Oregon Essentialized Assessment Framework (EAF)

Science Grades 5, 8 and High School

About This Document

This document presents Oregon's updated Essentialized Assessment Framework (EAF), for Oregon's Alternate Assessment, based on the Alternate Academic Achievement Standards (AA-AAAS) for Science, organized by grade level and aligned with the most current state academic content standards. The AA-AAAS are essentialized versions of Oregon's general education standards, systematically reduced in depth, breadth, and complexity to ensure meaningful access for students with the most significant cognitive disabilities, as required by Every Student Succeeds Act (ESSA, 2015).

Each page is structured to serve as a clear, practical tool for classroom planning and instructional decision-making and includes the following:

- Source Standard: The original or updated Oregon grade-level academic content standard that provides the academic foundation for each AA-AAAS.
- Alternate Academic Achievement Standard (AA-AAAS): A carefully essentialized version of the source standard, developed using Oregon's validated SCORE process (Select, COde, Reduce, Essentialize) to maintain the core intent while removing barriers to access.
- Low, Medium, and High (L, M, H) Parameters: Defined ranges of complexity that guide how each AA-AAAS can be taught and assessed at levels appropriate to individual student abilities and needs.

Approach to Non-Essentialized Standards

In linkage with established practice for alternate academic achievement standards, not all general education source standards are essentialized for inclusion in this document. The essentialization process focuses on selecting and adapting standards that can be clearly linked to observable skills and measured reliably within the structure of Oregon's Extended Assessment. A list of source standard codes that were reviewed but not essentialized is included on the last page of each grade level. Educators may refer to Oregon's published content standards for the full description and context of these codes.

How to Use This Document

This resource is designed to be an instructional planning companion for teachers, specialists, and support staff delivering meaningful academic instruction aligned with the Oregon Extended Assessment (ORExt). Unlike previous versions distributed in Excel format, this PDF is streamlined and organized for ease of use, based on direct feedback from Oregon educators.

Teachers are encouraged to use the Source Standards for context, the AA-AAAS for instructional targets, and the L/M/H parameters to scaffold lessons and adjust complexity, ensuring each student has an appropriately challenging and accessible pathway toward grade-level expectations.

Contact

For additional support in implementing the AA-AAAS or for questions about alignment and instruction, please contact the Oregon Department of Education or visit ODE's Alternate Assessment webpage.

ORExt Standard Code: S05ESS1.1 Equivalent ODE Standard: 5-ESS1-1	
Oregon Science Standard 2022: Support an argument that the apparent brightness of the Sun and stars is due to their relative distances from Earth. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is to obtain information and construct an explanation on how the scale of the distance to objects giving off light affects the brightness of objects (e.g. nearby streetlights appear bigger and brighter than distant streetlights).] [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, and stage).]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the Sun is brighter than other objects on Earth and in space. **Low (L), Medium (M), High (H) Parameters:** **L:** Questions ask about the Sun being brighter than other common objects that do not shine on their own (e.g., toy, ball, rock). **M:** Questions ask about the Sun being brighter than other objects in sky or space that are not as bright (e.g., clouds, airplanes, rockets, birds, Moon, other stars, planets). **H:** Questions ask about the Sun being brighter than other stars in space because it is closer to the Earth.

ORExt Standard Code: S05ESS1.2 Equivalent ODE Standard: 5-ESS1-2	
Oregon Science Standard 2022: Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the Sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Use picture models to understand the difference between day and night and the appearance and direction of shadows. **Low (L), Medium (M), High (H) Parameters:** **L:** Questions use simple pictures and diagrams to ask about the difference between day and night (e.g., the Sun/daylight is associated with daytime and the Moon/stars/darkness are associated with nighttime), including that shadows typically happen during the daytime. **M:** Questions use simple pictures and diagrams to ask about shadows that occur during the daytime (e.g., occurrence/direction/size of shadows based on position of Sun). **H:** Questions use simple pictures and diagrams to ask about the Sun and the direction of shadows, including the relative amount of sunlight in different circumstances and the portion of the Earth that is daytime/nighttime (e.g., Sun lighting one side of the Earth and not the other).

ORExt Standard Code: S05ESS2.1 Equivalent ODE Standard: 5-ESS2-1	
Oregon Science Standard 2022: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different parts of the Earth's systems, what they are comprised of, and associated processes. **Low (L), Medium (M), High (H) Parameters:** **L:** Correctly identify common living organisms of Earth's biosphere, including plants and animals, though not specific names of animals or plants. **M:** Correctly identify common non-living features of the Earth from various systems, restricted to: ponds, lakes, rivers, streams, and oceans (i.e., from the hydrosphere); rocks, minerals, mountains, volcanoes, and canyons (i.e., from the geosphere); and air, clouds, and fog (i.e., from the atmosphere). **H:** Correctly identify simple interactions among the systems (e.g., clouds (from the atmosphere) providing water (through rain) to oceans and lakes (from the hydrosphere) and to humans/animals/plants (from the biosphere); lakes/rivers (hydrosphere) providing water to humans/animals/plants (biosphere); weather (atmosphere) and water (hydrosphere) eroding mountains/rocks (through wind/rain and streams/rivers, respectively)).

Science Grade 5

ORExt Standard Code: S05ESS2.2 Equivalent ODE Standard: 5-ESS2-2	
Oregon Science Standard 2022: Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on models to organize data about the quantity of saltwater and freshwater in various reservoirs and graph data to compare the proportions of saltwater and freshwater on Earth.] [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify features made of water, and compare the amount of water in different reservoirs on Earth. **Low (L), Medium (M), High (H) Parameters:** **L:** Restricted to questions about which Earth features are made of water (i.e., oceans, lakes, rivers, streams) as compared to common objects that are not (e.g., rock, toy, ball). **M:** Restricted to questions about which Earth features are made of water (i.e., oceans, lakes, rivers, streams) as compared to other natural features that are not (e.g., mountains, volcanoes, forests). **H:** Restricted to comparing the relative amounts of water in various features of the hydrosphere (i.e., oceans, lakes, rivers, streams, ponds) using diagrams/graphs that reflect the relative percentages (e.g., ocean vs. lakes vs. rivers, Pacific Ocean vs. other oceans).

Science Grade 5

ORExt Standard Code: S05ESS3.1 Equivalent ODE Standard: 5-ESS3-1	
Oregon Science Standard 2022: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on gathering data to construct an explanation on how and why the selected activity protects the Earth's resources and environment for the identified region or community (e.g. agriculture practices, solar or wave energy).] [Assessment Boundary: Assessment is limited to describing how communities use science ideas to protect Earth's resources and environment and does not focus on cause and effect of human impacts on the environment.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which people and communities protect or harm the Earth's environment. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify activities that pollute or harm the planet (e.g., car with exhaust, trash on ground) as compared to common activities that obviously do not (e.g., walking, riding bike, playing outside). **M:** Identify which of several simple and common choices is a way to protect or help the Earth (e.g., putting trash in can, recycling, riding bike for transportation) as compared to common and unrelated activities (e.g., playing with a toy, reading a book). **H:** Identify which of several simple and common choices is a way to protect or help the Earth (e.g., putting trash in can, recycling, riding bike for transportation) as compared to activities that pollute or harm the Earth (e.g., pollution from a factory, littering in streams or ocean, oil spilling from a ship).

Science Grade 5

ORExt Standard Code: S05ETS1.1 Equivalent ODE Standard: 3-5-ETS1-1	
Oregon Science Standard 2022: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: A design problem must be identified before solutions are developed. Solutions or designs identify the criteria for success and identify limitations and constraints.] [Assessment Boundary: Assessment does not include limitations or criteria based on specific process or system boundaries (e.g. limitations of scientific principles or long-term societal and environmental impacts).]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different problems to solve, including those related to science/engineering design. **Low (L), Medium (M), High (H) Parameters:** **L:** Questions are of a type "Which shows a (design) problem to solve?", and are restricted to pictures and descriptions of a simple problem compared to simple objects (e.g., flat bike tire compared to a book, bird). **M:** Questions are of a type "Which shows a (design) problem to solve?", and are restricted to a picture and description of a simple problem compared to other activities or situations that are obviously not (e.g., flat tire/missing bike tire/broken toy compared to reading a book, eating food, driving a car). **H:** Questions are of the type "Which shows a (design) problem to solve?", and are restricted to more complex problems (e.g., displaying cars/airplanes) with answers showing a possible (design) problem compared to those that are not (e.g., running out of fuel, missing a wheel/wing vs. car driving/plane flying).

ORExt Standard Code: S05ETS1.2 Equivalent ODE Standard: 3-5-ETS1-2	
Oregon Science Standard 2022: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on researching a problem prior to designing a solution, plan for testing to evaluate how well it will perform under a range of likely conditions using scientific knowledge and communicating the design process.] [Assessment Boundary: Assessment is limited to the design process and modeling.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify possible solutions to different problems, including those related to science/engineering design. **Low (L), Medium (M), High (H) Parameters:** **L:** Questions involve simple solutions around daily activities or needs (e.g., eating food - use a spoon/fork; being cold outside - wearing a coat). **M:** Questions involve simple solutions and are restricted to common problems and solutions and/or the tools that solve them (i.e., flat bike/car tire - use a bike pump; plants dying – use a sprinkler or hose/give plant food; nail or screw sticking out - use a hammer or screwdriver) compared to obvious non-solutions or unrelated actions (e.g., play outside, go to the park). **H:** Questions involve simple solutions and are restricted to common problems and actions and/or the tools that solve them (i.e., flat bike/car tire - use a pump; plants in a garden dying – use sprinkler or hose/give plant food; nail or a screw sticking out - use a hammer or screwdriver) compared to solutions to other similar and related problems.

Science Grade 5

OExt Standard Code: S05LFS1.1 Equivalent ODE Standard: 5-LS1-1	
Oregon Science Standard 2022: Support an argument that plants get the materials they need for growth chiefly from air and water. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.] [Assessment Boundary: Assessment does not include photosynthesis or the photosynthesis reaction equation.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that plants need light, air, and water to grow. **Low (L), Medium (M), High (H) Parameters:** **L:** Questions use simple diagrams that ask what a plant/tree/flower needs to grow – the correct answer being light, water and/or air compared to things that would obviously not help growth. **M:** Questions use simple diagrams to examine if a single plant/tree/flower will grow better/worse/the same if given varying amounts of light, water and/or air. **H:** Questions use simple diagrams to compare the (potential or actual) growth of 2-3 plants/trees/flowers when one is given an appropriate light, water and/or air, and the others are not.

ORExt Standard Code: S05LFS2.1 Equivalent ODE Standard: 5-LS2-1	
Oregon Science Standard 2022: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that living organisms need different things to grow and survive. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify which is an animal, plant, or decomposer using common terminology and pictures of common organisms. **M:** Identify that animals must eat food (i.e., plants, other animals) and drink water to survive, and that plants need materials in soil, air and water to survive compared to common objects/features they don't need - emphasis is on the matter these organisms need for survival. **H:** Expand to include where in the environment such matter needed for survival comes from.

Science Grade 5

<table>
<tr><td colspan="2">ORExt Standard Code: S05PHS1.1
Equivalent ODE Standard: 5-PS1-1</td></tr>
<tr><td>Oregon Science Standard 2022:
Develop a model to describe that matter is made of particles too small to be seen.

Oregon Science Standard Clarifications/Assessment Boundary 2022:
[Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.]
[Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]</td><td>Oregon Alternate Academic Achievement Standard (Essentialized Standard):
Recognize that objects, animals, and plants are made of smaller parts and identify various seen and unseen parts.

Low (L), Medium (M), High (H) Parameters:
L: Identify the parts of large common and inanimate objects with easily recognizable smaller parts (e.g., cars/trucks - wheels; buildings/houses - doors and windows; building blocks - smaller blocks).
M: Identify the parts of a wider variety of inanimate objects (e.g., computer screen - keyboard) and common living organisms (e.g., dogs/cats/birds – arms/legs/eyes/wings; plants/trees – leaves/flowers/trunk).
H: Identify more complex parts of other common objects and living organisms including those that are too small to be seen (e.g., water/objects/animals/plants are made of atoms/molecules).</td></tr>
</table>

Science Grade 5

ORExt Standard Code: S05PHS1.2 Equivalent ODE Standard: 5-PS1-2	
Oregon Science Standard 2022: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Measure and/or compare the weight of different types of matter. **Low (L), Medium (M), High (H) Parameters:** **L:** Measure the weight/mass of common objects in various phases of matter using pictures of such objects (e.g., an object on a scale that weighs 3 pounds). **M:** Compare the weight/mass of common objects in various stages of matter using pictures of such objects (e.g., a balloon weighs less than a rock or glass of water) or choose the correct tool to measure the weight/mass of objects. **H:** Compare the weight/mass of common objects in various phases of matter using graphs and data.

Science Grade 5

ORExt Standard Code: S05PHS1.3 Equivalent ODE Standard: 5-PS1-3	
Oregon Science Standard 2022: Make observations and measurements to identify materials based on their properties. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and measure the physical properties of matter. **Low (L), Medium (M), High (H) Parameters:** **L:** Properties include size and shape of common objects. **M:** Properties include size, shape and extend to include hardness/softness and mass of objects. **H:** Properties include size, shape, hardness/softness, mass, and volume, including the use of graphs and picture representations of matter in different phases (i.e., solid, liquid, vapor/gas).

ORExt Standard Code: S05PHS1.4 Equivalent ODE Standard: 5-PS1-4	
Oregon Science Standard 2022: Conduct an investigation to determine whether the mixing of two or more substances results in new substances. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is to investigate the effect of combining various substances to determine if a new substance is formed. Quantitative or qualitative data will be collected (e.g. weight or mass, temperature, state of matter, color, texture, odor).] [Assessment Boundary: Assessment does not include having students distinguish between mass and weight. This specific distinction occurs in middle grades.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize when substances are mixed together. **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize two solids mixed together that do not form a new substance (e.g., rocks and soil, objects in sand). **M:** Recognize one solid and one liquid mixed together that do not form a new substance (e.g., sand and water). **H:** Picture of one solid and one liquid, two liquids or two gasses that when mixed form a new substance (e.g., salt water, fruit punch, paint, air).

Science Grade 5

ORExt Standard Code: S05PHS2.1 Equivalent ODE Standard: 5-PS2-1	
Oregon Science Standard 2022: Support an argument that the gravitational force exerted by Earth on objects is directed down. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that gravity makes objects fall downward. **Low (L), Medium (M), High (H) Parameters:** **L:** Restrict questions/pictures/diagrams to asking about the direction common objects will fall when dropped (i.e., a ball moves downward when dropped). **M:** Incorporate the concept of gravity into questions (i.e., similar questions as L-level, but specifically using the word "gravity"). **H:** Incorporate more abstract diagrams (i.e., of larger land areas/the Earth/Moon in space) with and without objects in diagrams that ask about the influence of gravity.

Science Grade 5

ORExt Standard Code: S05PHS3.1 Equivalent ODE Standard: 5-PS3-1	
Oregon Science Standard 2022: Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the Sun. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of models could include diagrams, and flow charts.] [Assessment Boundary: Assessment does not include photosynthesis or the photosynthesis reaction equation. Students should know that plants carry out photosynthesis for energy, but they do not need to know the specifics of the process or equation. Similarly, this assessment does not include the process or mechanisms for metabolism. Students should understand the relationship between animals and the food they eat to obtain energy for bodily functions, growth, and repair.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the Sun provides the Earth and living organisms with energy. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify that the Sun (compared to other space and/or non-space objects) gives the vast majority of light and heat energy to the Earth. **M:** Identify that the Sun gives light and heat energy to organisms (e.g., plants and animals) on Earth for survival. **H:** Recognize that the Sun gives light and heat energy to plants and animals on Earth, which in turn provide humans with energy (i.e., for survival, body repair, growth and motion).

Standards not Essentialized:
Please refer to Oregon's published content standards for the full description and context of these codes.

3-5-ETS1-3

ORExt Standard Code: S08ESS1.2 Equivalent ODE Standard: MS-ESS1-2 and MS-PS2-4	
Oregon Science Standard 2022: MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. MS-PS2-4: Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** MS-ESS1-2: [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.] MS-PS2-4: [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that gravity influences the way objects move on Earth and in space (progression from S05PHS2.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Use questions and diagrams to ask about the direction that common objects will fall when dropped (i.e., a ball moves downward when dropped) based on the role of gravity, including the use of the term. **M:** Extend L-level to include role of gravity involving Earth-Moon relations and Earth-Sun relations. **H:** Extend M-level to include role of gravity involving other objects in the solar system (e.g., other planets and the Sun, moons of other planets, comets).

ORExt Standard Code: S08ESS1.3 Equivalent ODE Standard: MS-ESS1-3	
Oregon Science Standard 2022: Analyze and interpret data to determine scale properties of objects in the solar system. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and compare objects in the solar system and their features. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the Sun and the Earth as compared to other unrelated objects here on Earth. **M:** Identify the Sun, Earth, and Moon as compared to other related space objects in the solar system. **H:** Extend M-level to involve the comparison of various objects (e.g., their size or shape) in the solar system (i.e., Sun, Moon, Earth, other planets, comets, asteroids) using diagrams, graphs, and models.

Science Grade 8

ORExt Standard Code: S08ESS2.2 Equivalent ODE Standard: MS-ESS2-2	
Oregon Science Standard 2022: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different geoscience processes that shape the Earth (progression from S05ESS2.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the process that leads to erosion when provided a model (e.g., water, ice, or wind). **M:** Identify conditions that lead to specific types of surface weathering (i.e., with water, ice, or wind as mechanism). **H:** Identify geoscience processes that shape local geographic features (e.g., earthquakes, volcanoes, river erosion, meteorites/craters).

Science Grade 8

ORExt Standard Code: S08ESS2.4 Equivalent ODE Standard: MS-ESS2-4	
Oregon Science Standard 2022: Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify water in its various forms, and how water changes, including through the water cycle. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the three forms of water as compared to other unrelated objects. **M:** Identify a specific form of water as compared to other forms of water. **H:** Connect the forms of water to various (simple) points in the water cycle using diagrams and picture representations.

ORExt Standard Code: S08ESS2.5 Equivalent ODE Standard: MS-ESS2-5	
Oregon Science Standard 2022: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different types of weather conditions and their characteristics. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify different simple weather conditions (i.e., rain, cloudy, sunny, foggy, stormy, etc.) as compared to objects or conditions that are unrelated. **M:** Identify different simple weather conditions (i.e., rain, cloudy, sunny, foggy, etc.) as compared to objects or conditions that are related (i.e., other weather conditions). **H:** Connect physical conditions to weather (e.g., wet to rain, dry or hot to sunny).

ORExt Standard Code: S08ESS3.3 Equivalent ODE Standard: MS-ESS3-3	
Oregon Science Standard 2022: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which people and communities protect the Earth's environment (progression from S05ESS3.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify which among several simple and common choices is a way to protect or help the Earth/environment (e.g., putting trash in can, recycling, riding bike for transportation, using less water) as compared to common and unrelated activities (e.g., playing with a toy, reading a book). **M:** Identify which of several simple and common choices is a way to protect or help the Earth/environment (e.g., putting trash in can, recycling, riding bike) as compared to activities that pollute or harm the Earth (e.g., pollution from a factory, littering in streams/ocean, oil spilling from a ship). **H:** Identify and compare simple methods for monitoring or reducing human impact on the Earth/environment (e.g., a graph comparing the amount of trash three cities produce, the amount of water three cities consume, the amount of materials recycled by three schools).

***** This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea.

Science Grade 8

ORExt Standard Code: S08ESS3.4 Equivalent ODE Standard: MS-ESS3-4	
Oregon Science Standard 2022: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which people and communities use and impact the Earth's resources (progression from S05ESS3.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify natural resources as compared to other unrelated items or objects. **M:** Identify natural resources based on their use (e.g., Which is burned for fire?; Which do we use for energy?). **H:** Extend M-level to human use of natural resources and its effects using simple graphs and diagrams (e.g., Which city consumes/produces the most food resources/water/energy?).

ORExt Standard Code: S08ETS1.1 Equivalent ODE Standard: MS-ETS1-1	
Oregon Science Standard 2022: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and compare different problems, including design-related problems, that impact people and the environment (progression from S05ETS1.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions are of the type "Which shows a (design) problem to solve?", and are restricted to a picture and description of a simple problem compared to other activities or situations that are obviously not (e.g., flat tire/missing bike tire/broken toy compared to reading a book, eating food, driving a car). **M:** Questions are of the type "Which shows a (design) problem to solve?", and are restricted to more complex problems (e.g., displaying cars/airplanes) with answers showing a possible (design) problem compared to those that are not (e.g., running out of fuel, missing a wheel/wing vs. car driving/plane flying). **H:** Extend the complexity of M-level, including the use of graphs (e.g., weakest material among distractors) and diagrams, and questions about likelihood based on simple data (e.g., Which material is likely to break first?).

ORExt Standard Code: S08ETS1.2 Equivalent ODE Standard: MS-ETS1-2	
Oregon Science Standard 2022: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and compare possible solutions to different problems, including design-related problems, that impact people and the environment (progression from S05ETS1.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions involve simple solutions and are restricted to common problems and solutions and/or the tools that solve them (i.e., flat bike/car tire - use a bike pump: plants dying – use a sprinkler or hose/give plant food: nail or screw sticking out - use a hammer or screwdriver) compared to obvious non-solutions/unrelated actions (e.g., play outside, go to the park). **M:** Questions involve simple solutions and are restricted to common problems and actions and/or the tools that solve them (i.e., flat bike/car tire - use a pump: plants in garden dying – use sprinkler or hose/give plant food: nail or a screw sticking out - use a hammer or screwdriver) compared to solutions to other similar problems. **H:** Extend the complexity of M-level, including the use of graphs (e.g., strongest metal, hardest material, best material for making something) and diagrams (e.g., simple flow charts).

Science Grade 8

ORExt Standard Code: S08LFS1.3 Equivalent ODE Standard: MS-LS1-3	
Oregon Science Standard 2022: Construct an explanation supported by evidence for how the body is composed of interacting systems consisting of cells, tissues, and organs working together to maintain homeostasis. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis should be on the function and interactions of the major body systems (e.g. circulatory, respiratory, nervous, musculoskeletal).] [Assessment Boundary: Assessment is focused on the interactions between systems not on the functions of individual systems.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different parts or systems of the human body, including that they are composed of different materials and have different functions. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify simple external parts of the body. **M:** Identify simple internal parts or systems of the body using simple terminology and diagrams. **H:** Connect human body parts to their materials and function (e.g., skeletal system/bones providing structure, muscles providing strength for movement).

ORExt Standard Code: S08LFS1.4 Equivalent ODE Standard: MS-LS1-4	
Oregon Science Standard 2022: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on both animals and plants (behaviors and structures). Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different ways in which animals and plants better survive (i.e., behaviors/structures in animals and structures in plants connected to successful functions) (progression from S05LFS1.1, S05LFS1.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify or distinguish animals and plants from other objects (e.g., Which is an animal?). **M:** Identify different animal and plant behaviors and structures (e.g., Which part is the flower? Which part shows the ears?; Which shows a bear hibernating?). **H:** Connect animal and plant behaviors/structures to their function (e.g., Which body parts help the cheetah run fast?; Which tree gets the most sunlight?; Which body parts help the owl see prey at night?).

ORExt Standard Code: S08LFS1.6 Equivalent ODE Standard: MS-LS1-6	
Oregon Science Standard 2022: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that plants need light, air, and water to grow through a process called photosynthesis (progression from S05LFS1.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions use simple pictures and diagrams to ask what a plant/tree/flower needs to grow (i.e., the correct answer being light, water, or air compared to materials that would not help it grow such as complete darkness, soda, salt). **M:** Questions use simple pictures and diagrams to compare the (potential) growth of a plant/tree/flower (if one is given light, water, and/or air, and the other is not), while including the term/role/description of photosynthesis in questions about what would help the plant grow (comparisons between two different plants may be used). **H:** Extend M-level by incorporating into diagrams images of the Sun, arrows that indicate flow of energy, intake of carbon dioxide, release of oxygen, with questions pertaining to growth under different environmental conditions during photosynthesis.

ORExt Standard Code: S08LFS1.7 Equivalent ODE Standard: MS-LS1-7	
Oregon Science Standard 2022: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that food helps living organisms grow and obtain energy (progression from S05LFS2.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions are related to humans and animals needing food to grow (e.g., Which do you eat to grow?; Which helps the kitten grow?). **M:** Extend L-level questions to involve food providing "energy" to humans and animals. **H:** Introduce graphical displays/diagrams to ask questions about the relative amount of energy or expected growth based on a given situation (e.g., a bar chart showing varying amounts of food/water given to a pet/plant).

OrExt Standard Code: S08LFS2.1 Equivalent ODE Standard: MS-LS2-1, MS-LS1-5 and MS-LS2-4	
Oregon Science Standard 2022: MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** MS-LS2-1: [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.] MS-LS1-5: [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.] MS-LS2-4: [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the availability of and changes in resources (i.e., food, water, shelter, habitat) effects the growth and number of living organisms in an ecosystem (progression from S05LFS2.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Differentiate between individual living organisms and groups of living organisms (e.g., Which is a living organism?; Which shows a group of living animals?). **M:** Identify various resources that individual or groups of living organisms need to grow, reproduce, or sustain their population. **H:** Extend M-level to involve simple changes in resources and how such changes might affect an individual or group of living organisms.

Science Grade 8

OrExt Standard Code: S08LFS2.2 Equivalent ODE Standard: MS-LS2-2	
Oregon Science Standard 2022: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which living organisms interact with other living and non-living ecosystem components. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify related living organisms versus (specifically) non-living parts of ecosystems and vice versa (e.g., Which shows a pond - pond, frog, fish). **M:** Extend L-level to involve interactions between living and non-living aspects of a given ecosystem (e.g., habitat, shelter, water). **H:** Extend M-level to involve interaction between individual or groups of living organisms (e.g., predator-prey, competitive, mutually beneficial).

ORExt Standard Code: S08LFS3.2 Equivalent ODE Standard: MS-LS3-2	
Oregon Science Standard 2022: Develop and use models to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that reproduction produces offspring with similar though varied traits. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify (match) the offspring of a given living organism (i.e., plants, animals, humans): answer should be exactly or very closely identical and distractors include different species. **M:** Identify the offspring of a given living organism (i.e., plants, animals, humans): answer should not be identical, and distractors should be different species. **H:** Identify the offspring of a given living organism (i.e., plants, animals, humans): should not be identical, and include variations of the same and different species.

ORExt Standard Code: S08LFS4.2 Equivalent ODE Standard: MS-LS4-2 and MS-LS4-1	
Oregon Science Standard 2022: MS-LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. MS-LS4-1: Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** MS-LS4-2: [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.] MS-LS4-1: [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize anatomically similar organisms, including that they are likely related. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify like animals based on their physical characteristics (i.e., dogs with dogs, or cats with cats, with distractors being very different organisms such as a bug and bird, while like animals look slightly different - e.g., add spots, face a different way). **M:** Identify similar animals based on their physical characteristics with more reasonable distractors (e.g., lion with cat). **H:** Extend M-level to include fossils of common extinct organisms.

ORExt Standard Code: S08LFS4.4 Equivalent ODE Standard: MS-LS4-4	
Oregon Science Standard 2022: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify genetic traits that help living organisms survive. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify simple traits of animals that help them survive or reproduce (though not referring to survival/reproduction) as compared to traits or objects that are unrelated to animal. **M:** Extend L-level by directly referring to/asking about traits that help them survive as compared to traits from other animals that help them survive. **H:** Questions ask about the function of traits related to a single animal or group of same animal (e.g., Which trait helps the giraffe reach food from the tops of trees?; Which trait helps the owl see prey in the dark?) among other traits of the target animal.

ORExt Standard Code: S08PHS1.2 Equivalent ODE Standard: MS-PS1-2	
Oregon Science Standard 2022: Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and measure the physical and chemical properties of matter, including before or after they change (progression from 5.PHS1.3). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify and compare simple physical properties including size, shape, hardness/softness, weight, mass and density of common objects, with the chemical property restricted to whether or not a substance is flammable. **M:** Properties include all of those in L-level and may involve identifying properties after a physical/chemical change to a given substance, including the use of graphs and data tables of such properties. **H:** Extend M-level to physical versus chemical changes, including which has occurred and simple results.

ORExt Standard Code: S08PHS1.3 Equivalent ODE Standard: MS-PS1-3	
Oregon Science Standard 2022: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different materials we use and that they come from the Earth's natural resources. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify different types of common and everyday objects or materials. **M:** Identify different types of common and everyday objects or materials that come from natural resources. **H:** Identify the natural resource from which common and everyday objects or materials come from (e.g., paper comes from wood/trees, metal in a car comes from iron/aluminum).

Science Grade 8

ORExt Standard Code: S08PHS2.1 Equivalent ODE Standard: MS-PS2-1	
Oregon Science Standard 2022: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify objects in motion and actions, including associated reactions. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify objects that are at rest or in motion. **M:** Identify actions that will involve an associated reaction. **H:** Identify and associate simple actions and reactions.

***** This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea.

ORExt Standard Code: S08PHS2.2 Equivalent ODE Standard: MS-PS2-2	
Oregon Science Standard 2022: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the force, mass, and motion of objects are related and comparable. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify or compare objects in relation to their mass. **M:** Qualitatively link mass with force and motion. **H:** Qualitatively compare forces, mass, and changes in motion in various situations.

OExt Standard Code: S08PHS3.4 Equivalent ODE Standard: MS-PS3-4, MS-PS1-4, and MS-PS3-3	
Oregon Science Standard 2022: MS-PS3-4: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. MS-PS1-4: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. MS-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** MS-PS3-4: [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.] MS-PS1-4: [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.] MS-PS3-3: [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize temperature as a measure of how hot or cold matter is, and that heat is transferable. **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize the difference between hot and cold (e.g., using objects, outside vs. inside). **M:** Recognize that hot and cold are related to measures of temperature, including changes in temperature. **H:** Identify examples of heat transfer, and how such transfer might be minimized or maximized (e.g., wearing a coat to stay warm).

Science Grade 8

ORExt Standard Code: S08PHS4.2 Equivalent ODE Standard: MS-PS4-2 and MS-PS4-1	
Oregon Science Standard 2022: MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** MS-PS4-2: [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.] MS-PS4-1: [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different types of mechanical (e.g., ocean sound) and electromagnetic (e.g., light) waves, and describe/compare them qualitatively/quantitatively. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify waves as compared to other objects. **M:** Describe waves qualitatively. **H:** Describe or compare waves qualitatively and quantitatively.

Standards not Essentialized:
Please refer to Oregon's published content standards for the full description and context of these codes.

MS-ESS1-1	MS-ESS3-5	MS-LS2-5	MS-PS1-6
MS-ESS1-4	MS-ETS1-3	MS-LS3-1	MS-PS2-3
MS-ESS2-1	MS-ETS1-4	MS-LS4-3	MS-PS2-5
MS-ESS2-3	MS-LS1-1	MS-LS4-5	MS-PS3-1
MS-ESS2-6	MS-LS1-2	MS-LS4-6	MS-PS3-2
MS-ESS3-1	MS-LS1-8	MS-PS1-1	MS-PS3-5
MS-ESS3-2	MS-LS2-3	MS-PS1-5	MS-PS4-3

ORExt Standard Code: S11ESS1.1 Equivalent ODE Standard: HS-ESS1-1	
Oregon Science Standard 2022: Develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth in the form of radiation. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the Sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the Sun's radiation varies due to sudden solar flares ("space weather"), the 11- year sunspot cycle, and non-cyclic variations over centuries.] [Assessment Boundary: Assessment does not include details of the atomic and sub-atomic processes involved with the Sun's nuclear fusion.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the Sun provides the Earth and living organisms with different types of energy, including in the form of radiation (progression from S05PHS3.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize that the Sun (compared to other space and non-space objects) gives light and heat energy to the Earth. **M:** Recognize that the Sun gives light and heat energy to the Earth and its organisms (e.g., plants and animals) compared to other space and non-space objects. **H:** Recognize that the Sun gives energy to the Earth, plants and animals, and thus, humans in the form of different types of radiation. H-level specifically uses the term "radiation" and can introduce types of radiation beyond heat and visible light (e.g., infra-red, ultraviolet, x-ray), though questions/diagrams/graphs should remain clear and simplistic (e.g., Which is a type of radiation the Sun sends to the Earth? - ultraviolet, rain, wind).

ORExt Standard Code: S11ESS1.4 Equivalent ODE Standard: HS-ESS1-4	
Oregon Science Standard 2022: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify and compare features of natural and manmade objects in the solar system, including how they orbit due to gravity (progression from S08ESS1.2, S08ESS1.3). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the Sun, Earth, and Moon as compared to other objects in the solar system; restrict questions related to gravity/orbiting motion to the Moon around the Earth and the Earth around the Sun. **M:** Extend to identify or ask questions about the features of or the role of gravity in the orbit of other natural objects in the solar system (i.e., Sun, Moon, Earth, other planets). **H:** Extend M-level to include questions about identifying or the features of additional natural and manmade objects and their orbit around the Earth, the Sun, or other planets (or other moons, comets, asteroids and man-made satellites) including through the use of diagrams and/or graphs.

ORExt Standard Code: S11ESS2.1 Equivalent ODE Standard: HS-ESS2-1	
Oregon Science Standard 2022: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).] [Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different (geoscience) processes that shape the Earth including associated Earth features (progression from S08ESS2.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify conditions that lead to specific types of surface weathering (i.e., with water, ice, or wind as vehicle - Which shows water erosion?). **M:** Identify geoscience processes that shape local geographic features (e.g., earthquakes, rivers, volcanoes, meteorites/craters - Which is an example of volcanism?). **H:** Extend M-level by linking features to the geoscience process (e.g., Which type of erosion process likely led to the canyon?; Which feature is associated with recent volcanism?).

Science High School

OExt Standard Code: S11ESS2.5 Equivalent ODE Standard: HS-ESS2-5	
Oregon Science Standard 2022: Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify the properties of the three forms of water and how water changes, including through various stages of the water cycle (progression from S08ESS2.4). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the three forms of water as compared to other related substances (i.e., near distractor might be another form of water, far could be another chemical or other natural object/substance). **M:** Identify and ask questions about the three forms of water as compared to other forms of water. **H:** Extend M-level to connect the forms of water to various points in the water cycle using diagrams and picture models, including specific questions about the three forms using graphic representations.

<table>
<tr><td colspan="2">ORExt Standard Code: S11ESS3.1
Equivalent ODE Standard: HS-ESS3-1, HS-ESS3-3, and HS-ESS3-5</td></tr>
<tr><td>Oregon Science Standard 2022:
HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
HS-ESS3-5: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

Oregon Science Standard Clarifications/Assessment Boundary 2022:
HS-ESS3-1: [Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting, and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]</td><td>Oregon Alternate Academic Achievement Standard (Essentialized Standard): Identify ways in which humans and other living organisms are influenced by natural resources, natural hazards, and weather or climate changes (progression from S08ESS2.5).

Low (L), Medium (M), High (H) Parameters:
L: Identify natural resources, natural hazards and aspects of weather/climate as compared to other unrelated items or objects.
M: Identify natural resources, natural hazards and aspects of weather/climate as compared to other related materials processes (e.g., Which shows a hurricane?; Which shows rain?).
H: Extend M-level by linking resource use and natural hazards and aspects of weather/climate to their impact on humans (e.g., Which is burned for fire?; Which do we use for energy?; Which is a natural disaster that is dangerous to humans?; Which of the following involves a change in weather or climate?).</td></tr>
</table>

HS-ESS3-3: [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.] [Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.] HS-ESS3-5: [Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]	

ORExt Standard Code: S11ESS3.4 Equivalent ODE Standard: HS-ESS3-4, HS-LS2-7, and HS-LS4-6	
Oregon Science Standard 2022: HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems. HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. HS-LS4-6: Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** HS-ESS3-4: [Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoengineering design solutions (such as altering global temperatures by making large changes to the atmosphere or ocean).] HS-LS2-7: [Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.] HS-LS4-6: [Clarification Statement: Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which people and communities protect the Earth's environment, including through the use of technology (progression from S08ESS3.3). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify which among simple/common choices is a way to protect or help the Earth (e.g., putting trash in can, recycling, riding bike) as compared to activities that pollute or harm the Earth (e.g., pollution from a factory, littering in streams/ocean, oil spilling from a ship). **M:** Identify and compare simple methods for monitoring or reducing human impact on the Earth or environment (e.g., a graph comparing the amount of trash three cities produce, the amount of water three cities consume, the amount of materials recycled by three schools). **H:** Extend M-level to include the use of technology to monitor/solve problems/protect the environment. H-level graphs can be similar if not the same, but content should specifically use language around the use of technology to monitor or solve an environmental problem.

Science High School

Science High School

ORExt Standard Code: S11ETS1.1 Equivalent ODE Standard: HS-ETS1-1 and HS-ETS1-2	
Oregon Science Standard 2022: HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify real-world problems and associated solutions that impact individuals and broader society (progression from S08ETS1.1, S08ETS1.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Based on a simple problem that impacts an individual or small group (i.e., a family, group of friends), identify the problem, possible constraints, and solutions to the problem. **M:** Based on a simple problem that impacts a broader community (i.e., a neighborhood, community, town, city, etc.) identify the problem, possible constraints, and solutions to the problem. **H:** Based on a simple problem that impacts broader society (i.e., state, region, nation, global, culture, etc.) identify the problem, possible constraints, and solutions to the problem.

OExt Standard Code: S11LFS1.2 Equivalent ODE Standard: HS-LS1-2	
Oregon Science Standard 2022: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify different parts/internal systems of living organisms, including that they are composed of different materials and have different functions (progression from S08LFS1.3). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify different external/internal parts/systems of the body using simple terminology and diagrams. **M:** Connect external human body parts to their materials and function (e.g., legs providing walking/running movement, eyes providing sight). **H:** Connect internal human body parts to their materials and function (e.g., skeletal system/bones providing structure).

ORExt Standard Code: S11LFS1.5 Equivalent ODE Standard: HS-LS1-5	
Oregon Science Standard 2022: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that plants need light, air, and water to grow and create energy through a process called photosynthesis (progression from S08LFS1.6). **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize through simple pictures and diagrams what a plant/tree/flower needs to grow (i.e., the correct answer being light, water, or air vs. related materials that would not help it grow - darkness, no water, no air, soda), while including the term/role/description of photosynthesis. **M:** Extend L-level by using simple representative diagrams to compare the (potential) growth of a plant/tree/flower (if one is given light, water and/or air, and the other is not), while including the term/role/description of photosynthesis in questions about what would help the plant grow (comparisons between plants are acceptable). **H:** Extend M-level by incorporating diagrams of photosynthesis that include things like the Sun (or other light source), arrows that indicate flow of light energy to create food (sugars) for the plants to function and grow under different environmental conditions.

Science High School

OExt Standard Code: S11LFS1.7 Equivalent ODE Standard: HS-LS1-7	
Oregon Science Standard 2022: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that humans and animals need oxygen to breathe and break down food to grow and obtain energy (progression from S08LFS1.7). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions are related to humans and animals needing food and oxygen to survive and grow (e.g., Which do you need to grow?; What does the dog breathe?). **M:** Extend L-level to involve oxygen and/or food helping to provide "energy" to humans and animals. **H:** Extend M-level by incorporating graphical diagrams that involve the relative amount of energy or expected growth based on a given situation involving food and/or oxygen.

Science High School

OExt Standard Code: S11LFS2.2 Equivalent ODE Standard: HS-LS2-2 and HS-LS2-1	
Oregon Science Standard 2022: HS-LS2-2: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. HS-LS2-2: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** HS-LS2-1: [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.] HS-LS2-1: [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize and identify factors that affect living organisms, including biodiversity and populations of organisms in an ecosystem (progression from S08LFS2.1). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify various resources or environmental factors that individual or groups of living organisms need to grow/reproduce/sustain their population. **M:** Extend L-level to involve simple changes in resources and how change might affect an individual or group of living organisms (e.g., removing a forest/food source might decrease bird/mammal populations). **H:** Introduce and ask questions about the concept of biodiversity, including how it might change based on factors such as availability of and changes in resources (e.g., food, water, shelter, habitat).

Science High School

ORExt Standard Code: S11LFS2.6 Equivalent ODE Standard: HS-LS2-6	
Oregon Science Standard 2022: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify ways in which living organisms interact with other living and non-living ecosystem components and how such interactions may change under different environmental conditions (progression from S08LFS2.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Questions involve interaction between living and non-living aspects of a given ecosystem (e.g., habitat, shelter, water). **M:** Extend L-level to involve interaction between living organisms (e.g., predator-prey, competitive, mutually beneficial). **H:** Extend M-level to involve a change to either non-living or living related interaction and what the result might be, including the development of new ecosystems (e.g., no water becomes a desert-like ecosystem; loss of habitat induces animals to move to new area or decrease in numbers; loss of predator results in an increase in prey population) - being careful to give enough detail so that student understands the context and interaction being targeted.

ORExt Standard Code: S11LFS3.2 Equivalent ODE Standard: HS-LS3-2	
Oregon Science Standard 2022: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.] [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that sexual reproduction produces offspring with similar though varied traits based on genetic and environmental factors (progression from S08LFS3.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify the offspring of a living organism (i.e., plants, animals, humans); correct answer should not be identical, and distractors should include different species. **M:** Identify the offspring of a given living organism (i.e., plants, animals, humans); correct answer should not be identical to distractor and should include variations of the same and different species. **H:** Identify the offspring of a given living organism (i.e., plants, animals, humans); correct answer should not be identical, with distractor options including both same and different species, and questions can introduce concept/situations involving changing environmental factors/mutations (e.g., increased pollution might cause an unhealthy offspring or a deformity, a slow change in habitat might result in detrimental or beneficial traits).

ORExt Standard Code: S11LFS4.3 Equivalent ODE Standard: HS-LS4-3	
Oregon Science Standard 2022: Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations.] [Assessment Boundary: Assessment is limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that living organisms have traits that help them survive, and that those organisms with advantageous traits are more likely to survive compared to organisms with less advantageous traits (progression from S08LFS4.4). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify simple traits of animals (that help them survive/reproduce, while specifically referring to survival/reproduction) as compared to traits from other animals that are unrelated to target animal. **M:** Extend L-level to include the function of traits related to a single animal/group of same animal (e.g., Which trait helps the giraffe reach food from the tops of trees?; Which trait helps the owl see prey in the dark?) among other traits of the target animal. **H:** Extend M-level by involving issues of survival/reproduction (e.g., Which group of giraffes would survive/increase in number if...) given a certain set of traits in a certain environmental circumstance or setting (e.g., habitat with tall trees). For H-level, the traits need to be variations on the same trait - the crux being that the correct option should relate to having an advantage in the given circumstance. M- and H-level may also involve similar traits across different animals (i.e., wings on birds, tails for balance, etc).

ORExt Standard Code: S11LFS4.4 Equivalent ODE Standard: HS-LS4-4	
Oregon Science Standard 2022: Construct an explanation based on evidence for how natural selection leads to adaptation of populations. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify examples of and ways in which living organisms adapt to their environment. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify simple features of humans, animals, or plants that involve an adaptation without using language that links the featured adaptation to its purpose (e.g., Which shows the tusks of an elephant?; Which is the hand of this boy?) as compared to other features of the organism or from a different organism. **M:** Identify features of humans, animals, or plants that involve an adaptation using language that links the featured adaptation to its purpose (e.g., The elephant uses its tusks for digging and sparring with other elephants. Which shows the elephants tusks?) as compared to other features of the target organism. **H:** Identify a specific adaptation (i.e., body part, behavior) based on asking about its function (e.g., Which adaptation does the tiger use to hide in tall grass?; Which adaptation attracts bees to the flower?).

Science High School

OExt Standard Code: S11PHS1.2 Equivalent ODE Standard: HS-PS1-2	
Oregon Science Standard 2022: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen.] [Assessment Boundary: Assessment is limited to chemical reactions involving main group elements and combustion reactions.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify physical and chemical properties before and after a physical/chemical change, and whether nor not a physical/chemical change has occurred (progression from S08PHS1.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify and compare simple physical properties (including size, shape, hardness/softness, weight, mass, and density) of common objects; and chemical property includes whether or not a substance is flammable. **M:** Properties include all of those in L-level and involves analyzing properties after a physical/chemical change to a given substance, including the use of graphs and data tables of such properties. **H:** Extend M-level to physical versus chemical changes, which has occurred, and simple results.

Science High School

OrExt Standard Code: S11PHS1.3 Equivalent ODE Standard: HS-PS1-3	
Oregon Science Standard 2022: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** **[**Clarification Statement: Emphasis is on understanding the strengths of forces between particles, not on naming specific intermolecular forces (such as dipole-dipole). Examples of particles could include ions, atoms, molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [Assessment Boundary: Assessment does not include Raoult's law calculations of vapor pressure.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify the properties of bulk substances, including on the material/resources from which they are made (progression from S08PHS1.3). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify different bulk properties of common and everyday objects or materials by linking them to the properties of the material or resources from which they are made (e.g., This chair is made from hard wood. What property does the chair have?). **M:** Identify different bulk properties of common and everyday objects or materials while linking them to the material or resources from which they are made. **H:** Identify the common (shared) physical or chemical property of both the object or material, and the material or resource, from which common and everyday objects or materials come from. Clarification around OrExt test questions: M-level does not explicitly detail the property of the resource/material. H-level questions require students to explicitly identify the shared property between the source material and object.

Science High School

ORExt Standard Code: S11PHS1.7 Equivalent ODE Standard: HS-PS1-7	
Oregon Science Standard 2022: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on using mathematical ideas to communicate the proportional relationships between masses of atoms in the reactants and the products, and the translation of these relationships to the macroscopic scale using the mole as the conversion from the atomic to the macroscopic scale. Emphasis is on assessing students' use of mathematical thinking and not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include complex chemical reactions.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that matter is conserved, including during physical changes and chemical reactions (progression from S08PHS1.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize through pictures/diagrams when a material or an object is the same. **M:** Recognize through pictures/diagrams when the amount of matter (mass) of a given material/object is the same. **H:** Recognize that the amount of matter (mass) is conserved after a physical change or chemical reaction. Clarification around ORExt test questions: The primary difference between L- and M-level questions is that mass (a mathematical measurement) is introduced in the M-level. H-level introduces a physical change or chemical reaction.

Science High School

ORExt Standard Code: S11PHS2.1 Equivalent ODE Standard: HS-PS2-1	
Oregon Science Standard 2022: Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the force, mass, and the motion of objects are related and comparable (progression from S08PHS2.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Qualitatively link mass with force and motion. **M:** Qualitatively compare forces, mass, and changes in motion in various comparative situations. **H:** Qualitatively and quantitatively compare forces, mass, and changes in motion using diagrams, graphs, or tables.

Science High School

ORExt Standard Code: S11PHS2.3 Equivalent ODE Standard: HS-PS2-3	
Oregon Science Standard 2022: Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that the amount of force on objects is comparable and alterable, and identify ways in which the amount of force can be decreased or minimized (progression from S08PHS2.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify which object has the most/least force (e.g., two of three different objects not moving, and one large/massive object moving or vice versa). **M:** Identify, which among three options or scenarios (using the same object), would result in an increase (larger amount) or decrease (smaller amount) in the amount of force. **H:** Identify devices that would help or ways in which one might decrease/minimize the amount of force during an impact or collision.

Science High School

OExt Standard Code: S11PHS3.3 Equivalent ODE Standard: HS-PS3-3	
Oregon Science Standard 2022: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.* **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize that energy is transferable and convertible, and identify examples of and ways in which such transfers occur (progression from S08PHS3.4). **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize or identify different examples of energy relative to its source (i.e., Sun to heat energy, light bulb to light energy, radio to sound energy - Which shows an example of heat energy?). **M:** Extend L-level to also involve language around "energy transfer". **H:** Recognize examples of common everyday conversions of energy (e.g., Which shows an example of converting the Sun's energy to electricity?; Which object converts electricity to heat energy?).

***** This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea.

Science High School

OExt Standard Code: S11PHS3.4 Equivalent ODE Standard: HS-PS3-4	
Oregon Science Standard 2022: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] [Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Recognize temperature (thermal energy) as a measure of how hot or cold matter is and that it is transferable (progression from S11PHS3.4). **Low (L), Medium (M), High (H) Parameters:** **L:** Recognize that hot and cold are related to measures of temperature, including the tools used to measure temperature (i.e., traditional/digital thermometers). **M:** Recognize examples of heat transfer or changes in temperature, and how such transfer might be minimized/maximized and measured (e.g., wearing a coat to stay warm, heating up a pan of water using stove, measuring temperature (changes) using a digital thermometer). **H:** Recognize heat transfer and changes in temperature using diagrams, models, and graphs to show such transfer/change, whether in a given circumstance or over time.

Science High School

ORExt Standard Code: S11PHS4.1 Equivalent ODE Standard: HS-PS4-1 and HS-PS4-5	
Oregon Science Standard 2022: HS-PS4-1: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. HS-PS4-5: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** HS-PS4-1: [Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.] [Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.] HS-PS4-5: [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify, describe, and compare different types of waves qualitatively and quantitatively, including how they travel (progression from S08PHS4.2). **Low (L), Medium (M), High (H) Parameters:** **L:** Identify and describe examples of waves qualitatively. **M:** Identify, describe, or compare waves qualitatively (e.g., Which shows a wave being reflected?; Which wave has the largest wavelength?). **H:** Identify, describe, or compare waves using diagrams, graphs, and data tables that show examples of waves traveling through or interacting with various objects/media. L-level may, but does not have to, include comparisons to non-waves. M- and H-levels introduce the manner in which waves travel and quantitative aspects of wave measurement.

Science High School

ORExt Standard Code: S11PHS4.2 Equivalent ODE Standard: HS-PS4-2	
Oregon Science Standard 2022: Evaluate questions about the advantages of using a digital transmission and storage of information. **Oregon Science Standard Clarifications/Assessment Boundary 2022:** [Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.]	**Oregon Alternate Academic Achievement Standard (Essentialized Standard):** Identify examples and uses of digital technology that store and transmit information. **Low (L), Medium (M), High (H) Parameters:** **L:** Identify common types of digital storage/transmitting technology (e.g., desktop/laptop computers, smart phones, tablets) as compared to objects devices that are unrelated (e.g., Which shows a computer?; Which shows a laptop?). **M:** Identify that digital technology stores and transmits information in various common ways (e.g., email, texting, picture transfer) as compared to other unrelated (i.e., non-electronic and non-digital) objects that do not. **H:** Identify that digital devices store and transmit information in various common ways (e.g., email, texting, picture transfer) as compared to other electronic objects that do not, including other electronic/digital devices.

Science High School

Standards not Essentialized:
Please refer to Oregon's published content standards for the full description and context of these codes.

HS-ESS1-2	HS-LS1-1	HS-PS1-1
HS-ESS1-3	HS-LS1-3	HS-PS1-4
HS-ESS1-5	HS-LS1-4	HS-PS1-5
HS-ESS1-6	HS-LS1-6	HS-PS1-6
HS-ESS2-2	HS-LS2-3	HS-PS1-8
HS-ESS2-3	HS-LS2-4	HS-PS2-2
HS-ESS2-4	HS-LS2-5	HS-PS2-4
HS-ESS2-6	HS-LS2-8	HS-PS2-5
HS-ESS2-7	HS-LS3-1	HS-PS2-6
HS-ESS3-2	HS-LS3-3	HS-PS3-1
HS-ESS3-6	HS-LS4-1	HS-PS3-2
HS-ETS1-3	HS-LS4-2	HS-PS3-5
HS-ETS1-4	HS-LS4-5	HS-PS4-3
		HS-PS4-4