

ROCKS AND MINERALS DEEP ALIGNMENT TO THE WASHINGTON STATE SCIENCE LEARNING STANDARDS

STANDARDS ALIGNMENT KEY

- ◆ Unit is aligned as is.
- ◆ V Unit is aligned with the intentional use of vocabulary from the Washington Science Standards
- ◆ R Unit is aligned with the intentional use of the STC Children's Book
- ◆ r Unit is aligned with the intentional use of the readings within the unit.
- ◆ E Unit is aligned with the intentional use of the lesson extensions
- ▲ Unit needs identified changes or additions to be aligned

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EALR	Grade Band	Code	Content Standard	Performance Expectation	Lesson Number	Alignment Symbol	Comments/Evidence
Inquiry	4-5	INQB	Scientists plan and conduct different kinds of investigations, depending on the <i>questions</i> they are trying to answer. Types of investigations include <i>systematic observations</i> and descriptions, <i>field studies, models</i> , and <i>open-ended explorations</i> as well as <i>experiments</i> .	<p>Given a research <i>question</i>, plan an appropriate investigation, which may include <i>systematic observations, field studies, models, open-ended explorations, or controlled experiments</i>.</p> <p>Work collaboratively with other students to carry out an investigation, selecting appropriate <i>tools</i> and demonstrating safe and careful use of equipment.</p>	Addressed throughout the unit.	◆	<p>Throughout the unit students make systematic observations of rocks and minerals and record descriptions of their properties.</p> <p>As students perform tests on each mineral they must demonstrate safe and careful use of tools or equipment such as nails, streak plates, and magnets.</p> <p>NOTE: Students do not conduct controlled investigations in this unit.</p>
Inquiry	4-5	INQD	Investigations involve systematic collection and recording of relevant <i>observations</i> and data.	Gather, record, and organize data using appropriate units, tables, graphs, or maps.	Lessons 6-12, 14-15	◆	
Inquiry	4-5	INQE	Repeated <i>trials</i> are necessary for <i>reliability</i> .	<i>Explain that additional trials</i> are needed to ensure that the results are repeatable.	Lessons 8-12	▲	As students perform the tests on minerals in the indicated lessons the teacher has the opportunity to introduce and use the terms <i>repeated trials</i> and <i>reliability</i> . When groups have different test results, the teacher has the opportunity to discuss reasons for differences and have students retest for reliability.

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Inquiry	4-5	INQH	<p>Scientists communicate the results of their investigations verbally and in writing. They review and ask <i>questions</i> about the results of other scientists' work.</p>	<p>Display the findings of an investigation, using tables, graphs, or other visual means to represent the data accurately and meaningfully.</p> <p>Communicate to peers the purpose, procedure, results, and conclusions of an investigation.</p> <p>Respond non-defensively to comments and <i>questions</i> about their investigation.</p> <p>Discuss differences in findings and conclusions reported by other students.</p>	Addressed throughout the unit.	◆	
Inquiry	4-5	INQI	<p>Scientists report the results of their investigations honestly, even when those results show their predictions were wrong, or when they cannot <i>explain</i> the results.</p>	<p><i>Explain</i> why records of <i>observations</i> must never be changed, even when the <i>observations</i> do not match expectations.</p>	Addressed throughout the unit.	◆	<p>To meet this standard, teachers must intentionally emphasize that <i>honesty</i> is an important trait scientists must possess even when they predict a different outcome, or when the data does not support their prediction.</p>

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Inquiry	2-3	INQB	A scientific investigation may include making and following a plan to accurately observe and <i>describe</i> objects, events, and <i>organisms</i> ; make and record measurements; and <i>predict</i> outcomes.	Work with other students to make and follow a plan to carry out a scientific investigation. Actions may include accurately observing and describing objects, events, and <i>organisms</i> ; measuring and recording data; and predicting outcomes.	Addressed throughout the unit.	◆	In this unit students engage in scientific investigations where they predict, observe, measure, and record. They are not asked to “make a plan”.
Inquiry	2-3	INQD	Simple instruments, such as <i>magnifiers</i> , <i>thermometers</i> , and rulers provide more information than scientists can obtain using only their unaided senses.	Use simple instruments (e.g., metric scales or balances, thermometers, and rulers) to observe and make measurements, and record and display data in a table, bar graph, line plot, or pictograph.	Addressed throughout the unit	◆	
Inquiry	2-3	INQG	Scientists make the results of their investigations public, even when the results contradict their expectations.	Communicate honestly about their investigations, describing how <i>observations</i> were made, and summarizing results.	Addressed throughout the unit.	◆	<p>To meet this standard, teachers must intentionally emphasize that <i>honesty</i> is an important trait scientists must possess even when they predict a different outcome, or when the data does not support their prediction.</p> <p>The teacher should model honesty when recording and reporting data.</p>

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Application	4-5	APPA	<i>Technology</i> involves changing the <i>natural world</i> to meet human needs or wants.	<i>Describe</i> ways that people use <i>technology</i> to meet their needs and wants (e.g., text messages to communicate with friends; use bicycles or cars for transportation).	STC Children's Books	◆ R	STC Children's Book: <ul style="list-style-type: none"> • <i>Minerals: Can't Live Without Them;</i> • <i>Salt: Eat a Mineral;</i> • <i>Famous Faces Carved in Stone.</i>
Application	4-5	APPB	People in different cultures all around the world use different materials or <i>technologies</i> to solve the same problems.	Give examples of how people around the world use different materials or technologies to solve the same problem. (e.g., in some countries, people use forks for eating, while in other countries they use chopsticks; people in different countries use different materials to build their houses.)	Lesson 5-12 Reading Selection STC Children's Books	◆r ◆R	The reading selections in each of the lessons listed mention historical information from around the world on how different people used minerals to solve problems. Collectively, when looking at each of the following stories, different cultures have used different building materials to solve the same problem of building design. STC Children's Book: <ul style="list-style-type: none"> • <i>A Museum that Honors a People's Past and Present;</i> • <i>Rocks: From Beginning to End;</i> • <i>The Pyramids: Tombs Fit for a King</i>
Application	4-5	APPD	Scientists and engineers often work in teams with other individuals to <i>generate</i> different <i>ideas</i> for solving a problem.	Work with other students to <i>generate</i> possible <i>solutions</i> to a problem, and agree on the most promising <i>solution</i> based on how well each different idea meets the <i>criteria</i> for a successful <i>solution</i> .	Lesson 15	◆	Students select the most appropriate test(s) that will enable them to determine the identity of 3 mystery minerals.

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Application	4-5	APPG	Science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication.	Describe specific ways that science and technology have improved the quality of the students' lives.	Lesson 5-12 Reading Selection	◆r	The reading selections in each of the lessons listed mention how science and technology have improved our lives.
Application	4-5	APPH	People of all ages, interests, and abilities engage in a variety of scientific and technological work.	<i>Describe</i> several activities or careers that require people to <i>apply</i> their knowledge and abilities in <i>science</i> , <i>technology</i> , engineering, and mathematics.	STC Children's Books	◆R	STC Children's Book: <ul style="list-style-type: none"> • <i>Park Rangers of the Grand Canyon</i>; • <i>A Scientist Who's Right on Track</i>
Application	2-3	APPB	Scientific ideas and discoveries can be applied to solving problems.	Give an example in which the application of scientific knowledge helps solve a problem (e.g., use electric lights to see at night).	STC Children's Books	◆R	STC Children's Book: <ul style="list-style-type: none"> • <i>Stored Sunshine</i>
Application	2-3	APPD	Tools help scientists see more, measure more accurately, and do things that they could not otherwise accomplish.	Select appropriate <i>tools</i> and materials to meet a goal or solve a specific problem (e.g., build the tallest tower with wooden blocks, or longest bridge span) and <i>explain</i> the reason for those choices.	Lesson 15	◆	Students select appropriate tools and materials to help them to identify the mystery minerals.

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Application	2-3	APPE	Successful <i>solutions</i> to problems often depend on selection of the best tools and materials and on previous experience.	Students can also <i>evaluate</i> how well it solved the problem and discuss what they might do differently the next time they have a similar problem.	Lesson 15	◆	<p>In Lesson 15 students use their previous experience to select the best tools and tests to assist them in identifying 3 mystery minerals.</p> <p>To meet the performance expectation teachers should give students the opportunity to evaluate how well their selected tools and tests solved the problem.</p>
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EALR	Grade Band	Code	Content Standard	Performance Expectation	Lesson Number	Alignment Symbol	Comments/Evidence
Earth & Space Science	4-5	ES2A	<p>Earth materials include solid rocks and soil, water, and <i>gases</i> of the atmosphere. Materials have different <i>physical</i> and <i>chemical properties</i>, which make them useful in different ways. Earth materials provide many of the resources that humans use.</p>	<p><i>Describe</i> Earth materials and list their physical and <i>chemical properties</i>.</p> <p><i>Explain how the properties</i> of an Earth material make it useful for certain purposes, but not useful for other purposes (e.g., wood is easily cut, is a good <i>insulator</i>, and does not conduct electricity, so it is used to build houses, not for electrical wires).</p> <p>Give examples of <i>human-made</i> materials, including those that are changed only a little (e.g., wood and stones used for building) and those that look very different from the raw materials (e.g., metal, ceramics, and plastics).</p>	<p>Addressed throughout the unit.</p> <p>Lessons 3,5-12, 16 Readings</p> <p>STC Children's Books</p>	<p>◆</p> <p>◆r</p> <p>◆ R</p>	<p>STC Children's Book:</p> <ul style="list-style-type: none"> • <i>Stored Sunshine</i>; • <i>Minerals: Can't Live Without Them</i>; • <i>Salt: Eat a Mineral</i>

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Earth & Space Science	4-5	ES2B	<i>Weathering</i> is the breaking down of rock into pebbles and sand, caused by physical processes such as heating, cooling, and pressure, and chemical processes, such as acid rain.	<i>Describe</i> and give examples of the physical and chemical processes of <i>weathering</i> of rock.	Lesson 3	▲ r	Lesson 3 reading selection - <i>Rocks-Here, There, and Everywhere</i> offers the opportunity for teachers to introduce the concept of weathering.
Earth & Space Science	4-5	ES2C	<i>Erosion</i> is the movement of Earth materials by processes such as <i>wind</i> , water, ice, and <i>gravity</i> .	<i>Describe</i> the <i>forces</i> of water and <i>wind</i> as major causes of <i>erosion</i> . Identify local examples where <i>erosion</i> has occurred and <i>describe</i> the processes that most likely caused the <i>erosion</i> .	STC Children's Books	▲ R	STC Children's Book: <ul style="list-style-type: none"> • <i>Telling Earth's Story, Layer by Layer</i> addresses erosion however it does not fully address the concepts in this standard.
Earth & Space Science	4-5	ES2E	Soils are often found in layers, with each layer having a different chemical composition and different physical <i>properties</i> .	<i>Compare</i> different layers in soil with respect to physical <i>properties</i> (e.g., color, texture, particle size, amount of dead plant and animal material, capacity for holding water).	STC Children's Books	◆ R	STC Children's Book: <ul style="list-style-type: none"> • <i>Telling Earth's Story, Layer by Layer</i>

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Earth & Space Science	4-5	ES3A	Different kinds of events caused the formation of different kinds of <i>fossils</i> .	Given a <i>fossil</i> , <i>describe</i> an event that could cause the formation of that fossil (e.g., the plant or animal may have been buried in <i>sediment</i> that hardened into rock and left an imprint or dissolved minerals may have seeped into a piece of wood and hardened into rock).	Lesson 3 Reading Selection Supplemental (PNNL) Fossils Lessons Part 2 with associated PowerPoint	◆r ◆	Lesson 3 reading selection - <i>Rocks: Here, There, Everywhere</i> discusses how fossils form in rocks over time. Additional supplemental lessons have been created to meet this standard. They are available at: http://science-ed.pnl.gov/teachers/lessons.stm
Earth & Space Science	4-5	ES3B	By studying the kinds of plant and animal <i>fossils</i> in a layer of rock, it is possible to <i>infer</i> what the <i>environment</i> was like at the time and where the layer formed.	Given a picture and description of several <i>fossils</i> from a layer of rock, <i>infer</i> the <i>environmental</i> conditions that existed at the time the <i>fossils</i> formed (e.g., a fish <i>fossil</i> indicates that a body of water existed at the time the <i>fossil</i> formed).	Lesson 3 Reading Selection Supplemental (PNNL) Fossils Lessons Part 2 with associated PowerPoint	◆r ◆	Lesson 3 reading selection - <i>Rocks: Here, There, Everywhere</i> and <i>Park Rangers of the Grand Canyon</i> discuss how fossils form in rocks. Additional supplemental lessons have been created to meet this standard. They are available at: http://science-ed.pnl.gov/teachers/lessons.stm

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Life Science	4-5	LS3D	<i>Fossils provide evidence that many plant and animal species are extinct and that species have changed over time.</i>	<i>Compare fossils with one another and with living plants and animals to illustrate that fossils provide evidence that plant and animal species have changed over time.</i>	Supplemental (PNNL) Fossils Lessons Part 2 with associated PowerPoint, and Part 3	◆	Lesson 3 reading selection - <i>Rocks: Here, There, Everywhere</i> and <i>Park Rangers of the Grand Canyon</i> discuss how fossils form in rocks.(note picture on pg. 51). Additional supplemental lessons have been created to meet this standard. They are available at: http://science-ed.pnl.gov/teachers/lessons.stm
Physical Science	2-3	PS2A	Objects have <i>properties</i> , including size, <i>weight</i> , hardness, color, shape, texture, and magnetism. Unknown substances can sometimes be identified by their <i>properties</i> .	Given an object, list several of its <i>properties</i> . Given several objects, select one that best matches a list of <i>properties</i> . Sort objects by their <i>functions</i> , shapes and the materials they are composed of.	Addressed throughout the unit.	◆	

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Physical Science	2-3	PS2B	An object may be made from different materials. These materials give the object certain <i>properties</i> .	<p>List <i>properties</i> of common materials. Compare similar objects made of different materials (e.g., a plastic spoon and a metal spoon) and <i>explain how</i> their <i>properties</i> are similar and different.</p> <p><i>Compare</i> two objects made of the same material but a different shape (e.g., a plastic fork and a plastic spoon) and identify which of their <i>properties</i> are similar and different.</p>	Addressed throughout the unit.	◆	
Earth & Space Science	2-3	ES2A	Water plays an essential role in Earth <i>systems</i> , including shaping landforms.	<p><i>Identify</i> where natural water bodies occur in the students' local <i>environment</i>.</p> <p>Show how water has shaped a local landform (e.g., river valley, canyon, Puget Sound).</p>	STC Children's Books	▲ R	<p>STC Children's Book:</p> <ul style="list-style-type: none"> <i>Telling Earth's Story, Layer by Layer</i> addresses how water has shaped landforms. The teacher must be intentional about both identifying natural water bodies that occur locally and showing local landforms that were shaped by water.
Life Science	2-3	LS3D	<i>Fossils</i> are often similar to parts of plants or animals that live today.	<p>Observe <i>fossils</i> and <i>compare</i> them to similar plants or animals that live today (e.g., <i>compare</i> a <i>fossil</i> fern with a similar fern that grows today, a dinosaur leg bone with the leg bone of a reptile that lives today, a mastodon and an elephant).</p>	Supplemental (PNNL) Fossils Lessons Part 2 with associated PowerPoint, and Part 3.	◆	<p>Additional supplemental lessons have been created to meet this standard. They are available at: http://science-ed.pnl.gov/teachers/lessons.stm</p>

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Life Science	2-3	LS3E	<p>Some <i>fossils</i> are very different from plants and animals that live today.</p>	<p>Conclude from <i>fossil evidence</i> that once there were <i>species</i> on Earth that are no longer alive (e.g., T-Rex, trilobites).</p> <p>Given pictures of animals that are <i>extinct</i> (e.g., dinosaurs, mammoths), <i>describe</i> how these animals are different from animals that live today.</p>	<p>Supplemental (PNNL) Fossils Lessons Part 2 with associated PowerPoint, and Part 3</p>	◆	<p>Additional supplemental lessons have been created to meet this standard. They are available at: http://science-ed.pnl.gov/teachers/lessons.stm</p>
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