-type: none"> • Cell structure and function <ul style="list-style-type: none"> ▪ Structure, function and interrelatedness of cell organelle ▪ Eukaryotic cells and prokaryotic cells • Cellular processes <ul style="list-style-type: none"> ▪ Characteristics of life regulated by cellular processes
High School Course	Biology

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Heredity Yes
	B.	Evolution Yes
	C.	Diversity and Interdependence of Life Yes
	D.	Cells Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote college and career readiness?	A.	Undetermined
	B.	Undetermined
	C.	Undetermined
	D.	Yes
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element meet the definition of a standard?	A.	Yes

Review Criteria	Review Level	Notes
	B.	Yes
	C.	Yes
	D.	Yes

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⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

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Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Structure and Properties of Matter</p> <ul style="list-style-type: none"> • Atomic structure • Periodic Table • Intermolecular chemical bonding • Representing compounds • Quantifying matter • Phases of matter • Intermolecular chemical bonding <p>B. Interactions of Matter</p> <ul style="list-style-type: none"> • Chemical reactions • Gas laws • Stoichiometry • Nuclear Reactions
High School Course	Chemistry

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Structure and Properties of Matter Yes
	B.	Interactions of Matter Yes / p. 305 decay of a rock should be corrected
Is the element grade level appropriate ?	A.	Yes
	B.	Yes

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.	Yes
	B.	Yes
Does the element support subject matter comprehension?	A.	Yes
	B.	Yes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
Does the element promote college and career readiness?	A.	Yes, Excellent Career connections statement
	B.	Undetermined
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes

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Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

Subject Matter Comprehension – ability to understand¹¹ matter presented for consideration in discussion, thought, or study¹²

¹ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/clear>

² Ohio Uniform Statewide Standards for Remediation-Free Status:
https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/data/reports/hs-to-college/2012_UNIFORM_STATEWIDE_REMEDIATION_FREE_STANDARDS%28010913%29.pdf

³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Earth Systems: Interconnected Spheres of Earth</p> <ul style="list-style-type: none"> • Biosphere • Atmosphere • Lithosphere • Hydrosphere • Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere <p>B. Earth’s Resources</p> <ul style="list-style-type: none"> • Energy resources • Air and air pollution • Water and water pollution • Soil and land • Wildlife and wilderness <p>C. Global Environmental Problems and Issues</p> <ul style="list-style-type: none"> • Human population • Potable water quality, use and availability • Climate change • Sustainability • Species depletion and extinction • Air quality • Food production and availability • Deforestation and loss of biodiversity • Waste management (solid and hazardous)
High School Course	Environmental Science

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined**

No it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Earth Systems: Interconnected Spheres of Earth Yes
	B.	Earth's Resources Yes
	C.	Global Environmental Problems and Issues Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote essential knowledge in the subject ?	A.	yes
	B.	Yes
	C.	Yes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element promote the liberal arts tradition ?	A.	Yes
	B.	Yes
	C.	Yes

Review Criteria	Review Level	Notes
Does the element promote college and career readiness ?	A.	Undertermined
	B.	Yes/ Good career connections section.
	C.	Undetermined
Does the element reduce the need for remediation ?	A.	Yes
	B.	Yes
	C.	Yes
Does the element meet the definition of a standard ?	A.	Yes
	B.	Yes
	C.	Yes

Ohio Revised Code 3301.079 (I)(2)(a)

Each committee created in division (I)(1) of this section shall review the academic content standards for its respective subject area to ensure that such standards are **clear, concise, and appropriate for each grade level** and **promote higher student performance, learning, subject matter comprehension, and improved student achievement**. Each committee also shall review whether the standards for its respective subject area **promote essential knowledge in the subject, lifelong learning, the liberal arts tradition, and college and career readiness** and whether the standards **reduce remediation**.

Definitions

Clear – Easily understood; free from doubt or confusion¹

College and Career Readiness – remediation-free status; prepared to enroll in non-remedial, credit-bearing college courses leading to a postsecondary degree or other credential²

Concise – Succinct and comprehensive; using few words, not including extra or unnecessary information³

Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

Liberal Arts Tradition – the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education.⁶

Lifelong Learning – the ongoing, voluntary, self-motivated pursuit of knowledge⁷

Remediation – a prerequisite course to enrolling in courses generally required for first-year college students⁸

Standards – A level of attainment regarded as a goal or measure of adequacy of the essential academic content and skills that students are expected to know and be able to do at each grade level

Student Achievement – the amount of academic content a student learns in a determined amount of time⁹

Student Performance and Learning – academic progress as measured by such as formative and summative assessment data, coursework, instructor observations, information about student engagement and time on task, and similar information¹⁰

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³ Merriam-Webster Dictionary: <http://www.merriam-webster.com/dictionary/concise>

⁴ The Glossary of Education Reform: <http://edglossary.org/standards-based/>

⁵ Vocabulary.com: <http://www.vocabulary.com/dictionary/grade-appropriate>

⁶ Encyclopaedia Britannica: <http://www.britannica.com/EBchecked/topic/339020/liberal-arts>

⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

¹⁰ United States Department of Education: <http://www.ed.gov/race-top/district-competition/definitions>

¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Minerals</p> <ul style="list-style-type: none"> • Atoms and elements • Chemical bonding (ionic, covalent, metallic) • Crystallinity (crystal structure) • Criteria of a mineral (crystalline solid, occurs in nature, inorganic, defined chemical composition) • Prosperities of minerals (hardness, luster, cleavage, streak crystal shape, fluorescence, flammability, density/specific gravity, malleability) <p>B. Igneous, Metamorphic and Sedimentary Rocks</p> <ul style="list-style-type: none"> • Igneous • Metamorphic • Sedimentary <p>C. Earth's History</p> <ul style="list-style-type: none"> • The geologic rock record • Absolute age • Combining relative and absolute age data • The geologic time scale <p>D. Plate Tectonics</p> <ul style="list-style-type: none"> • Internal Earth • Structure of Earth • Historical review • Plate Motion <p>E. Earth's Resources</p> <ul style="list-style-type: none"> • Energy resources • Air • Water • Soil and sediment <p>F. Glacial Geology</p> <ul style="list-style-type: none"> • Glaciers and glaciation
High School Course	Physical Geology

Review level**Yes** it meets the review criteria**Partially** meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Minerals Review Form-Correct Prosperities of Minerals Yes
	B.	Igneous, Metamorphic and Sedimentary Rocks Yes
	C.	Earth's History Yes
	D.	Plate Tectonics Yes
	E.	Earth's Resources Yes
	F.	Glacial Geology Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes

Review Criteria	Review Level	Notes
Does the element promote higher student performance, learning and improved student achievement?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes Suggested visit to scientific center – Byrd Polar Research Center
Does the element support subject matter comprehension?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes

Review Criteria	Review Level	Notes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes

Review Criteria	Review Level	Notes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes
Does the element promote college and career readiness?	A.	Undetermined No Career Connections statement
	B.	Undetermined No Career Connections Statement
	C.	Undetermined No Career Connections statement
	D.	Undetermined No Career Connections statement
	E.	Partially
	F.	Undetermined No Career Connections statement

Review Criteria	Review Level	Notes
Does the element reduce the need for remediation ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes
Does the element meet the definition of a standard ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
	F.	Yes

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Definitions

Clear – Easily understood; free from doubt or confusion¹

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Essential Knowledge – key academic concepts and skills that are deemed to be essential in leading to success in school, higher education, careers, and adult life⁴

Grade Level Appropriate – the quality of ability and work that is appropriate for students in a specified grade⁵

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Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Study of Matter</p> <ul style="list-style-type: none"> • Classification of matter • Atoms • Periodic trends of the elements • Bonding and compounds • Reactions of matter. <p>B. Energy and Waves</p> <ul style="list-style-type: none"> • Conservation of energy • Transfer and transformation of energy (including work) • Waves • Thermal energy • Electricity <p>C. Forces and Motion</p> <ul style="list-style-type: none"> • Motion • Forces • Dynamics (how forces affect motion) <p>D. The Universe</p> <ul style="list-style-type: none"> • History of the Universe • Galaxy formation • Stars
High School Course	Physical Science

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Study of Matter Yes
	B.	Energy and Waves Yes
	C.	Forces and Motion Yes
	D.	The Universe Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote essential knowledge in the subject ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes

Review Criteria	Review Level	Notes
Does the element promote lifelong learning ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote the liberal arts tradition ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element promote college and career readiness ?	A.	Partially
	B.	Yes
	C.	Yes
	D.	Partially
Does the element reduce the need for remediation ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
Does the element meet the definition of a standard ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes

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⁷ Wikipedia: http://en.wikipedia.org/wiki/Lifelong_learning

⁸ Ohio Revised Code 333.041: <http://codes.ohio.gov/orc/3333.041>

⁹ Education Portal: <http://education-portal.com/academy/lesson/student-achievement-definition-factors-research.html>

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¹¹ Merriam-Webster: <http://www.merriam-webster.com/dictionary/comprehension>

¹² Merriam-Webster: <http://www.merriam-webster.com/dictionary/subject%20matter>

Standards Committee	Science
Committee Member Name	Russ Utgard
Topics	<p>A. Motion</p> <ul style="list-style-type: none"> • Graph interpretations • Problem solving • Projectiles <p>B. Forces, Momentum and Motion</p> <ul style="list-style-type: none"> • Newton's laws applied to complex problems • Gravitational force and fields • Elastic forces • Friction force (static and kinetic) • Air resistance and drag • Forces in two dimensions • Momentum, impulse and conservation of momentum <p>C. Energy</p> <ul style="list-style-type: none"> • Gravitational potential energy • Energy in springs • Nuclear energy • Work and power • Conservation of energy <p>D. Waves</p> <ul style="list-style-type: none"> • Wave properties • Light phenomena <p>E. Electricity and Magnetism</p> <ul style="list-style-type: none"> • Charging objects (friction, contact and induction) • Coulomb's law • Electric fields and electric potential energy • DC circuits • Magnetic fields and energy • Electromagnetic interactions
High School Course	Physics

Review level

Yes it meets the review criteria

Partially meets the review criteria or **undetermined****No** it does not meet the review criteria

Review Criteria	Review Level	Notes
Is the element clear and concise ?	A.	Motion Yes
	B.	Forces, Momentum and Motion Yes
	C.	Energy Yes
	D.	Waves Yes
	E.	Electricity and Magnetism Yes
Is the element grade level appropriate ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element promote higher student performance, learning and improved student achievement ?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element support subject matter comprehension ?	A.	Yes
	B.	Yes

Review Criteria	Review Level	Notes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element promote essential knowledge in the subject?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element promote lifelong learning?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element promote the liberal arts tradition?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element promote college and career readiness?	A.	Undetermined No Career Connections statement
	B.	Undetermined No Career Connections statement

Review Criteria	Review Level	Notes
	C.	Undetermined No Career Connections statement
	D.	Partially
	E.	Undetermined No Career Connection statement
Does the element reduce the need for remediation?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes
Does the element meet the definition of a standard?	A.	Yes
	B.	Yes
	C.	Yes
	D.	Yes
	E.	Yes