WASHINGTON STATE LASER

Alignment of Washington 6-8 Science Standards by Lesson Number for

FOSS/MS

Earth History

November 1, 2010

Alignment of Washington 6-8 Science Standards with
FOSS/MS Earth History ~ Investigation 01

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 1 parts 1 and 2 pp 39-48	**Aligned as designed**	Teacher must be intentional about making sure students can know and use mean, median, and mode to analyze data.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 1 parts 1 and 2 pp 39-49	**Aligned as designed**	Teacher must use scaffolded instruction and formative assessment of student use of evidence to support their conclusions (more than teacher observation) and critical review. Teacher must be intentional about use of the terms (vocabulary) investigation, results, and conclusion.

Alignment of Washington 6-8 Science Standards with
FOSS/MS Earth History ~ Investigation 02

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQA	Scientific inquiry involves asking and answering questions and comparing the answer with what scientists already know about the world.	• Generate a question that can be answered through scientific investigation. This may involve refining or refocusing a broad and ill-defined question.	Investigation 2 parts 3-4 pp 68-75; Extending the Learning Experience 2-3 p 75; Lab Notebook p 5	**Aligned with modifications (see comments)**	Teacher must be intentional about using The Extending The Learning 2 and 3 on page and The Grand Canyon Explorer Home Page at www.kaibab.org.
INQB	Different kinds of questions suggest different kinds of scientific investigations.	• Plan and conduct a scientific investigation (e.g., field study, systematic observation, controlled experiment, model, or simulation) that is appropriate for the question being asked. • Propose a hypothesis, give a reason for the hypothesis, and explain how the planned investigation will test the hypothesis. • Work collaboratively with other students to carry out the investigations.	Investigation 2 part 3 pp 68-70; Lab Notebook p 5	**Aligned with modifications (see comments)**	The teacher needs to be intentional about discussing the standard.
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 2 parts 2-3 pp 64-70; CD-ROM: Expeditions-Grand Canyon Rim, Pima Point, Auditorium-Grand Canyon	**Aligned as designed**	Teacher must be intentional about using the CD-ROM.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 2 parts 3-4 pp 68-74	**Module/Unit requires changes (see comments)**	When discussing the class questions, teacher must be intentional about determining the variables presented by their investigative question. Teacher can improve learning by connecting the local land forms to similarities and differences with their studies of the Grand Canyon.
APPB	Scientists and technological designers (including engineers) have different goals. Scientists answer questions about the natural world; technological designers solve problems that help people reach their goals.	• Investigate several professions in which an understanding of science and technology is required. Explain why that understanding is necessary for success in each profession.	Investigation 2 part 2 pp 45-49; Extending the Learning 2 p 75; Resource book pp 98-99; Lab Notebook pp 1-2	**Aligned as designed**	Teacher must be intentional about including the reading: Careers in Geology, Resource book pp 98-99.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 3 part 2 pp 96-101	**Aligned as designed**	Teacher must be intentional about use of the terms (vocabulary) and reinforcing the use.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 3 parts 1 and 3 pp 88 - 95 and 102-107; CD-ROM: Auditorium Colorado River and Colorado Plateau	**Aligned as designed**	Teacher must make use of information found on the CD-ROM.
ES3C	In most locations sedimentary rocks are in horizontal formations with the oldest layers on the bottom. However, in some locations, rock layers are folded, tipped, or even inverted, providing evidence of geologic events in the distant past.	• Explain why younger layers of sedimentary rocks are usually on top of older layers, and hypothesize what geologic events could have caused huge blocks of horizontal sedimentary layers to be tipped or older rock layers to be on top of younger rock layers.	Investigation 3 parts 1-4 pp 88-111	**Aligned as designed**	Teachers need to emphasize through building a three-dimensional view of the Grand Canyon the sequence of sedimentary rock.

Alignment of Washington 6-8 Science Standards with
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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQC	Collecting, analyzing, and displaying data are essential aspects of all investigations.	• Communicate results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. • Recognize and interpret patterns – as well as variations from previously learned or observed patterns – in data, diagrams, symbols, and words. • Use statistical procedures (e.g., median, mean, or mode) to analyze data and make inferences about relationships.	Investigation 4 part 2 pp 132-137; CD-ROM: Sand Types	**Aligned as designed**	Teacher must be intentional about using the CD-ROM resources in Geology Lab, Sand Types.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 4 parts 1, 5, and 6, pp 127-131, 150-163	**Aligned as designed**	The teacher needs to be intentional about discussing the standard and connecting the vocabulary and the scientific process being used, including how the processes represent models and what the limitations of these specific models are.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 4 parts 2 and 6 pp 132-137 and 156-162	**Aligned as designed**	The teacher needs to intentionally take advantage of multiple opportunities to observe and explain results of laboratory experiences using evidence to support conclusions. Results are to be used as objective findings from which students can infer.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPC	Science and technology are interdependent. Science drives technology by demanding better instruments and suggesting ideas for new designs. Technology drives science by providing instruments and research methods.	• Give examples to illustrate how scientists have helped solve technological problems (e.g., how the science of biology has helped sustain fisheries) and how engineers have aided science (e.g., designing telescopes to discover distant planets).	Investigation 4 parts 2-6 pp 132-163; Extending the Experience 1 and 2	**Aligned with modifications (see comments)**	Teacher must be intentional about adding examples of current technology advances that impact scientific knowledge.
APPD	The process of technological design begins by defining a problem and identifying criteria for a successful solution, followed by research to better understand the problem and brainstorming to arrive at potential solutions.	• Define a problem that can be solved by technological design and identify criteria for success. • Research how others solved similar problems. • Brainstorm different solutions.	Investigation 4 parts 2-6 pp 132-163; Lab Notebook pp 19, 23, 26, 27; Resource book pp 60-63	**Aligned with modifications (see comments)**	The teacher needs to be intentional about discussing the standard and posing questions during the investigation that can be answered by the model.
APPE	Scientists and engineers often work together to generate creative solutions to problems and decide which ones are most promising.	• Collaborate with other students to generate creative solutions to a problem, and apply methods for making tradeoffs to choose the best solution.	Investigation 4 parts 2-6 pp 132-163; Lab Notebook pp 19, 23, 26, 27; Resource book pp 60-63	**Aligned with modifications (see comments)**	Teachers need to ask students to explain how the model can answer certain questions related to problems that may arise.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
APPF	Solutions must be tested to determine whether or not they will solve the problem. Results are used to modify the design, and the best solution must be communicated persuasively.	• Test the best solution by building a model or other representation and using it with the intended audience. Redesign as necessary. • Present the recommended design using models or drawings and an engaging presentation.	Investigation 4 parts 2-6 pp 132-163; Lab Notebook pp 19, 23, 26, 27; Resource book pp 60-63	**Aligned with modifications (see comments)**	Teachers need to ask students to explain how the model can be used to answer scientific questions.
PS1B	Friction is a force that that can help objects start moving, stop moving, slow down or can change the direction of the object's motion.	• Demonstrate and explain the frictional force acting on an object with the use of a physical model.	Investigation 4 part 3 pp 140-146	**Module/Unit requires changes (see comments)**	Teacher must be intentional about use of the terms (vocabulary) related to forces when using the stream tables.
PS1C	Unbalanced forces will cause changes in the speed or direction of an object's motion. The motion of an object will stay the same when forces are balanced.	• Determine whether forces on an object are balanced or unbalanced and justify with observational evidence. • Given a description of forces on an object, predict the object's motion.	Investigation 4 parts 1-6 pp 127-163	**Module/Unit requires changes (see comments)**	Teacher must be intentional about making sure students understand the mathematical connections in this lesson.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS1D	The same unbalanced force will change the motion of an object with more mass more slowly than an object with less mass.	• Given two different masses that receive the same unbalanced force, predict which will move more quickly.	Investigation 4 parts 1-6 pp 127-163	**Module/Unit requires changes (see comments)**	Teacher must be intentional about directing student attention to the forces at work in the model.
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 4 parts 1-6 pp 127-163	**Aligned as designed**	Teacher must be intentional about referring to sand and rocks as a mixture, in addition to using the vocabulary words mixture, compound, physical, and chemical properties.
PS2E	Solids, liquids, and gases differ in the motion of individual particles. In solids, particles are packed in a nearly rigid structure; in liquids, particles move around one another; and in gases, particles move almost independently.	• Describe how solids, liquids, and gases behave when put into a container (e.g., a gas fills the entire volume of the container). Relate these properties to the relative movement of the particles in the three states of matter.	Investigation 4 parts 1-6 pp 127-163	**Aligned with modifications (see comments)**	Teacher must be intentional about relating solids and liquids states of rocks and minerals.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 4 parts 1-6 pp 127-163	**Aligned with modifications (see comments)**	Teacher must be intentional to relate molecular motion and temperature.
ES2D	Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.	• Distinguish between bodies of saltwater and fresh water and explain how saltwater became salty.	Investigation 4 parts 1-6 pp 127-163	**Aligned as designed**	Teacher must reinforce the idea that water is a solvent and how salt and fresh water differ.
ES2E	The solid Earth is composed of a relatively thin crust, a dense metallic core, and a layer called the mantle between the crust and core that is very hot and partially melted.	• Sketch and label the major layers of Earth, showing the approximate relative thickness and consistency of the crust, core, and mantle.	Investigation 4 parts 1-6 pp 127-163	**Aligned as designed**	The unit/lesson is an integral part of a learning progression.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2F	The crust is composed of huge crustal plates on the scale of continents and oceans which move centimeters per year, pushed by convection in the upper mantle, causing earthquakes, volcanoes, and mountains.	• Draw a labeled diagram showing how convection in the upper mantle drives movement of crustal plates. • Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunami, faults, mountain building), with examples from the Pacific Northwest.	Investigation 4 parts 1-6 pp 127-163	**Aligned as designed**	Teachers need to present and emphasize the Continental Drift Theory.
ES2G	Land forms are created by processes that build up structures and processes that break down and carry away material through erosion and weathering.	• Explain how a given land form (e.g., mountain) has been shaped by processes that build up structures (e.g., uplift) and by processes that break down and carry away material (e.g., weathering and erosion).	Investigation 4 parts 3 and 4 pp 138-149; Video: "Weathering and Erosion"; Resource book pp 64-67; Lab Notebook pp 26-31	**Aligned as designed**	Teacher must use the video and the reading.
ES2H	The rock cycle describes the formation of igneous rock from magma or lava, sedimentary rock from compaction of eroded particles, and metamorphic rock by heating and pressure.	• Identify samples of igneous, sedimentary, and metamorphic rock from their properties and describe how their properties provide evidence of how they were formed. • Explain how one kind of rock could eventually become a different kind of rock.	Investigation 4 parts 1-6 pp 127-163	**Aligned with modifications (see comments)**	Teacher must be intentional about relating the weathering, erosion and deposition to the rock cycle.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3A	Our understanding of Earth history is based on the assumption that processes we see today are similar to those that occurred in the past.	• Describe Earth processes that we can observe and measure today (e.g., rate of sedimentation, movement of crustal plates, and changes in composition of the atmosphere) that provide clues to Earth's past.	Investigation 4 parts 1-6 pp 127-163	**Aligned as designed**	Teacher must be intentional about relating the local area to changes in the earth over time.
ES3C	In most locations sedimentary rocks are in horizontal formations with the oldest layers on the bottom. However, in some locations, rock layers are folded, tipped, or even inverted, providing evidence of geologic events in the distant past.	• Explain why younger layers of sedimentary rocks are usually on top of older layers, and hypothesize what geologic events could have caused huge blocks of horizontal sedimentary layers to be tipped or older rock layers to be on top of younger rock layers.	Investigation 4 parts 1-4 pp 127-162	**Aligned as designed**	The teacher needs to relate size and shape of sand to the erosion process.
ES3D	Earth has been shaped by many natural catastrophes, including earthquakes, volcanic eruptions, glaciers, floods, storms, tsunami, and the impacts of asteroids.	• Interpret current land forms of the Pacific Northwest as evidence of past geologic events (e.g., Mount St. Helen's and Crater Lake provide evidence of volcanism, the Channeled Scablands provides evidence of floods that resulted from melting of glaciers).	Investigation 4 parts 2-4 pp 132-148	**Aligned as designed**	Teacher must relate the local types of sand to what they observe in the investigations.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 5 part 3 pp 183-187	**Aligned as designed**	Teachers need to emphasize the process of observation and recording the observations clearly and concisely.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 5 parts 1 and 4 pp 175-178, 188-193; CD-ROM: Geology Lab-Limestone, and Auditorium-Modern Environments	**Aligned as designed**	Teacher must be intentional about using the CD-ROM.
PS2B	Mixtures are combinations of substances whose chemical properties are preserved. Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	• Separate a mixture using differences in properties (e.g., solubility, size, magnetic attraction) of the substances used to make the mixture. • Demonstrate that the properties of a compound are different from the properties of the reactants from which it was formed.	Investigation 5 part 2 pp 180-182; Resource book pp 68-72	**Aligned with modifications (see comments)**	Teacher must be intentional about discussing limestone as a mixture and calcium carbonate and other minerals as compounds, in addition to using the vocabulary words mixture, compound, physical, and chemical properties.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2D	Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.	• Distinguish between bodies of saltwater and fresh water and explain how saltwater became salty.	Investigation 5 parts 1-4 pp 175-193	**Aligned as designed**	The unit/lesson is an integral part of a learning progression.
ES2E	The solid Earth is composed of a relatively thin crust, a dense metallic core, and a layer called the mantle between the crust and core that is very hot and partially melted.	• Sketch and label the major layers of Earth, showing the approximate relative thickness and consistency of the crust, core, and mantle.	Investigation 5 parts 1-4 pp 175-193	**Aligned as designed**	The unit/lesson is an integral part of a learning progression.
ES2F	The crust is composed of huge crustal plates on the scale of continents and oceans which move centimeters per year, pushed by convection in the upper mantle, causing earthquakes, volcanoes, and mountains.	• Draw a labeled diagram showing how convection in the upper mantle drives movement of crustal plates. • Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunami, faults, mountain building), with examples from the Pacific Northwest.	Part 1-4 pp 175-193	**Aligned as designed**	Teacher must be intentional about use of the terms (vocabulary) and the drift theory.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3A	Our understanding of Earth history is based on the assumption that processes we see today are similar to those that occurred in the past.	• Describe Earth processes that we can observe and measure today (e.g., rate of sedimentation, movement of crustal plates, and changes in composition of the atmosphere) that provide clues to Earth's past.	Investigation 5 parts 1-4 pp 175-193	**Aligned as designed**	Teacher must continue to relate the local earth history to that of the earth in general.
ES3C	In most locations sedimentary rocks are in horizontal formations with the oldest layers on the bottom. However, in some locations, rock layers are folded, tipped, or even inverted, providing evidence of geologic events in the distant past.	• Explain why younger layers of sedimentary rocks are usually on top of older layers, and hypothesize what geologic events could have caused huge blocks of horizontal sedimentary layers to be tipped or older rock layers to be on top of younger rock layers.	Investigation 5 parts 1-4 pp 175-193	**Aligned as designed**	Teacher must be intentional about using questioning strategies that relate to inferences based on evidence from rocks and fossils.
ES3D	Earth has been shaped by many natural catastrophes, including earthquakes, volcanic eruptions, glaciers, floods, storms, tsunami, and the impacts of asteroids.	• Interpret current land forms of the Pacific Northwest as evidence of past geologic events (e.g., Mount St. Helen's and Crater Lake provide evidence of volcanism, the Channeled Scablands provides evidence of floods that resulted from melting of glaciers).	Investigation 5 part 4 pp 188-189	**Aligned as designed**	Teachers can enhance the learning experience by posing questions related to limestone and evidence of early environments.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3E	Living organisms have played several critical roles in shaping land forms that we see today.	• List several ways that living organisms have shaped land forms (e.g., coral islands, limestone deposits, oil and coal deposits).	Investigation 5 parts 1-4, pp 175-193	**Aligned as designed**	Teacher must be intentional about connecting the investigation to oil, coral islands and limestone deposits.

Alignment of Washington 6-8 Science Standards with
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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
SYSB	The boundaries of a system can be drawn differently depending on the features of the system being investigated, the size of the system, and the purpose of the investigation.	• Explain how the boundaries of a system can be drawn to fit the purpose of the study (e.g., to study how insect populations change, a system might be a forest, a meadow in the forest, or a single tree).	Investigation 6 parts 2-4 pp 209-225; Extending The Learning 1 and 3 p 225	**Aligned as designed**	Teacher must be intentional about use of the terms (vocabulary) system and boundary and use the Extending The Learning.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 6 Parts 1, 3, and 4, pp 205-208, 215-219, 220-224	**Aligned with modifications (see comments)**	Teachers need to ask students to explain their process during each part of the investigation, and how timelines relate to models, including the limitations of this type of timeline.
ES2D	Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.	• Distinguish between bodies of saltwater and fresh water and explain how saltwater became salty.	Investigation 6 parts 2-4, pp 209-225; CD-ROM: Colorado Plateau over time	**Aligned as designed**	The unit/lesson is an integral part of a learning progression Investigations 4-8.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2E	The solid Earth is composed of a relatively thin crust, a dense metallic core, and a layer called the mantle between the crust and core that is very hot and partially melted.	• Sketch and label the major layers of Earth, showing the approximate relative thickness and consistency of the crust, core, and mantle.	Investigation 6 parts 2-4 pp 209-225; CD-ROM: Colorado Plateau over Time	**Aligned as designed**	The unit/lesson is an integral part of a learning progression. Teacher must be intentional about explaining how the earth's surface is a layer, as well as, where other rock types are formed.
ES2F	The crust is composed of huge crustal plates on the scale of continents and oceans which move centimeters per year, pushed by convection in the upper mantle, causing earthquakes, volcanoes, and mountains.	• Draw a labeled diagram showing how convection in the upper mantle drives movement of crustal plates. • Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunami, faults, mountain building), with examples from the Pacific Northwest.	Investigation 6 parts 2-4 pp 209-225	**Aligned as designed**	The teacher needs to be intentional about discussing the standard and how the investigation is related.
ES2H	The rock cycle describes the formation of igneous rock from magma or lava, sedimentary rock from compaction of eroded particles, and metamorphic rock by heating and pressure.	• Identify samples of igneous, sedimentary, and metamorphic rock from their properties and describe how their properties provide evidence of how they were formed. • Explain how one kind of rock could eventually become a different kind of rock.	Investigation 6 parts 1-4 pp 205-225	**Aligned with modifications (see comments)**	The unit/ lesson contain many opportunities to discuss the rock cycle and environmental issues.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3A	Our understanding of Earth history is based on the assumption that processes we see today are similar to those that occurred in the past.	• Describe Earth processes that we can observe and measure today (e.g., rate of sedimentation, movement of crustal plates, and changes in composition of the atmosphere) that provide clues to Earth's past.	Investigation 6 parts 1-4 pp 205-224	**Aligned as designed**	Teachers need to emphasize how we explain our past based on geologic evidence and be intentional about the idea that what we see today is similar to what has occurred in the past.
ES3C	In most locations sedimentary rocks are in horizontal formations with the oldest layers on the bottom. However, in some locations, rock layers are folded, tipped, or even inverted, providing evidence of geologic events in the distant past.	• Explain why younger layers of sedimentary rocks are usually on top of older layers, and hypothesize what geologic events could have caused huge blocks of horizontal sedimentary layers to be tipped or older rock layers to be on top of younger rock layers.	Investigation 6 parts 1-4 pp 205-224	**Aligned as designed**	Teacher can enhance learning with a connection to sedimentary rock storing evidence of the past (fossils).
ES3D	Earth has been shaped by many natural catastrophes, including earthquakes, volcanic eruptions, glaciers, floods, storms, tsunami, and the impacts of asteroids.	• Interpret current land forms of the Pacific Northwest as evidence of past geologic events (e.g., Mount St. Helen's and Crater Lake provide evidence of volcanism, the Channeled Scablands provides evidence of floods that resulted from melting of glaciers).	Investigation 6 parts 2-4 pp 209-224	**Aligned as designed**	The unit/ lesson contain many opportunities to discuss how the passing of time as evidenced by land formations.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
LS2A	An ecosystem consists of all the populations living within a specific area and the nonliving factors they interact with. One geographical area may contain many ecosystems.	• Explain that an ecosystem is a defined area that contains populations of organisms and nonliving factors. • Give examples of ecosystems (e.g., Olympic National Forest, Puget Sound, one square foot of lawn) and describe their boundaries and contents.	Investigation 6 parts 1-4 pp 198-224; Lab Notebook, pp 45-53	**Aligned with modifications (see comments)**	The teacher needs to be intentional about using living examples that the students are familiar with in addition to the fossil evidence.
LS2D	Ecosystems are continuously changing. Causes of these changes include nonliving factors such as the amount of light, range of temperatures, and availability of water, as well as living factors such as the disappearance of different species through disease, predation, habitat destruction and overuse of resources or the introduction of new species.	• Predict what may happen to an ecosystem if nonliving factors change (e.g., the amount of light, range of temperatures, or availability of water or habitat), or if one or more populations are removed from or added to the ecosystem.	Investigation 6 parts 1-3 pp 198-224; Lab Notebook, pp 45-51	**Aligned as designed**	The teacher needs to be intentional about discussing the effects of environmental change on flora & fauna using kid familiar examples.
LS3A	The scientific theory of evolution underlies the study of biology and explains both the diversity of life on Earth and similarities of all organisms at the chemical, cellular, and molecular level. Evolution is supported by multiple forms of scientific evidence.	• Explain and provide evidence of how biological evolution accounts for the diversity of species on Earth today.	Investigation 6 parts 2 and 3 pp 209-219; Resource book pp 76-82	**Aligned as designed**	The unit/lesson has international use of terms: evolution, natural selection, evidence and theory. The teacher must have students analyze their time lines for similarities and differences between the life forms depicted there.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
LS3E	Adaptations are physical or behavioral changes that are inherited and enhance the ability of an organism to survive and reproduce in a particular environment.	• Give an example of a plant or animal adaptation that would confer a survival and reproductive advantage during a given environmental change.	Investigation 6 parts 2-4 pp 209-219; Lab Notebook pp 49-53	**Aligned with modifications (see comments)**	The unit/ lesson contain many opportunities to discuss the effects of environment on the flora and fauna in a local ecosystem and how changes to the environment might affect the life there.
LS3F	Extinction occurs when the environment changes and the adaptive characteristics of a species, including its behaviors, are insufficient to allow its survival.	• Given an ecosystem, predict which organisms are most likely to disappear from that environment when the environment changes in specific ways.	Investigation 6 parts 2-4 pp 209-219; Lab Notebook pp 49-53	**Aligned as designed**	The teacher must be intentional about use of the terms: extinct, fossil, index fossil and correlation.
LS3G	Evidence for evolution includes similarities among anatomical and cell structures, and patterns of development make it possible to infer degree of relatedness among organisms.	Infer the degree of relatedness of two species, given diagrams of anatomical features of the two species (e.g., chicken wing, whale flipper, human hand, bee leg).	Investigation 6 parts 2-4 pp 209-219; Lab Notebook pp 49-53; Resource book pp 76-82	**Aligned as designed**	Teacher must make use of information found on the CD-ROM and Resource book on pp 76 - 82. Teacher must be intentional about use of the terms for evolution: natural selection, parent, daughter, characteristics and patterns. Teacher must ask questions about degree of relatedness between numerous specimens.

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FOSS/MS Earth History ~ Investigation 07

Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 7 part 2 pp 240-243; Lab Notebook p 63; Resource book pp 83-88	**Aligned as designed**	Teacher must make use of information found in the "Index-Fossil Correlation Questions" and the Resource book. The use of Extending the Experience 1-4 on p 244 of the teacher guide will enhance retention.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 7 parts 1 and 2 pp 234-243; CD-ROM: Time Room-Time Machine	**Aligned as designed**	Teacher must be intentional about using the CD-ROM connecting inference and evidence when analyzing observations.
ES2E	The solid Earth is composed of a relatively thin crust, a dense metallic core, and a layer called the mantle between the crust and core that is very hot and partially melted.	• Sketch and label the major layers of Earth, showing the approximate relative thickness and consistency of the crust, core, and mantle.	Investigation 7 parts 1 and 2 pp 234-244	**Aligned as designed**	The unit/lesson is an integral part of a learning progression. Continue to reinforce the knowledge of the earths layers and rock formation.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2F	The crust is composed of huge crustal plates on the scale of continents and oceans which move centimeters per year, pushed by convection in the upper mantle, causing earthquakes, volcanoes, and mountains.	• Draw a labeled diagram showing how convection in the upper mantle drives movement of crustal plates. • Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunami, faults, mountain building), with examples from the Pacific Northwest.	Investigation 7 parts 1 and 2 pp 234-244	**Aligned as designed**	The teacher needs to intentionally take advantage of multiple opportunities to relate the standard to the work being performed in the investigations.
ES2H	The rock cycle describes the formation of igneous rock from magma or lava, sedimentary rock from compaction of eroded particles, and metamorphic rock by heating and pressure.	• Identify samples of igneous, sedimentary, and metamorphic rock from their properties and describe how their properties provide evidence of how they were formed. • Explain how one kind of rock could eventually become a different kind of rock.	Investigation 7 parts 1-4 pp 234-245	**Aligned with modifications (see comments)**	Teacher must continue to relate the investigations to the rock cycle and earth history.
ES3A	Our understanding of Earth history is based on the assumption that processes we see today are similar to those that occurred in the past.	• Describe Earth processes that we can observe and measure today (e.g., rate of sedimentation, movement of crustal plates, and changes in composition of the atmosphere) that provide clues to Earth's past.	Investigation 7 parts 1 and 2 pp 234-244	**Aligned as designed**	Teacher can enhance the learning and retention of Earth History by posing questions related to time and how our earth provides evidence of what took place in the past and what may take place in the future.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3C	In most locations sedimentary rocks are in horizontal formations with the oldest layers on the bottom. However, in some locations, rock layers are folded, tipped, or even inverted, providing evidence of geologic events in the distant past.	• Explain why younger layers of sedimentary rocks are usually on top of older layers, and hypothesize what geologic events could have caused huge blocks of horizontal sedimentary layers to be tipped or older rock layers to be on top of younger rock layers.	Investigation 7 parts 1 and 2 pp 228-234	**Aligned as designed**	This unit/lesson is a part of a conceptual sequence of time and sedimentary rock.
ES3D	Earth has been shaped by many natural catastrophes, including earthquakes, volcanic eruptions, glaciers, floods, storms, tsunami, and the impacts of asteroids.	• Interpret current land forms of the Pacific Northwest as evidence of past geologic events (e.g., Mount St. Helen's and Crater Lake provide evidence of volcanism, the Channeled Scablands provides evidence of floods that resulted from melting of glaciers).	Investigation 7 parts 1 and 2 pp 234-243	**Aligned as designed**	Teacher can enhance the retention of the learning by keeping an ongoing discussion about how fossils tell us about our past.
LS1E	In classifying organisms, scientists consider both internal and external structures and behaviors.	• Use a classification key to identify organisms, noting use of both internal and external structures as well as behaviors.	Investigation 7 parts 1-2 pp 228-243: Lab Notebook pp 54-71	**Aligned as designed**	Teacher must be intentional about sharing numerous examples of both internal and external structure to show similarities.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
LS2A	An ecosystem consists of all the populations living within a specific area and the nonliving factors they interact with. One geographical area may contain many ecosystems.	• Explain that an ecosystem is a defined area that contains populations of organisms and nonliving factors. • Give examples of ecosystems (e.g., Olympic National Forest, Puget Sound, one square foot of lawn) and describe their boundaries and contents.	Investigation 7 parts 1-2 pp 228-243; Lab Notebook pp 54-69	**Aligned with modifications (see comments)**	Teacher must be intentional about using local living examples that students should be familiar then go to extinct examples.
LS2D	Ecosystems are continuously changing. Causes of these changes include nonliving factors such as the amount of light, range of temperatures, and availability of water, as well as living factors such as the disappearance of different species through disease, predation, habitat destruction and overuse of resources or the introduction of new species.	• Predict what may happen to an ecosystem if nonliving factors change (e.g., the amount of light, range of temperatures, or availability of water or habitat), or if one or more populations are removed from or added to the ecosystem.	Investigation 7 parts 1-2 pp 228-243; Lab Notebook pp 54-71	**Aligned as designed**	The teacher needs to be intentional about having students compare and contrast various life forms current and extinct, to connect evidence for evolution.
LS3A	The scientific theory of evolution underlies the study of biology and explains both the diversity of life on Earth and similarities of all organisms at the chemical, cellular, and molecular level. Evolution is supported by multiple forms of scientific evidence.	• Explain and provide evidence of how biological evolution accounts for the diversity of species on Earth today.	Investigation 7 parts 1-2 pp 228-243; Lab Notebook pp 54-71	**Aligned as designed**	Teacher must be intentional about using examples that the kids will be familiar with.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
LS3E	Adaptations are physical or behavioral changes that are inherited and enhance the ability of an organism to survive and reproduce in a particular environment.	• Give an example of a plant or animal adaptation that would confer a survival and reproductive advantage during a given environmental change.	Investigation 7 parts 1 and 2 pp 228-243; Lab Notebook pp 54-71	**Aligned with modifications (see comments)**	The unit/ lesson contain many opportunities to discuss the effects of environment on the flora and fauna in a local ecosystem and how changes to the environment might affect the life there.
LS3F	Extinction occurs when the environment changes and the adaptive characteristics of a species, including its behaviors, are insufficient to allow its survival.	• Given an ecosystem, predict which organisms are most likely to disappear from that environment when the environment changes in specific ways.	Investigation 7 parts 1 and 2 pp 228-243; Lab Notebook pp 5-71	**Aligned as designed**	Teacher must be intentional about use of the terms: extinct, fossil, index fossil and correlation.
LS3G	Evidence for evolution includes similarities among anatomical and cell structures, and patterns of development make it possible to infer degree of relatedness among organisms.	Infer the degree of relatedness of two species, given diagrams of anatomical features of the two species (e.g., chicken wing, whale flipper, human hand, bee leg).	Investigation 7 parts 1 and 2 pp 228-243; Lab Notebook pp 54-71; Resource Book pp 76-82	**Aligned as designed**	Teacher must make use of information found on the CD-ROM and the Resource book on pp 76 - 82. Teacher must be intentional about use of the terms for Evolution: natural selection, parent, daughter, characteristics and patterns. Teacher must ask questions about degree of relatedness between numerous specimens.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQD	For an experiment to be valid, all (controlled) variables must be kept the same whenever possible, except for the manipulated (independent) variable being tested and the responding (dependent) variable being measured and recorded. If a variable cannot be controlled, it must be reported and accounted for.	• Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables. Determine which variables should be kept the same (controlled), which (independent) variable should be systematically manipulated, and which responding (dependent) variable is to be measured and recorded. Report any variables not controlled and explain how they might affect results.	Investigation 8 part 2 pp 259-265	**Module/Unit requires changes (see comments)**	Teacher must be intentional about use of the terms (vocabulary)variable, control, manipulated (independent) variable, responding (dependent) variable. This will take an intentional re-teaching of the vocabulary and experimental process.
INQE	Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations.	• Create a model or simulation to represent the behavior of objects, events, systems, or processes. Use the model to explore the relationship between two variables and point out how the model or simulation is similar to or different from the actual phenomenon.	Investigation 8 parts 2 and 4 pp 259-265, 270-275	**Aligned as designed**	Teacher may make use of local geologic information. This may include information about the flood from Glacial Lake Missoula, or the Spokane Aquifer, for example.
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 8 parts 2-4 pp 259-274	**Aligned as designed**	The teacher needs to be intentional about discussing the standard and connecting the investigation to the local area.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
INQF	It is important to distinguish between the results of a particular investigation and general conclusions drawn from these results.	• Generate a scientific conclusion from an investigation using inferential logic, and clearly distinguish between results (e.g., evidence) and conclusions (e.g., explanation). • Describe the differences between an objective summary of the findings and an inference made from the findings.	Investigation 8 parts 2-4 pp 259-274	**Aligned as designed**	
APPB	Scientists and technological designers (including engineers) have different goals. Scientists answer questions about the natural world; technological designers solve problems that help people reach their goals.	• Investigate several professions in which an understanding of science and technology is required. Explain why that understanding is necessary for success in each profession.	Investigation 8 part 4 pp 270-275; Extending the Learning 2 on p 275; Resource book pp 98-99	**Aligned as designed**	Teacher must be intentional about referring to the reading on careers, as well as, using the internet to explore other careers in science.
PS2A	Substances have characteristic intrinsic properties such as density, solubility, boiling point, and melting point, all of which are independent of the amount of the sample.	• Use characteristic intrinsic properties such as density, boiling point, and melting point to identify an unknown substance.	Investigation 8 parts 3 and 4 pp 266-275; CD-ROM: Rock Database, Expeditions-Bright Angel Train; Extending the Experience 4 p 275	**Aligned with modifications (see comments)**	Teacher must be intentional about relating the properties to all substances.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS2D	Compounds are composed of two or more kinds of atoms, which are bound together in well-defined molecules or arrays.	• Demonstrate with a labeled diagram and explain the relationship among atoms, molecules, elements, and compounds.	Investigation 8 parts 1 and 2 pp 254-265; CD-ROM: Geology Lab-Rock Database	**Module/Unit requires changes (see comments)**	Teachers need to relate sand and rock as an example of a compound using a model.
PS2E	Solids, liquids, and gases differ in the motion of individual particles. In solids, particles are packed in a nearly rigid structure; in liquids, particles move around one another; and in gases, particles move almost independently.	• Describe how solids, liquids, and gases behave when put into a container (e.g., a gas fills the entire volume of the container). Relate these properties to the relative movement of the particles in the three states of matter.	Investigation 8 parts 1 and 2 pp 254-265	**Aligned with modifications (see comments)**	Teacher must relate the solid and liquid states of rocks and minerals to crystal formation.
PS3A	Energy exists in many forms: heat, light, chemical, electrical, motion of objects, and sound. Energy can be transformed from one form to another and transferred from one place to another.	• List different forms of energy (e.g., thermal, light, chemical, electrical, kinetic, and sound energy). • Describe ways in which energy is transformed from one form to another and transferred from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).	Investigation 8 parts 1 and 2 pp 254-265	**Aligned with modifications (see comments)**	Teacher must use the correct vocabulary for energy transfers within liquids and solids

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
PS3B	Conduction, radiation, and convection, or mechanical mixing, are means of energy transfer.	• Use everyday examples of conduction, radiation, and convection, or mechanical mixing, to illustrate the transfer of energy from warmer objects to cooler ones until the objects reach the same temperature.	Investigation 8 parts 1 and 2 pp 254-265	**Module/Unit requires changes (see comments)**	Teacher must be intentional about using the correct vocabulary for energy transfers within liquids and solids. Teacher must also make the connection between the structure of the Earth and heat flow.
PS3C	Heat (thermal energy) consists of random motion and the vibrations of atoms and molecules. The higher the temperature, the greater the atomic or molecular motion. Thermal insulators are materials that resist the flow of heat.	• Explain how various types of insulation slow transfer of heat energy based on the atomic-molecular model of heat (thermal energy).	Investigation 8 parts 1 and 2 pp 254-265	**Module/Unit requires changes (see comments)**	Teacher must be intentional about relating motion of molecules to temperature and distribution of energy and make the connection to rock and crystal formation.
ES2E	The solid Earth is composed of a relatively thin crust, a dense metallic core, and a layer called the mantle between the crust and core that is very hot and partially melted.	• Sketch and label the major layers of Earth, showing the approximate relative thickness and consistency of the crust, core, and mantle.	Investigation 8 parts 1-4 pp 254-275	**Aligned as designed**	The unit/lesson is an integral part of a learning progression. Reflect upon crystal size in igneous rock as related to environmental conditions. Also, ensure students understand the constructive and destructive forces in the lithosphere.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES2F	The crust is composed of huge crustal plates on the scale of continents and oceans which move centimeters per year, pushed by convection in the upper mantle, causing earthquakes, volcanoes, and mountains.	• Draw a labeled diagram showing how convection in the upper mantle drives movement of crustal plates. • Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunami, faults, mountain building), with examples from the Pacific Northwest.	Investigation 8 parts 1-4 pp 254-275	**Aligned as designed**	Teacher must be intentional about reinforcing the knowledge of the effect of the environment on rock formation, as well as, the constructive and destructive forces in the lithosphere.
ES2H	The rock cycle describes the formation of igneous rock from magma or lava, sedimentary rock from compaction of eroded particles, and metamorphic rock by heating and pressure.	• Identify samples of igneous, sedimentary, and metamorphic rock from their properties and describe how their properties provide evidence of how they were formed. • Explain how one kind of rock could eventually become a different kind of rock.	Investigation 8 parts 1-4 pp 254-275	**Aligned with modifications (see comments)**	Teacher can reinforce the learning by using Extending the Experience.
ES3A	Our understanding of Earth history is based on the assumption that processes we see today are similar to those that occurred in the past.	• Describe Earth processes that we can observe and measure today (e.g., rate of sedimentation, movement of crustal plates, and changes in composition of the atmosphere) that provide clues to Earth's past.	Investigation 8 parts 1-4 pp 254-274	**Aligned as designed**	Teacher can enhance the learning with questions relating to making inferences based on evidence.

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Standard	Content Standard	Performance Expectation	Evidence of Alignment	Alignment	Alignment Comments
ES3D	Earth has been shaped by many natural catastrophes, including earthquakes, volcanic eruptions, glaciers, floods, storms, tsunami, and the impacts of asteroids.	• Interpret current land forms of the Pacific Northwest as evidence of past geologic events (e.g., Mount St. Helen's and Crater Lake provide evidence of volcanism, the Channeled Scablands provides evidence of floods that resulted from melting of glaciers).	Investigation 8 parts 1 and 3 pp 254-258 and 268-269	**Aligned as designed**	Teacher must be intentional about bringing closure to the unit with a connection to local earth history and the similarities and differences between what they see locally and what they have studied in this module.