

# Washington State Science

## EALRs

(Essential Academic Learning Requirements)

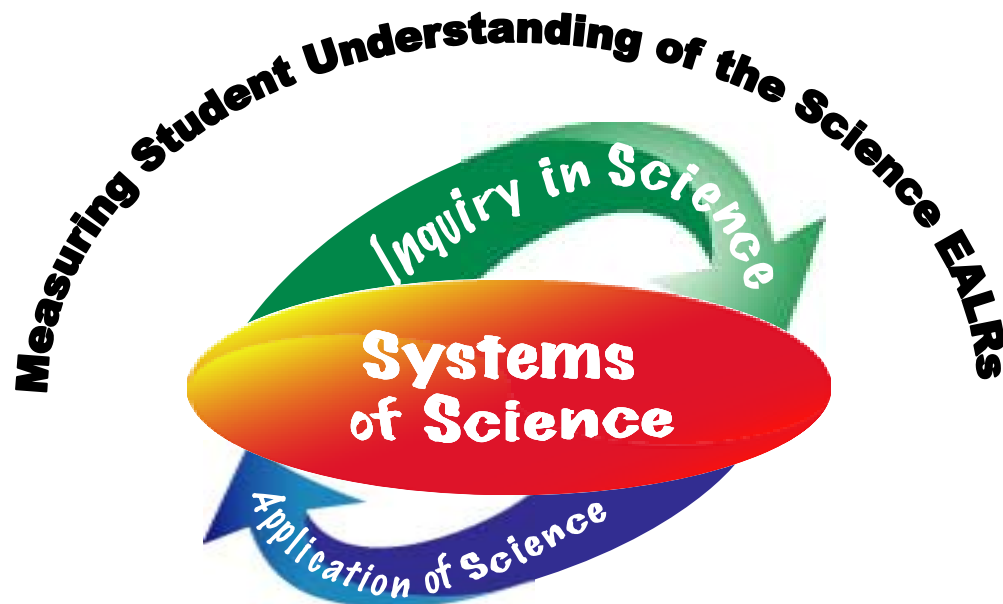
## GLEs

(Grade Level Expectations)

# WASL Evidences of Learning

(Washington Assessment of Student Learning)

- This is a guiding document for developing the Science WASL, PCAs, and SIMEs; and for aligning science curriculum to assessment.
- This is a hyperlinked Word document with the precise Science EALRs, GLEs (assessment learning targets), Core Science Concepts, WASL Evidences of Learning (assessment item specifications), WASL codes, WASL vocabulary, It Scoring Rule, and IDEA Definition of Action Words.
- This document also contains clarification of GLE coding and troublesome science concepts.



**NOTE:** All 2007 refinements are highlighted in yellow.



# Science GLEs with WASL Evidences of Learning

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**Note:** GLE's in large capital letters are **core science concepts**. These concepts are keys to understanding the systems of science (EALR 1). Core concepts are fundamental and incorporate other related concepts. Students proficient on the science WASL, demonstrate understanding of these core science concepts

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**Note:** In this document, 'i.e.' means 'in other words' and 'e.g.' means 'for example'. The use of 'i.e.' indicates a strong clarification of an Evidence of Learning. The use of 'e.g.' indicates the following is included simply as an example.



# Science WASL Specifications

## **EALR 1: Systems of Nature Strand**

The student knows and applies scientific concepts and principles to understand the properties, structure, and changes in physical, earth/space, and living systems.

### **1.1 Properties of Systems**

Understand how properties are used to identify, describe, and categorize substances, materials, and objects and how characteristics are used to categorize living things.

#### **Grade Level Expectation: PR01 1.1.1 Properties of Substances**

*For changes in the state of matter, go to CH03 Conservation of Matter and Energy*

#### **Grades K-2**

Understand simple properties of common natural and manufactured materials and objects.

#### **Classroom Evidences of Learning**

- a) (K) Identify and describe a property of an object.
- b) (K) Sort common materials and objects using a simple property (e.g. texture, color, size, shape).
- c) (2) Sort common objects by multiple simple properties (e.g. texture and color, size and shape).
- d) (2) Identify and describe the differences between common natural and manufactured materials and objects using properties.

#### **Grades 3-5**

Understand how to use properties to sort natural and manufactured materials and objects.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (4) Identify, describe, sort, or classify objects, natural materials, and manufactured materials using observed physical properties (e.g. color, hardness, length, shape, size, smell, temperature, texture, magnetic properties, and weight).
- b) (4) Identify or describe water's state of matter as solid, liquid, or gas in different situations.
- c) (4) Identify or describe which state(s) of matter (solid, liquid, or gas) can change shape and which can expand to fill a container.

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# Science WASL Specifications

## **Grade Level Expectation: PR01 1.1.1 Properties of Substances** (continued)

*For changes in the state of matter, go to CH03 Conservation of Matter and Energy*

### **Grades 6-8**

Understand how to use physical and chemical properties to sort and identify substances.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- (6) Identify, categorize, or describe substances using physical and/or chemical properties (i.e. boiling point, density, freezing point, mass, acidity (pH), magnetism, and solubility).
- (8) Identify an unknown substance using properties of known substances.
- (8) Identify or describe how the mass of an object is the same when measured anywhere in the universe at any normal speed.
- (8) Identify or describe why substances with the same volume or same mass may have different densities.
- (8) Identify or describe the volumetric properties of solids, liquids, and gases (e.g. a gas has the same volume as its container).

### **Grades 9-10**

Understand the atomic nature of matter, how it relates to physical and chemical properties, and how it serves as the basis for the structure and use of the Periodic Table.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- (10) Identify an unknown substance using the substance's physical and/or chemical properties.
- (10) Identify, describe, explain, or predict the behavior of a substance based upon the substance's atomic structure, physical properties, and/or chemical properties.
- (10) Identify or describe the characteristics of electrons, neutrons, and/or protons (i.e. electrons have negative charge and very little mass, protons have positive charge and much greater mass than electrons, neutrons have neutral charge and the same mass as protons).
- (10) Identify, describe, or explain how changing the number of electrons, neutrons, and/or protons of an atom affects that atom (e.g. Changing the number of electrons and neutrons of an atom does not change that atom's atomic number or placement on the periodic table.).
- (10) Identify, describe, or explain the similar properties shared by elements in vertical columns (groups or families) of the periodic table.
- (10) Identify, describe, or predict the properties of an element based on the element's location (groups or families) on the periodic table.

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# Science WASL Specifications

## Grade Level Expectation: PR02 1.1.2 Motion of Objects

### Grades K-2

Understand the position and motion of common objects.

#### **Classroom Evidences of Learning**

- a) (1) Know that things may move in many different ways (i.e. back and forth, fast and slow, around and around, straight)
- b) (1) Describe that the way to change an object's motion is to push or pull the object.

### Grades 3-5

Understand the relative position and motion of objects.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (3) Identify or describe the position of one object relative to another object (or surroundings) using positional language (e.g. in front of, behind, to the left, to the right, above, below) and/or a distance scale (e.g. centimeters).
- b) (5) Identify or describe the motion of an object as the object travels in a straight line in terms of distance, time, and/or direction.

### Grades 6-8

Understand the positions, relative speeds, and changes in speed of objects.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (7) Identify or describe the relative position or change in position of one or two objects.
- b) (7) Identify or describe an object's motion as speeding up, slowing down, or moving with constant speed using models, numbers, words, diagrams, or graphs.
- c) (7) Identify or describe the speed of an object relative to the speed of another object.

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# Science WASL Specifications

## Grade Level Expectation: PR02 1.1.2 Motion of Objects (continued)

### Grades 9-10

Apply an understanding of direction, speed, and acceleration when describing the linear motion of objects.

### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (9) **Identify or** describe the linear motion (speed, direction, and/or acceleration) of an object during a given time interval relative to Earth or some other object (e.g. as a car accelerates onto a freeway, the car speeds up from 30 km/hr to 90 km/hr in 10 seconds).
- b) (9) Identify, describe, explain, or determine the average speed of an object during a given time interval when the object is moving in a straight line.

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# Science WASL Specifications

## **Grade Level Expectation: PR03 1.1.3 Wave Behavior**

**Grades K-2** (No GLE at this grade level)

### **Grades 3-5**

Understand the behavior of sound in terms of vibrations and pitch. Understand the behavior of light in terms of bouncing off, passing through, and changes in direction.

### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (3) Identify or describe that when an object vibrates, the object may produce sound people can hear.
- b) (3) Identify, describe, or explain the relationship between the pitch of a sound and the vibrations of the object causing the sound.
- c) (3, 4) Identify or describe the motion of light as light bounces off and/or passes through an object.

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# Science WASL Specifications

## **Grade Level Expectation: PR03 1.1.3 Wave Behavior** (continued)

### **Grades 6-8**

Understand sound waves, water waves, and light waves, using wave properties including amplitude, wavelength, and speed. Understand wave behaviors including reflection, refraction, transmission, and absorption.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (6) Identify or describe how sound waves and/or water waves affect the motion of the particles in the substance through which the wave is traveling (e.g. molecules in air vibrate back and forth as sound waves move through air).
- b) (6) Identify or describe how the observed properties of light, sound, and water are related to amplitude, frequency, wavelength, and speed of waves (e.g. color and brightness of light, pitch and volume of sound, height of water waves, light waves are faster than sound waves).
- c) (8) Identify or describe the behavior of light waves when light interacts with transparent, translucent, and opaque substances (e.g. objects appear the color blue because the object reflects mostly blue light and absorbs all the other colors of light, transparent objects transmit most light through them, lenses refract light).
- d) (8) Identify or describe the behavior of sound waves and/or water waves as the waves are reflected and/or absorbed by a substance.
- e) (8) Identify or describe the changes in speed and/or direction as a wave goes from one substance into another.

### **Grades 9-10**

Analyze sound waves, water waves, and light waves, using wave properties including frequency and energy. Understand wave interference.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (10) Identify or describe the relationship between the wave's properties of amplitude and frequency, and the wave's energy (e.g. loud vs. soft sound, bright vs. dim light, high vs. low pitch sound, blue vs. red light).
- b) (10) Identify or describe the relationship between a wave's speed and the properties of the substance through which the wave travels (e.g. all sound, regardless of loudness and pitch, travels the same speed in the same air; a wave changes speed only when traveling from one substance to another).
- c) (10) Identify, describe, predict, and/or explain what happens to the pitch of sound or color of light as the wave's frequency increases or decreases.
- d) (10) Identify, describe, or compare the properties of light waves, sound waves, and/or water waves.
- e) (10) Identify or describe the effects of wave interference (i.e. constructive and destructive).

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# Science WASL Specifications

## **Grade Level Expectation: PR04 1.1.4 Forms of Energy**

*For changes in energy in a physical system, go to ST02 Energy Transfer and Transformation  
For changes in energy in a living system,  
go to CH08 Life Processes and the Flow of Matter and Energy*

**Grades K-2** (No GLE at this grade level)

### **Grades 3-5**

Understand that energy comes in many forms.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (4) Identify or describe the forms of energy present in a system (i.e. heat energy, sound energy, light energy, electrical energy, energy of motion (kinetic), chemical energy, and food energy).

Note: A device that gives off light energy should be referred to as a lamp. Lamps give off light energy that can be transformed into heat energy in a substance or an object.

### **Grades 6-8**

Understand that energy is a property of matter, objects, and systems and comes in many forms.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (6) Identify or describe the form(s) of energy present in some matter (substance), an object, or a system (i.e. heat energy, sound energy, light energy, electrical energy, kinetic energy, potential energy, and chemical energy).
- b) (6) Identify or describe the form of energy stored in a part of a system (i.e. energy can be stored in many forms; 'stored energy' is not a form of energy).
- c) (8) Compare the potential and/or kinetic energy of parts of the system at various locations or times (i.e. kinetic energy is an object's energy of motion, potential energy is an object's energy of position).

Note: Heat energy is not light energy. Sunlight does not have heat energy because sunlight has no matter; sunlight is not hot. Light energy from the Sun, or any other source, must be transformed into the heat energy of a substance to have a temperature or be 'hot.'

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# Science WASL Specifications

## **Grade Level Expectation: PR04 1.1.4 Forms of Energy** (continued)

*For changes in energy in a physical system, go to ST02 Energy Transfer and Transformation*

*For changes in energy in a living system,*

*go to CH08 Life Processes and the Flow of Matter and Energy*

### **Grades 9-10**

Analyze the forms of energy in a system, subsystems, or parts of a system.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- (10) Identify, describe, or explain the forms of energy present in a system (i.e. heat energy, sound energy, light energy, electrical energy, kinetic energy, potential energy, chemical energy, nuclear energy, and wave energy).
- (10) Identify or describe the heat energy of a system, subsystems, and/or parts of a system in terms of molecular motion (temperature) and energy from a phase change.
- (10) Identify, describe, or compare the potential and/or kinetic energy of parts of the systems at various locations or times (i.e. kinetic energy is an object's energy of motion, potential energy is an object's energy of position).

Notes:

- The term 'mechanical energy' is not used. An object's 'mechanical energy' is discussed as the object's potential energy and kinetic energy.
- Heat energy is not light energy. Sunlight does not have heat energy because sunlight has no matter; sunlight is not hot. Light energy from the Sun, or any other source, must be transformed into the heat energy of a substance to have a temperature or be 'hot.'
- The heat energy of a substance is the combination of the energy due to the motion of the molecules of the substance (temperature) and the energy inputted into the substance to cause a phase change.

For example:

- Ice vs. Water: One gram of ice at 0° C has some heat energy; but that same substance when melted is water at 0° C with 80 calories more heat energy.
- Cold vs. Hot Water: One gram of water at 100° C has 100 calories more heat energy than that same gram of water at 0° C.
- Water vs. Water Vapor: When one gram of water at 100° C is boiled or evaporated to one gram of water vapor at 100° C, the substance has 540 more calories than that gram of water at 100° C.

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# Science WASL Specifications

## **Grade Level Expectation: PR05 1.1.5 Nature and Properties of Earth Materials**

*For the weather effect of the water cycle, go to CH06 Hydrosphere and Atmosphere*

*For identifying water's state of matter, go to PR01 Properties of Substances*

*For water changing state, go to CH03 Conservation of Matter and Energy*

### **Grades K-2**

Understand physical properties of Earth materials.

#### **Classroom Evidences of Learning**

- a) (K) Sort rocks based on size, shape, and other physical properties (e.g. color, texture).
- b) (2) Illustrate and tell about the properties of water as a solid and liquid.
- c) (2) Describe how some Earth materials are used by living things (e.g. water and soil for growing plants).

### **Grades 3-5**

Understand physical properties of Earth materials, including rocks, soil, water, and air.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (3) Identify, describe, or sort images of rocks based on physical properties (e.g. color, shape, size, texture).
- b) (3) Identify, describe, or sort soils based on physical properties (e.g. color, particle size, texture, smell, ability to drain or retain water, ~~source of mineral nutrients for plants~~ **redundant of CH08**).
- c) (4) **Identify or** describe the states of water on Earth (i.e. clouds, fog, dew, rain, hail, snow, ice) as solid, liquid, or gas.
- d) (4) Identify or describe the common conditions or properties of air (i.e. moving, blowing, wind, still, warm, cold, moist, takes up space, has weight).

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# Science WASL Specifications

## **Grade Level Expectation: PR05 1.1.5 Nature and Properties of Earth Materials** (continued)

*For the weather effect of the water cycle go to CH06 Hydrosphere and Atmosphere*

*For identifying water's state of matter, go to PR01 Properties of Substances*

*For water changing state, go to CH03 Conservation of Matter and Energy*

### **Grades 6-8**

Understand how to classify rocks, soils, air, and water into groups based on their chemical and physical properties.

#### **WASL Evidence of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (7) Identify or describe the properties of minerals and rocks that give evidence of how they were formed (e.g. crystal size and arrangement, texture, luster, cleavage, hardness, layering, reaction to acid).
- b) (7) Identify or describe the properties of soils that give evidence of how the soils were formed (e.g. chemical composition, particle type and size, organic materials, layering).
- c) (7) Identify or describe how Earth's water (i.e. oceans, fresh waters, glaciers, groundwater) can have different properties (i.e. salinity, density).
- d) (7) Identify or describe how the atmosphere has different properties at different elevations.

### **Grades 9-10**

Understand and analyze how the chemical composition of Earth materials (i.e. rocks, soils, water, and air) is related to their physical properties.

#### **WASL Evidence of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (9) Identify, describe, or correlate the chemical composition of Earth materials (i.e. rocks, soils, water, and gases of the atmosphere) with their physical properties (e.g. limestone's reaction to acid, conductivity of copper, ice floats on water).

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# Science WASL Specifications

## Grade Level Expectation: PR06 1.1.6 Characteristics of Living Matter

### Grades K-2

Understand characteristics of living organisms.

#### **Classroom Evidences of Learning**

- a) (K) Identify observable characteristics of living organisms (e.g. spiders have eight legs; birds have feathers; plants have roots, stems, leaves, seeds, flowers).
- b) (2) Observe and describe characteristics of living organisms (e.g. spiders have eight legs, birds have feathers, plants have roots, stems, leaves, seeds, flowers).

### Grades 3-5

Understand how to distinguish living organisms from nonliving objects and how to use characteristics to sort common organisms into plant and animal groups.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (4) Identify or describe the characteristics of organisms.
- b) (4) Identify, describe, or sort organisms using multiple characteristics (e.g. anatomy, like fins for swimming or leaves for gathering light; behavior patterns such as burrowing or migration; how plants and animals get food differently).
- c) (4) Identify, classify, or sort common organisms into plant and animal groups.

### Grades 6-8

Understand how to classify organisms into groups by their external and internal structures.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (6) Identify or describe how organisms can be classified using similarities and differences in physical and functional characteristics (both internal and external).
- b) (8) Identify, describe, or explain an inference about whether organisms have a biological relationship or common ancestry based on given characteristics.

### Grades 9-10

Analyze structural, cellular, biochemical, and genetic characteristics in order to determine the relationships among organisms.

#### **WASL Evidences of Learning**

Given a description of an appropriate system, items may ask students to:

- a) (10) **Identify or** describe or analyze the relationship among organisms based on their shared physical, biochemical, genetic, and cellular characteristics and/or functional processes.

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# Science WASL Specifications

## 1.2 Structure of Systems

Understand how the components, structures, and organization of systems, and the interconnections within and among systems, describe the system.

### **Grade Level Expectation: ST01 1.2.1 Systems Approach**

*Note: This GLE should only be used to classify items when NO other EALR 1 GLE is appropriate.*

#### **Grades K-2**

Understand that things are made of parts that go together.

#### **Classroom Evidences of Learning**

- a) (K) Identify the parts of objects, organisms, and materials (e.g. toys with moving parts, plant with flowers and leaves).
- b) (1) Describe how the parts of objects, organisms, and materials go together.
- c) (2) Construct simple devices to do common tasks using common materials (e.g. cardboard, wood, clay, rubber bands) and explain how the parts depend on each other.

#### **Grades 3-5**

Analyze how the parts of a simple system go together, and how these parts depend on each other.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (3) Identify the parts of a system (e.g. a device, a natural object, a living thing) and/or how the parts go together.
- b) (3) Identify or describe the function of a part of a system (e.g. a rubber band to store energy for a model airplane).
- c) (4) Identify, describe, or explain how one part of a system depends upon other parts of the same system.
- d) (5) Identify, predict, or explain how a system would function if one of the parts was missing or broken.
- e) (5) Identify or describe the input (what goes into) and/or the output (what goes out) of a system.
- f) (5) Identify or describe the effect on a system when an input to the system is changed.

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# Science WASL Specifications

## **Grade Level Expectation: ST01 1.2.1 Systems Approach** (continued)

*Note: This GLE should only be used to classify items when NO other EALR 1 GLE is appropriate.*

### **Grades 6-8**

Analyze how the parts of a system interconnect and influence each other.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (6) Identify, describe, or explain how the parts of a system interconnect and influence each other.
- b) (7) Identify or describe the flow of matter and energy through a system (i.e. energy and matter inputs, outputs, transfers, transformations).
- c) (7) Identify or describe the interactions and/or influences between two or more simple systems.

### **Grades 9-10**

Analyze how systems function, including the inputs, outputs, transfers, transformations, and feedbacks of a system and subsystems.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify or describe the function of a system's parts or subsystems.
- b) (9) Identify, describe, or explain the inputs, outputs, transfers, transformations, and feedbacks of energy, matter, and/or information in a system.
- c) (10) Identify, describe, or explain the interconnections between a system's parts or subsystems.

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# Science WASL Specifications

## Core Concept: Energy Transfer

### Grade Level Expectation: ST02 1.2.2 Energy Transfer and Transformation

*For identifying or naming an energy form, go to PR04 Energy Sources and Kinds  
For energy in a living system, go to CH08 Life Processes and the Flow of Matter and Energy*

**Grades K-2** (No GLE at this grade level)

#### **Grades 3-5**

Understand that energy can be transferred from one object to another and can be transformed from one form of energy to another.

#### **WASL Evidences of Learning**

Given an adequate description of a simple physical system, items may ask students to:

- (4) Identify sources of energy in physical systems (e.g. battery for a flashlight, spring for a toy).
- (4) Identify where or when a part of a simple physical system has the greatest or least energy (e.g. a toy car will have the greatest energy of motion at the bottom of a ramp when released from the top of a ramp).
- (4) Identify or describe transfers of energy (e.g. in a cup of hot water, heat energy is transferred from the hot water to the cup).
- (4) Identify or describe transformations of energy (e.g. energy of motion of hands clapping changing into sound energy).

#### **Grades 6-8**

Understand how various factors affect energy transfers and that energy can be transformed from one form of energy to another.

#### **WASL Evidences of Learning**

Given an adequate description of a simple physical system, items may ask students to:

- (6) Identify or describe the factors that affect heat and electrical energy transfer (e.g. conducting and insulating properties of substances, distance between objects).
- (6) Identify or describe how an increase in one **form type** of energy of an object or system results in a decrease in other **forms types** of energy within that object or system (e.g. a falling object's potential energy decreases while the object's kinetic energy increases).
- (6) Identify or describe how waves transfer energy (e.g. light waves transfer energy from the Sun to Earth, air transfers an object's vibrations from one place to another as sound).
- (8) Identify, describe, or explain the transfers or transformations of energy within a physical system (e.g. conduction and convection of heat energy).

Note: The term 'transfer' can be used to include transformations on the WASL. (E.g. 'Describe an energy transfer' means describe an energy transfer or transformation.)

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# Science WASL Specifications

## Core Concept: Energy Transfer

### Grade Level Expectation: ST02 1.2.2 Energy Transfer and Transformation (continued)

*For identifying or naming an energy form, go to PR04 Energy Sources and Kinds*

#### Grades 9-10

Analyze energy transfers and transformations within a physical system, including energy conservation.

#### **WASL Evidences of Learning**

Given an adequate description of a physical system or systems, items may ask students to:

- a) (9) Identify, describe, or explain how energy is transferred or transformed within and among physical systems.
- b) (9) Identify, describe, explain, or analyze conditions likely to result in transfers or transformations of energy from one part of a physical system to another (e.g. a temperature difference may result in the flow of heat energy from a hot area to a cold area).
- c) (9) Identify, describe, or explain the relationship between the motion of particles in a substance and the transfer or transformation of heat or electrical energy (e.g. conduction of heat or electrical energy as particles collide or interact, convection of heat energy as groups of particles move from one place to another, light waves transform into heat energy).
- d) (9) Describe a physical system's total energy in terms of energy conservation (e.g. energy in a system is never "lost;" the gain in one energy form always corresponds to the loss in other energy forms).
- e) (10) Identify, describe, or explain the energy input/output in a phase change, a chemical reaction, or a nuclear reaction (e.g. water changing from a vapor to a liquid outputs energy).
- f) (10) Identify, describe, or determine the energy input to an object as work (i.e. work on an object is the product of the force acting on the object and the distance the object moves as the force acts).
- g) (10) Identify, describe, **or explain** how a machine transfers work and/or transforms force and distance through a force-distance trade-off (e.g. a small force acting over a long distance can be transformed into a large force acting over a short distance).

Note: The term 'transfer' can be used to include transformations on the WASL. (E.g. 'Describe an energy transfer' means describe an energy transfer or transformation.)

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# Science WASL Specifications

## Grade Level Expectation: ST03 1.2.3 Structure of Matter

### Grades K-2

Know that common materials are made of smaller parts

#### **Classroom Evidences of Learning**

- a) (1) Understand or show that people use magnifiers to observe things they cannot see with their eyes.
- b) (2) Sort objects based on component parts (e.g. toys with wheels)

### Grades 3-5

Know that substances are made of small particles.

#### **WASL Evidences of Learning**

Given an adequate description of a simple substance, items may ask students to:

- a) (4) Identify that smaller parts of a substances are still the same substance (e.g. a drop of water is still water, a granule of sugar is still sugar).
- b) (4) Identify or describe that some particles can only be seen with magnification.
- c) (4) Identify or describe objects made of only one kind of material and objects made of several kinds of material.

### Grades 6-8

Understand that all matter is made up of particles called atoms and that atoms may combine to form molecules and atoms and/or molecules can form mixtures.

#### **WASL Evidences of Learning**

Given an adequate description of a substance, items may ask students to:

- a) (6) Identify that matter is made of particles called atoms and molecules.
- b) (6) Identify that elements are made of one kind of atom.
- c) (8) Identify, describe, or diagram how atoms may be combined in various ways and ratios to form molecules.
- d) (8) Identify or describe the different atoms or molecules in a mixture (e.g. dissolving carbon dioxide in water produces a mixture [solution] of CO<sub>2</sub> and H<sub>2</sub>O molecules).

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# Science WASL Specifications

## Grade Level Expectation: ST03 1.2.3 Structure of Matter (continued)

### Grades 9-10

Understand the structure of atoms, how atoms bond to form molecules, and that molecules form solutions.

#### **WASL Evidences of Learning**

Given an adequate description a substance, items may ask students to:

- a) (10) Identify or describe the structure of atoms in terms of protons and neutrons forming the nucleus which is surrounded by electrons (e.g. helium atoms usually have a nucleus formed by two protons and two neutrons which is surrounded by two electrons).
- b) (10) Identify or describe how atoms bond to form molecules in terms of transferring and/or sharing of electrons (e.g. sodium atoms transfer an electron to chlorine atoms to form salt).
- c) (10) Identify or describe molecules forming a solution (e.g. salt added to water dissolves, forming a salt water solution, until saturation when no more salt will dissolve).
- d) (10) Identify or describe how to separate mixtures and/or solutions of several different types of substances (e.g. sand, sugar, and iron filings).

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# Science WASL Specifications

## **Core Concept: Earth System Components**

### **Grade Level Expectation: ST04 1.2.4 Components and Patterns of Earth Systems**

*For interactions of, or changes in Earth Systems, go to  
CH04 Processes and Interactions in Earth Systems or  
CH06 Atmosphere and Hydrosphere*

**Grades K-2** (No GLE at this grade level)

### **Grades 3-5**

Understand that Earth's system includes a mostly solid interior, landforms, bodies of water, and an atmosphere.

#### **WASL Evidences of Learning**

Given an adequate description of a part of Earth's systems, items may ask students to:

- (3) Identify or describe patterns (e.g. landmasses, bodies of water, and landforms) found in the description or diagram of a part of Earth's systems.
- (5) Identify or describe how one part of Earth's system depends on or connects to another part of Earth's system (e.g. Puget Sound water affects the air over Seattle).
- (5) Identify or describe various landmasses, bodies of water, and landforms (e.g. continents, oceans, seas, rivers, mountains, plains) using a map.

#### **Classroom Evidences of Learning**

- Construct a model that demonstrates understanding of Earth's structure as a system made of parts (e.g. solid surface, water, and atmosphere).

### **Grades 6-8**

Understand the components and interconnections of Earth's systems.

#### **WASL Evidences of Learning**

Given an adequate description of a part of Earth's systems, items may ask students to:

- (7) **Identify or** describe the components of Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, hydrosphere, and atmosphere).
- (7) **Identify or** describe the interconnections among the components of Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, hydrosphere, and atmosphere).
- (7) Identify or describe magma (i.e. magma comes from Earth's mantle and cools to form rocks).

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# Science WASL Specifications

## **Core Concept: Earth System Components**

### **Grade Level Expectation: ST04 1.2.4 Components and Patterns of Earth Systems** (continued)

*For interactions of, or changes in Earth Systems, go to  
CH04 Processes and Interactions in Earth Systems or  
CH06 Atmosphere and Hydrosphere*

#### **Grades 9-10**

Analyze the patterns and arrangements of Earth systems and subsystems, including the core, the mantle, tectonic plates, the hydrosphere, and layers of the atmosphere.

#### **WASL Evidences of Learning**

Given an adequate description of a part of Earth's systems, items may ask students to

- a) (9) Identify or describe sources of Earth's internal and external heat energy.
- b) (9) Identify, describe, or explain how plate tectonics is caused by Earth's internal energy. (i.e. Energy stored in the core [nuclear energy from radioactivity and heat energy from Earth's molten formation] is transferred into heat energy in the mantle. Heat energy in the mantle moves in convection currents from the core to the crust. The friction between these convection currents and the crust causes the motion of tectonic plates.)
- c) (9) Correlate Earth's surface features to observable weather patterns (e.g. rain shadow, deserts, rain forest).
- d) (9) Identify, describe, or explain the patterns and arrangement of Earth's hydrosphere
- e) (9) Identify, describe, or explain the patterns and arrangement of the layers of Earth's atmosphere.

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# Science WASL Specifications

## **Grade Level Expectation: ST05 1.2.5 Components of the Solar System and Beyond (Universe)**

*For the causes of days, years, phases of the Moon, eclipses, seasons, and ocean tides,  
go to CH07 Interactions of the Solar System and Beyond  
For the effect of gravitational forces on objects in the Solar System,  
go to CH02 Forces to Explain Motion*

### **Grades K-2**

Know daily changes of the position of the Sun.

#### **Classroom Evidences of Learning**

- a) (1) Observe and record (i.e. draw, construct, build, measure with nonstandard units) changes in the Sun's position in the sky during the day.

### **Grades 3-5**

Know how the Sun, the Moon, and the stars appear from Earth.

#### **WASL Evidences of Learning**

Given an adequate description of the Solar System, items may ask students to:

- a) (4) Identify or describe the daily motion of the Sun, the Moon and stars as seen from Earth's surface (e.g. the Sun, the Moon and the stars all rise in the east and set in the west).
- b) (4) Identify or describe how the Moon looks a little different every day as seen from Earth (e.g. the lighted portion of the Moon changes shape every day).
- c) (4) Identify or describe how the patterns of stars in the sky stay the same as seen from Earth (e.g. constellations like the Orion always have the same pattern).

### **Grades 6-8**

Understand the structure of the Solar System.

#### **WASL Evidences of Learning**

Given an adequate description of the Solar System, items may ask students to:

- a) (6) Identify or describe how Earth orbits the Sun and the Moon orbits Earth.
- b) (6) Identify or describe the Sun (i.e. a medium-sized star, the largest body in our solar system, major source of energy for phenomena on Earth's surface).
- c) (6) Identify or describe how planets, asteroids, and comets orbit the Sun.
- d) (6) Identify or describe meteors (i.e. planetary and comet debris that collides with Earth).
- e) (8) Identify, describe, or compare the relationship among the components of the solar system (e.g. composition, size, atmosphere, gravity, distance from the Sun, and number of moons).

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## Science WASL Specifications

### **Grade Level Expectation: ST05 1.2.5 Components of the Solar System and Beyond (Universe)** (continued)

*For the causes of days, years, phases of the Moon, eclipses, seasons, and ocean tides,  
go to CH07 Interactions of the Solar System and Beyond  
For the effect of gravitational forces on objects in the Solar System,  
go to CH02 Forces to Explain Motion*

### **Grades 9-10**

Understand that the solar system is in a galaxy in a universe composed of an immense number of stars and other celestial bodies.

### **WASL Evidences of Learning**

Given an adequate description of the Solar System, items may ask students to:

- a) (10) Identify or describe how the Solar System is part of the Milky Way Galaxy.
- b) (10) Identify, describe, or compare how stars and/or other celestial bodies (at least 100 billion) are similar to and different from each other (i.e. mass, radius, temperature, age, composition, distance from Earth, source of light, movement in space).
- c) (10) Identify or describe how other galaxies and/or other celestial bodies appear from Earth.

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# Science WASL Specifications

## Grade Level Expectation: ST06 1.2.6 Structure and Organization of Living Systems

### Grades K-2

Know that living things are made of small parts.

#### **Classroom Evidences of Learning**

- a) (K) Observe and show how living things look different under a magnifier.
- b) (2) Observe and identify the parts of an object seen under a magnifier.
- c) (2) Illustrate or draw the small parts that make up the whole living thing.

### Grades 3-5

Understand that organisms can be a single cell or many cells that form parts with different functions.

#### **WASL Evidences of Learning**

Given an adequate description of living things or the cells of living things, items may ask students to:

- a) (3) Identify or describe that all living things are made mostly of cells (i.e. plants, animals, and single-celled organisms).
- b) (3) Identify or describe how plant and animal cells are similar and different.
- c) (3) Identify or describe the life function of a part of a living thing (e.g. wings of a bird).

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# Science WASL Specifications

## Grade Level Expectation: ST06 1.2.6 Structure and Organization of Living Systems (continued)

### Grades 6-8

Understand that specialized cells within multi-cellular organisms form different kinds of tissues, organs, and organ systems to carry out life functions.

#### **WASL Evidences of Learning**

Given an adequate description of a living thing or a part of a living thing, items may ask students to:

- a) (6) Identify or describe how plant and animal cells are similar and different in structure and function.
- b) (6) Identify or describe basic cell functions (i.e. extracting energy from food, using energy, and getting rid of waste).
- c) (8) Identify or describe the life function of specialized cells or tissues (e.g. red blood cells carry oxygen to body tissues, cells in plant leaves capture the light energy).
- d) (8) Identify or describe the life function of organs or organ systems (e.g. the stomach breaks down food and the intestines absorb food in the digestive system)

### Grades 9-10

Understand cellular structures, their functions, and how specific genes regulate these functions.

#### **WASL Evidences of Learning**

Given an adequate description of a cell, items may ask students to:

- a) (10) Identify or describe cellular structures that allow cells to extract and use energy from food, eliminate wastes, and respond to the environment (e.g. every cell is covered by a membrane that controls what can enter and leave the cell).
- b) (10) Identify or describe how DNA molecules are long chains linking four kinds of smaller molecules, whose sequence encodes genetic information.
- c) (10) Identify or describe how genes (DNA segments) provide instructions for assembling protein molecules in cells.
- d) (10) Identify or describe how proteins control life functions (e.g. the protein hemoglobin carries oxygen in some organisms, the proteins actin and myosin interact to cause muscle contraction).

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# Science WASL Specifications

## Grade Level Expectation: ST07 1.2.7 Molecular Basis of Heredity

### Grades K-2

Understand that plants and animals have life cycles.

#### **Classroom Evidences of Learning**

- a) (2) Observe and describe the life cycle of a plant or animal (e.g. describe the life cycle of a butterfly - egg, caterpillar or larva, cocoon, and butterfly or adult).

### Grades 3-5

Understand the life cycles of plants and animals and the differences between inherited and acquired characteristics.

#### **WASL Evidences of Learning**

Given an adequate description of a living system, items may ask students to:

- a) (3) Identify or describe the life cycle of a plant or animal.
- b) (3) Identify or describe how the young of plants and animals grow to resemble their parents as they mature into adults.
- c) (3) Identify or describe inherited characteristics (e.g. leaf shape, eye color) and/or learned characteristics (e.g. languages, social customs).

#### **Note:**

- Students should know the basic phases of a plant's life cycle without sexual reproduction:
  1. Sprouting of seeds
  2. Growth of plants (in light with water, air, and mineral nutrients)
  3. Flowering of mature plants
  4. New seeds forming (e.g. a fruit forms with seeds)
  
- Students should know the basic phases of an animal's life cycle without sexual reproduction:
  1. Baby grows in an adult animal or in an egg for egg-laying animals
  2. Baby is born or hatched
  3. Baby grows into an adult animal
  4. Adult animal produces a new baby

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# Science WASL Specifications

## Grade Level Expectation: ST07 1.2.7 Molecular Basis of Heredity (continued)

### Grades 6-8

Understand that organisms pass on genetic information in their life cycle, and that an organism's characteristics are determined by both genetic and environmental influences.

#### **WASL Evidences of Learning**

Given an adequate description of a living system, items may ask students to:

- (6) Identify, describe, analyze, or explain the life cycle of an organism.
- (6) Identify, describe, or explain that organisms require a set of instructions for specifying their traits (i.e. heredity is the passage of these instructions from one generation to another).
- (6) Identify or describe that genes inherited from parents are combined in their offspring to produce a new combination of characteristics.
- (8) **Identify, describe, or** explain how physical traits of living things can be affected by genetic information and/or by interactions with the environment (e.g. nutrition, disease, sanitation).
- (8) **Identify,** describe, or compare the sexual (two parents) and/or asexual (one parent) life cycles of plants and/or animals.

#### Notes:

- Students should know the basic phases of a plant's life cycle with sexual reproduction:
  1. Germination of seeds (e.g. the seed sprouts)
  2. Growth of plants (in light with water, air, and mineral nutrients)
  3. Flowering of mature plants
  4. Fertilization of flowers to produce seeds (e.g. a fruit forms with seeds)
- Students should know the basic phases of a common mammal's life cycle with sexual reproduction:
  1. Egg in a female adult is fertilized during mating
  2. Fertilized egg develops into a baby inside the female adult
  3. Baby is born
  4. Baby grows into an adult (i.e. male, female with eggs)

### Grades 9-10

Understand how genetic information (DNA) in the cell is encoded at the molecular level and provides genetic continuity between generations.

#### **WASL Evidences of Learning**

Given an adequate description of a living system, items may ask students to:

- (10) Identify or describe the role of chromosomes in reproduction (i.e. parents pass chromosomes, which contain genes, to their offspring).
- (10) Identify or describe possible results of mutations in DNA (e.g. only mutations in sex cells can be passed on to offspring, mutations in other cells can only be passed to descendant cells).
- (10) Identify or describe how organisms pass on genetic information via asexual life cycles (i.e. replication of genes in asexual reproduction results in the same gene combinations in the offspring as those of the parent).
- (10) Identify or describe how organisms pass on genetic information via sexual life cycles (i.e. the sorting and recombination of genes in sexual reproduction results in a great variety of possible gene combinations and resultant variations in the offspring of any two parents).

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# Science WASL Specifications

## Grade Level Expectation: ST08 1.2.8 Human Biology

### Grades K-2

Know the external parts of the body.

#### **Classroom Evidences of Learning**

- a) (1) Identify the external parts of the body (e.g. head, hands, fingers, ears).
- b) (1) Draw and name the external parts of the body.

### Grades 3-5

Understand the organization and function of human body structures and organs and how those structures and organs interconnect.

#### **WASL Evidences of Learning**

Given an adequate description of a simplified human body system, items may ask students to:

- a) (4) **Identify or describe** examples of human systems that are composed of organs (e.g. ear for hearing, mouth for speech).
- b) (4) Identify or describe the functions of major organs and/or body structures (e.g. the skin protects the human body from harmful substances, unhealthy organisms, and from drying out; the brain gets signals from the parts of the human body, controls the life functions, and sends signals out to the body parts).
- c) (4) Identify or describe the interdependence of organ systems in the human body (e.g. what would happen if one part of the human body system was missing).
- d) (4) Identify or describe how the systems allow the human body to take in and use matter and energy (air, food, mineral nutrients, and water) for living, growth, and repair (e.g. breathing in air supplies the oxygen necessary to live).
- e) (4) Identify or describe how the human body systems compare to the systems of other living organisms (e.g. human ear compared to an elephant ear for hearing sound).

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# Science WASL Specifications

## Grade Level Expectation: ST08 1.2.8 Human Biology (continued)

### Grades 6-8

Understand human life functions and the interconnecting organ systems necessary to maintain human life.

#### **WASL Evidences of Learning**

Given an adequate description of a human body system, items may ask students to:

- a) (6) Identify or describe the components and functions of the human body organ systems (i.e. circulatory, digestive, reproductive, excretory, nervous-sensory [brain, nerves, spinal cord, hearing, vision], respiratory, and muscular-skeletal systems).
- b) (8) **Identify or** describe relationships among the organ systems of the human body (e.g. the role of the senses and the nervous system for human survival, the relationships between the digestive and excretory systems).
- c) (8) Compare human body systems to another organism's systems (e.g. human lungs to plant leaves).

### Grades 9-10

Analyze how human organ systems regulate growth, development, and life functions.

#### **WASL Evidences of Learning**

Given an adequate description of a human body system, items may ask students to:

- a) (10) Identify or describe the structural and/or functional characteristics of human organ systems, including the endocrine, immune, nervous, reproductive, and skin systems.
- b) (10) **Identify or** describe how the human body maintains relatively constant internal conditions (e.g. temperature, acidity, blood sugar).
- c) (10) Identify, describe, or explain how human organ systems help maintain human health.
- d) (10) Identify or describe the role of human organ systems during human growth and development.
- e) (10) Compare the structure and function of a human body system or subsystem to a non-living system (e.g. human joints to hinges, enzymes and substrates to interlocking puzzle pieces).

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# Science WASL Specifications

## 1.3 Changes in Systems

Understand how interactions within and among systems cause changes in matter and energy.

### Grade Level Expectation: CH01 1.3.1 Nature of Forces

#### Grades K-2

Know that a push or a pull is a force on an object, but some forces can act without touching an object.

#### **Classroom Evidences of Learning**

- a) (1) Observe and show that a push or a pull on an object is a force on that object.
- b) (1) Observe and show that a magnet can push or pull some objects without touching the objects.

#### Grades 3-5

Understand forces in terms of strength and direction.

#### **WASL Evidences of Learning**

Given an adequate description of one or more objects and forces acting, items may ask students to:

- a) (3) Identify or describe a force that is acting on an object in terms of strength and direction (i.e. electrical force, frictional force, gravitational force, magnetic force, a push, a pull).
- b) (5) Compare the strength of one force to the strength of another force (e.g. measure how a 5-newton pull from a spring scale is like the weight of 1-pound object).

#### **Classroom Evidences of Learning**

- c) (3, 5) Measure the force acting on an object with a spring scale calibrated in newtons (N).

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# Science WASL Specifications

## Grade Level Expectation: CH01 1.3.1 Nature of Forces (continued)

### Grades 6-8

Understand factors that affect the strength and direction of forces.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Identify or describe factors that affect the strength of forces (e.g. an object with a greater mass has a greater gravitational force [weight]; certain types of magnets have greater magnetic forces; a larger muscle can pull with a greater force).
- b) (7) Identify or describe how forces acting on an object may balance each other (e.g. the downward gravitational force on an object sitting on a table is balanced by an upward force from the table).
- c) (7) Identify or describe how a simple machine (i.e. levers and pulleys) can change the strength and/or the direction of a force.
- d) (7) Identify or describe pressure as forces acting on the surface of objects (e.g. the surface of an object at sea level normally experiences a force of 14.70 pounds per square inch or 101,300 newtons per square meter from air pressure).

### Grades 9-10

Analyze the forces acting on objects.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify or describe the strength (in newtons) and direction of forces acting on an object.
- b) (9) Identify or describe the sum of all the forces acting on an object (e.g. the sum of the forces acting on a falling object is the downward gravitational force minus the upward forces from the air resulting in an unbalanced downward force causing the object to accelerate).
- c) (9) Identify or describe how forces between objects occur, both when the objects are touching and when the objects are apart.
- d) (9) Identify, describe, or explain that the strength of a gravitational force between two objects depends on the mass of the objects and the distance between the objects.
- e) (9) **Identify** or describe how machines transform forces (e.g. a long lever allows a small downward input force to be transformed into a large upward output force).

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# Science WASL Specifications

## **Core Concept: Forces**

### **Grade Level Expectation: CH02 1.3.2 Forces to Explain Motion**

#### **Grades K-2**

Know that pushes and pulls can change the motion of common objects.

#### **Classroom Evidences of Learning**

- a) (1) Observe and show that objects fall toward the ground because of the pull of Earth's gravity.
- b) (1) Observe and show that magnets can make some objects move without touching the objects.

#### **Grades 3-5**

Understand that forces can change the motion of common objects.

#### **WASL Evidences of Learning**

Given an adequate description of one or more objects and forces, items may ask students to:

- a) (3) Identify or describe how the position and/or motion of objects or substances can be changed by a force (e.g. frictional force slows moving objects).
- b) (5) Identify or describe how a larger force acting on an object causes a greater change in motion of that object, 2<sup>nd</sup> Law of Motion (e.g. a 2-newton pull causes a toy car to speed up more than a 1-newton pull).

#### **Grades 6-8**

Understand how balanced and unbalanced forces can change the motion of objects.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Identify or describe how an unbalanced force changes the speed and/or direction of motion of different objects moving along a straight line, 2<sup>nd</sup> Law of Motion (e.g. a larger unbalanced force is needed to equally change the motion of more massive objects).
- b) (7) Identify or describe how frictional forces act to stop the motion of objects.
- c) (7) Identify or describe the balanced and unbalanced forces acting on an object (e.g. a model car speeding up on a table is being acted upon by an unbalanced forward force and a downward gravitational force balanced by an upward force from the table).
- d) (7) Identify or describe pressure differences that result in unbalanced forces moving objects or substances (e.g. pressure differences cause forces that move air masses, move blood through a heart, and move magma upward in a volcano).

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# Science WASL Specifications

## Core Concept: Forces

### Grade Level Expectation: CH02 1.3.2 Forces to Explain Motion (continued)

#### Grades 9-10

Analyze the effects of balanced and unbalanced forces on the motion of an object.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify, describe, or explain how unbalanced forces change the speed and/or direction of motion of different objects moving along a straight line, 2<sup>nd</sup> Law of Motion (e.g. a 2-kilogram object needs twice the unbalanced force to speed up the same amount as a 1-kilogram object).
- b) (9) Identify or describe the balanced forces acting on an object moving at a constant speed along a straight line, 1<sup>st</sup> law of Motion (e.g. a car traveling at a constant speed of 60 miles per hour, about 97 kilometers per hour, on a straight freeway has a force pushing the car forward balanced by forces acting in the opposite direction).
- c) (9) Identify or describe that forces always come in pairs, 3<sup>rd</sup> Law of Motion (e.g. spring scales pulling against each other measure two forces).

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# Science WASL Specifications

## **Core Concept: Matter**

### **Grade Level Expectation: CH03 1.3.3 Conservation of Matter and Energy**

*For identifying the state of water, go to PR01 Properties of Substances  
For the weather effect of the water cycle, go to CH06 Hydrosphere and Atmosphere*

#### **Grades K-2**

Know that water can exist in different states: solid and liquid.

#### **Classroom Evidences of Learning**

- (2) Observe and record water changing from solid to liquid and back to solid.
- (2) Describe the physical properties of water in solid and liquid states (e.g. hard, cold, wet).

#### **Grades 3-5**

Understand that a substance remains the same substance when changing state. Understand that two or more substances can react to become new substances.

#### **WASL Evidences of Learning**

Given an adequate description of an object or system, items may ask students to:

- (4) Identify or describe water changing state from ice to liquid water to water vapor and back (e.g. water remains the same substance when freezing, melting, evaporating, and condensing).
- (5) Identify or describe how a substance is the same substance before and after heating or cooling (e.g. solid candle wax can be heated to become liquid candle wax then cooled back to the same solid candle wax).
- (5) Identify or describe how two different substances can react to become new substances (e.g. solid baking soda and liquid vinegar react to produce a gas).

#### **Grades 6-8**

Understand that matter is conserved during physical and chemical changes.

#### **WASL Evidences of Learning**

Given an adequate description of an object or system, items may ask students to:

- (7) Identify or describe evidences of physical and chemical changes of matter (e.g. change of state, size, shape, temperature, or color; production of a new substance or light energy).
- (7) Identify or describe that substances undergoing physical changes produce matter with the same chemical properties as the original and the same total mass (e.g. tearing paper, freezing water, breaking wood, sugar or salt dissolving in water).
- (7) Identify or describe that substances may react chemically to form new substances with different chemical properties and the same total mass (e.g. iron rusting, diluted acid on limestone producing gas bubbles).

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# Science WASL Specifications

## **Core Concept: Matter**

### **Grade Level Expectation: CH03 1.3.3 Conservation of Matter and Energy**

*For identifying the state of water, go to PR01 Properties of Substances  
For the weather effect of the water cycle, go to CH06 Hydrosphere and Atmosphere*

#### **Grades 9-10**

Analyze the factors that affect physical, chemical, and nuclear changes; and understand that matter and energy are conserved.

#### **WASL Evidences of Learning**

Given an adequate description of an object or system, items may ask students to:

- a) (9) Identify, describe, or explain the effect of different factors upon the rate of a physical or chemical change (e.g. temperature, surface area, pressure, catalysts).
- b) (9) Identify, describe, or explain how chemical changes result in products with different chemical properties and the same total mass.
- c) (9) Identify or describe the products of radioactive decay (nuclear fission) in terms of the conservation of matter and energy (e.g. a radioactive nucleus decays into a new nucleus and emits particles and rays).
- d) (9) Identify that the rate of radioactive decay of a substance (nuclear fission) is constant, not affected by any factors (e.g. the half-life of a radioactive substance is constant over a long time and a wide range of conditions found on Earth).
- e) (9) Identify or describe the products of nuclear fusion in terms of the conservation of matter and energy (e.g. matter is converted to energy when hydrogen nuclei combine to form helium nuclei).

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# Science WASL Specifications

## **Core Concept: Earth System Processes**

### **Grade Level Expectation: CH04 1.3.4 Processes and Interactions in Earth Systems**

*For naming the components of Earth Systems, go to ST04 Components and Patterns of Earth Systems*

#### **Grades K-2**

Know that rocks break down to form pebbles and sand.

#### **Classroom Evidences of Learning**

- a) (2) Describe how rocks can break down into smaller pieces (e.g. pebbles, sand) by the action of water.

#### **Grades 3-5**

Know processes that change the surface of Earth.

#### **WASL Evidences of Learning**

Given a description or picture of a change in Earth's surface, items may ask students to:

- a) (5) Identify or describe how weathering and/or erosion changes the surface of Earth.
- b) (5) Identify or describe how earthquakes, landslides, and/or volcanic eruptions change Earth's surface.

#### **Grades 6-8**

Understand the processes that continually change the surface of Earth.

#### **WASL Evidences of Learning**

Given a description or picture of a change in Earth's surface, items may ask students to:

- a) (7) Identify or describe the processes by which soils are formed (e.g. erosion and deposition in river systems).
- b) (7) Identify or describe how heat energy flow due to the movement of substances (convection currents) beneath Earth's crust can cause earthquakes and volcanoes.
- c) (7) Identify or describe how constructive processes change landforms (e.g. crustal deformation, volcanic eruption, deposition of sediment).
- d) (7) Identify or describe how destructive processes change landforms (e.g. rivers erode landforms).
- e) (7) Identify or describe the processes involved in the rock cycle (e.g. magma cools into igneous rocks; rocks are eroded and deposited as sediments; sediments are compacted over many years to form sedimentary rocks; rocks can be changed by heat and pressure to form metamorphic rocks).

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# Science WASL Specifications

## **Core Concept: Earth System Processes**

### **Grade Level Expectation: CH04 1.3.4 Processes and Interactions in Earth Systems** (continued)

*For naming the components of Earth Systems, go to ST04 Components and Patterns of Earth Systems*

#### **Grades 9-10**

Analyze processes that have caused changes to Earth's systems, including plate tectonics.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate Earth system, items may ask students to:

- a) (9) Identify or describe the processes that cause the movement of material in Earth's systems (e.g. erosion and deposition; pressure differences that cause convection resulting in winds, mantle movement, ocean currents).
- b) (9) Identify or describe the effects of glaciation and floods on the Pacific Northwest.
- c) (9) Identify or describe the causes and effects of volcanoes, hot spots, and earthquakes in Washington State and elsewhere (e.g. subduction of the Juan de Fuca plate causes earthquakes that may cause seismic sea waves; earthquakes along the Seattle fault cause P, S, and surface seismic waves).
- d) (9) Identify, describe, or explain how substances change as they move through Earth's systems (e.g. carbon cycle, nitrogen cycle).

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# Science WASL Specifications

## Grade Level Expectation: CH05 1.3.5 History and Evolution of Earth

### Grades K-2

Know that fossils provide evidence of plants and animals that existed long ago.

#### **Classroom Evidences of Learning**

- a) (2) Identify a fossil in a rock.
- b) (2) Compare fossils (representing the remains of prehistoric plants and animals) with similar living organisms (e.g. a fossil leaf with a leaf, a fossil shell with a shell).

### Grades 3-5

Understand that fossils provide evidence of plants, animals, and environments that existed long ago.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (5) Identify or describe a fossil in a rock.
- b) (5) Identify or describe that fossils provide evidence about plants and animals that lived long ago and the nature of the environment at that time.

### Grades 6-8

Understand how fossils and other evidence are used to document life and environmental changes over time.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Identify or describe how fossils are formed.
- b) (7) Identify or describe different kinds of evidence used to document past conditions on Earth (e.g. glacial markings, ash layers, tree rings, rock layers).
- c) (7) Identify or describe how fossils and other artifacts provide evidence of how life has changed over time (e.g. extinction of species).

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# Science WASL Specifications

## **Grade Level Expectation: CH05 1.3.5 History and Evolution of Earth** (continued)

### **Grades 9-10**

Analyze a variety of evidence, including rock formations, fossil records, and radioactive decay, to construct a sequence of geologic events.

### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify, describe, or explain how decay rates of radioactive materials in rock layers are used to establish the age of fossil remains or the time of geologic events.
- b) (9) Identify or describe how rock formations can be used to determine the nature of past geologic events.
- c) (9) Identify, describe, or correlate evidence of geologic events to the relative and absolute dates of rock layers to construct a sequence of history of Earth.

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# Science WASL Specifications

## **Grade Level Expectation: CH06 1.3.6 Hydrosphere and Atmosphere**

*For identifying the state of water, go to PR01 Properties of Substances  
For water changing state, go to CH03 Conservation of Matter and Energy  
For global warming and ozone depletion, go to AP07 Environmental and Resource Issues*

### **Grades K-2**

Know common weather indicators and understand that weather conditions change from season to season.

#### **Classroom Evidences of Learning**

- a) (1) Observe, measure, and record weather conditions, noting changes and patterns from day to day and over the seasons (e.g. temperature, wind, rain, snow).
- b) (1) Name common weather conditions (e.g. rain, snow, wind).

### **Grades 3-5**

Understand weather indicators and understand how water cycles through the atmosphere.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (3) Identify or describe weather indicators (e.g. temperature, wind direction and speed, precipitation), noting changes and patterns of change from day to day and over the year.
- b) (3) Identify or describe the weather patterns of each season.
- c) (5) Identify or describe water cycling through the land, oceans and atmosphere (e.g. ocean waters evaporate into the atmosphere; water vapor in the atmosphere condenses to form clouds; rain, snow, and hail come from clouds in the atmosphere).

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# Science WASL Specifications

## **Grade Level Expectation: CH06 1.3.6 Hydrosphere and Atmosphere** (continued)

*For identifying the state of water, go to PR01 Properties of Substances  
For water changing state, go to CH03 Conservation of Matter and Energy  
For global warming and ozone depletion, go to AP07 Environmental and Resource Issues*

### **Grades 6-8**

Analyze the relationship between weather and climate and how ocean currents and global atmospheric circulation affect weather and climate.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Compare weather and climate.
- b) (7) Identify, describe, or explain effects of the water cycle on weather (e.g. cloud formation, storms).
- c) (7) Identify, describe, or explain how ocean currents influence the atmosphere in terms of weather and climate.
- d) (7) Identify, describe, or explain the causes of atmospheric circulation and oceanic currents (e.g. prevailing winds are the result of hot tropical regions, cold polar regions, and Earth's spin).

### **Grades 9-10**

Analyze the factors that influence weather and climate.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify, describe, or explain how energy transfers and transformations among the atmosphere, hydrosphere, and landforms affect climate and weather patterns.
- b) (9) Identify, describe, or explain how gases in the atmosphere affect climate (e.g. water vapor in the atmosphere can store heat energy that may result in a warmer climate).
- c) (9) **Identify or** describe how catastrophic events (e.g. volcanic eruptions, forest fires, asteroid impacts) can cause climate and weather changes.

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# Science WASL Specifications

## **Core Concept: Solar System**

### **Grade Level Expectation: CH07 1.3.7 Interactions in the Solar System and Beyond (Universe)**

**Grades K-2** (No GLE at this grade level)

#### **Grades 3-5**

Know how the appearance of the Sun and the Moon change as seen from Earth.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (4) Identify or describe how the Sun rises and sets daily.
- b) (4) Identify or describe how the appearance of the Moon changes in a predictable pattern (e.g. new Moon to full Moon every 28 days).

#### **Grades 6-8**

Understand the effects of the regular and predictable motions of planets and moons in the Solar System.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (6) Identify or describe how the spin of a planet (e.g. Earth, Mars) accounts for the length of a day on the planet.
- b) (6) Identify or describe how a planet's orbit around the Sun accounts for the length of a year on the planet.
- c) (6) Identify or describe how Earth's spin and tilt account for the motion and position of stars and star patterns.
- d) (8) Identify or describe how the position of the Moon and the Sun account for Earth phenomena (e.g. length of shadows on Earth, phases of the Moon, eclipses of the Moon and Sun, ocean tides on Earth).
- e) (8) Identify or describe how the tilt of Earth's axis accounts for Earth's seasons.

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# Science WASL Specifications

## Core Concept: Solar System

**Grade Level Expectation: CH07 1.3.7 Interactions in the Solar System and Beyond (Universe)** (continued)

### Grades 9-10

Understand how stars, solar systems, galaxies, and the universe were formed and how these systems continue to evolve.

### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (10) Identify, describe, or explain phenomena caused by the regular and predictable motions of planets and moons in the Solar System.
- b) (10) Identify or describe how the Solar System may have been formed.
- c) (10) Identify or describe the formation and life cycle of stars.
- d) (10) Identify or describe the properties of different stars (e.g. mass, radius, temperature, age, formation, energy production).
- e) (10) Identify or describe how the Big Bang theory explains the observed properties of the universe (e.g. expansion, evolution, structures, element formation by fusion).

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# Science WASL Specifications

## Core Concept: Life Processes

### Grade Level Expectation: CH08 1.3.8 Life Processes and the Flow of Matter and Energy

*For population effects, food chains or webs, go to CH10 Interdependence of Life*

#### Grades K-2

Know that most living things need food, water, and air.

#### **Classroom Evidences of Learning**

- a) (1) Observe and record that most living things need water, food, and air.
- b) (1) Observe and record or demonstrate that plants need light.

#### Grades 3-5

Understand that living things need constant energy and matter.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (3) Identify sources of energy and matter used by plants to grow and sustain life (e.g. air, water, light, food, mineral nutrients).
- b) (4) Identify sources of energy and matter used by animals to grow and sustain life (e.g. air, water, food, mineral nutrients).
- c) (5) Identify or describe how plants obtain food (i.e. plants make food from light, air, water, and mineral nutrients).
- d) (5) Identify or describe how animals obtain food (i.e. animals obtain food from other living things).

Note: On the WASL, the term ‘mineral nutrient’ will be used to describe the matter plants generally get from soil. Mineral nutrients are not food for plants. Plants make their food (energy-rich molecules) with light energy and matter from air, water, and mineral nutrients.

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# Science WASL Specifications

## Core Concept: Life Processes

### Grade Level Expectation: CH08 1.3.8 Life Processes and the Flow of Matter and Energy (continued)

*For population effects, food chains or webs, go to CH10 Interdependence of Life*

#### **Grades 6-8**

Understand how individual organisms, including cells, obtain matter and energy for life processes.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Identify or describe the different sources of matter and energy required for life processes in plants and animals (e.g. seeds have energy for germination, green plants need light for energy).
- b) (7) Identify or describe how organisms acquire materials for life processes.
- c) (7) Identify or describe how organisms distribute materials for life processes within the organism.
- d) (7) Identify or describe how organisms eliminate materials from within the organism.
- e) (7) Identify or describe that both plants and animals extract energy from food but plants produce their own food from light, air, water, and mineral nutrients, while animals consume energy-rich foods.

#### **Grades 9-10**

Understand how organisms, including cells, use matter and energy to sustain life and that these processes are complex, integrated, and regulated.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9) Identify or describe how organisms sustain life by obtaining, transporting, transforming, releasing, and eliminating matter and energy.
- b) (9) Identify or describe how energy is transferred and transformed from the Sun to energy-rich molecules during photosynthesis.
- c) (9) Identify or describe how individual cells break down energy-rich molecules to provide energy for cell functions (i.e. cellular respiration).

Note: On the WASL, the term 'mineral nutrient' will be used to describe the matter plants generally get from soil. Mineral nutrients are not food for plants. Plants make their food (energy-rich molecules) with light energy and matter from air, water, and mineral nutrients.

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# Science WASL Specifications

## **Core Concept: Biological Evolution**

### **Grade Level Expectation: CH09 1.3.9 Biological Evolution**

#### **Grades K-2**

Know that fossils show how organisms looked long ago.

#### **Classroom Evidences of Learning**

- a) (2) Observe and record how fossils are similar to living organisms (e.g. leaves, shells).

#### **Grades 3-5**

Understand that plant and animal species change over time.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (5) Identify or describe how some kinds of plants and animals survive well, some struggle to survive, and some cannot survive at all in particular environments.
- b) (5) Identify or describe how individual plants and animals of the same kind differ in their characteristics and sometimes the differences give individuals an advantage in surviving and reproducing.
- c) (5) Identify or describe that fossils can be compared to one another and to living organisms according to their similarities and differences (e.g. some organisms that lived long ago are similar to existing organisms, but others are quite different).

#### **Grades 6-8**

Understand how the theory of biological evolution accounts for species diversity, adaptation, natural selection, extinction, and change in species over time.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (7) Identify or describe how fossils show extinction is common and most organisms that lived long ago have become extinct.
- b) (7) Identify or describe how individual organisms with certain traits are more likely than others to survive and have offspring (i.e. natural selection, adaptation).
- c) (7) Identify or describe how biological evolution accounts for the diversity of species developed through gradual processes over many generations.

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# Science WASL Specifications

## Core Concept: Biological Evolution

Grade Level Expectation: CH09 1.3.9 Biological Evolution (continued)

### Grades 9-10

Analyze the scientific evidence used to develop the theory of biological evolution and the concepts of natural selection, speciation, adaptation, and biological diversity.

### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (10) Identify or describe the factors that drive natural selection (i.e. overproduction of offspring, genetic variability of offspring, finite supply of resources, competition for resources, differential survival).
- b) (10) Identify, describe, or explain how natural selection and adaptation leads to organisms well-suited for survival in particular environments (e.g. speciation, biological diversity).
- c) (10) Identify or describe the degree of evolutionary relationship between organisms based on biochemical, genetic, anatomical, and/or fossil record similarities and/or differences.

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# Science WASL Specifications

## **Core Concept: Interdependence of Life**

### **Grade Level Expectation: CH10 1.3.10 Interdependence of Life**

*For effects within an individual organism, go to CH08 Life Processes and the Flow of Matter and Energy*

#### **Grades K-2**

Know that plants and animals need a place to live.

#### **Classroom Evidences of Learning**

- a) (1) Observe and show how organisms live in specific places (e.g. fish live in a pond).
- b) (1) Describe how animals depend on plants or other animals for food.
- c) (1) Describe how animals depend on plants or other animals for shelter.

#### **Grades 3-5**

Understand that an organism's ability to survive is influenced by the organism's behavior and by the ecosystem in which the organism lives.

#### **WASL Evidences of Learning**

Given an adequate description of an ecosystem, items may ask students to:

- a) (3) Identify or describe the characteristics of organisms that allow them to survive in an ecosystem.
- b) (3) Identify or describe the role of an organism in a food chain of an ecosystem (i.e. predator, prey, consumer, producer, decomposer, scavenger).
- c) (5) Identify or describe how an organism's ability to survive is affected by a change in an ecosystem (e.g. the loss of one organism in a food chain affects all other organisms in that food chain).
- d) (5) Identify or describe the path of substances (e.g. air, water, mineral nutrients) through a food chain.

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# Science WASL Specifications

## Core Concept: Interdependence of Life

### Grade Level Expectation: CH10 1.3.10 Interdependence of Life (continued)

*For effects within an individual organism, go to CH08 Life Processes and the Flow of Matter and Energy*

#### **Grades 6-8**

Understand how organisms in ecosystems interact with and respond to their environment and other organisms.

#### **WASL Evidences of Learning**

Given an adequate description of an ecosystem, items may ask students to:

- a) (7) Identify or describe how energy flows through a food chain or food web.
- b) (7) Identify or describe how substances such as air, water, and mineral nutrients are continually cycled in ecosystems.
- c) (7) Identify, describe, or explain the role of different organisms in an ecosystem (i.e. predator, prey, consumer, producer, decomposer, scavenger, carnivore, herbivore, and omnivore).
- d) (7) Identify or describe how a population of an organism responds to a change in the population's environment.

#### **Grades 9-10**

Analyze the living and nonliving factors that affect organisms in ecosystems.

#### **WASL Evidences of Learning**

Given an adequate description of an ecosystem, items may ask students to:

- a) (9) Identify or describe how matter and energy are transferred and cycled through ecosystems (i.e. matter and energy move from plants to herbivores/omnivores, to carnivores, and then to decomposers).
- b) (9) Compare different ecosystems in terms of the cycling of matter and/or flow of energy.
- c) (9) Identify or describe how population changes cause changes in the cycle of matter and/or the flow of energy in ecosystems.
- d) (9) Identify or describe the living and nonliving factors that limit the size and/or affect the health of a population in an ecosystem.

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# Science WASL Specifications

## **EALR 2: Inquiry in Science Strand**

The student knows and applies the skills, processes, and the nature of scientific inquiry.

### **2.1 Investigating Systems**

Develop the knowledge and skills necessary to do scientific inquiry

#### **Grade Level Expectation: IN01 2.1.1 Questioning**

##### **Grades K-2**

Understand how to ask a question about objects, organisms and events in the environment.

##### **Classroom Evidences of Learning**

- a) (K, 1, 2) Wonder and ask questions about objects, organisms and events based on observations of the natural world.

##### **Grades 3-5**

Understand how to ask a question about objects, organisms, and events in the environment.

##### **WASL Evidences of Learning**

Given a description of a scientific investigation, items may ask students to:

- a) (3, 4, 5) Identify the question being answered in an investigation.
- b) (5) Identify a new question that can be investigated with the same materials and/or data as a given investigation.

##### **Classroom Evidences of Learning**

- c) (3, 4, 5) Ask questions about objects, organisms and events based on observations of the natural world.

##### **Grades 6-8**

Understand how to generate a question that can be answered through scientific investigation.

##### **WASL Evidences of Learning**

Given a description of a scientific investigation, items may ask students to:

- a) (6, 7, 8) Identify the question being answered in an investigation.
- b) (6, 7, 8) Identify a new question that can be investigated with the same materials and/or data as a given investigation.

##### **Classroom Evidences of Learning**

- c) (6, 7, 8) Generate multiple questions based on observations.
- d) (6, 7, 8) Generate a question that can be investigated scientifically.

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# Science WASL Specifications

## Grade Level Expectation: IN01 2.1.1 Questioning (continued)

### Grades 9-10

Understand how to generate and evaluate questions that can be answered through scientific investigation.

### **WASL Evidences of Learning**

Given a description of a scientific investigation and the results of the investigation, items may ask students to:

- a) (9, 10) Identify a new question that can be investigated with the same materials and/or data as a given investigation.

### **Classroom Evidences of Learning**

- b) (9, 10) Generate questions, and critique whether questions can be answered through scientific investigations.

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# Science WASL Specifications

## Core Concept: Investigations

### Grade Level Expectation: IN02 2.1.2 Planning and Conducting Safe Investigations

*For explaining the reasons for the steps of a procedure, go to IN09 Evaluating Methods of Investigations*

#### Grades K-2

Understand how to plan and conduct simple investigations following all safety rules

#### Classroom Evidences of Learning

- a) (1, 2) Make observations and record characteristics or properties.
- b) (2) Make predictions of the results of an investigation.
- c) (2) Plan and conduct an observational investigation that collects information about characteristics or properties.
- d) (2) Collect data using simple equipment and tools that extend the senses (e.g. magnifiers, rulers, balances, scales, thermometers).
- e) (K, 1, 2) Follow all safety rules during investigations.

#### Grades 3-5

Understand how to plan and conduct simple investigations following all safety rules.

#### WASL Evidences of Learning

Given a description of a scientific investigation, items may ask students to:

- a) (3, 4, 5) Make predictions about the relationship between the changed (manipulated) and measured (responding) variable of an investigation.
- b) (3, 4, 5) Identify variables kept the same (controlled) in an investigation.
- c) (3, 4, 5) Identify the changed (manipulated) variable in an investigation.
- d) (3, 4, 5) Identify the measured (responding) variable in an investigation.
- e) (3, 4, 5) Construct a logical plan for a simple controlled or field investigation with the following attributes:
  - Prediction
  - Appropriate materials, tools, and available computer technology
  - Variables kept the same (controlled)
  - One changed (manipulated) variable
  - One measured (responding) variable
  - Consistently gather and record data from multiple trials using appropriate units, charts, and/or graphs
- f) (3, 4, 5) Identify or describe appropriate safety rules for an investigation.

#### Classroom Evidences of Learning

- g) (3, 4, 5) Complete a planned simple controlled or field investigation following all safety rules.
- h) (3, 4, 5) Identify or describe simple materials, equipment, and tools to gather data and extend the senses (e.g. magnifiers, rulers, balances, scales, thermometers) **Moved from WASL to Classroom Only.**

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# Science WASL Specifications

## Core Concept: Investigations

### Grade Level Expectation: IN02 2.1.2 Planning and Conducting Safe Investigations (continued)

*For explaining the reasons for the steps of a procedure, go to IN09 Evaluating Methods of Investigations*

#### Grades 6-8

Understand how to plan and conduct scientific investigations.

#### WASL Evidences of Learning

Given a description of a scientific investigation, items may ask students to:

- a) (6, 7, 8) Hypothesize (a prediction with reasons) the relationship between the manipulated (changed) and responding variable of an investigation.
- b) (6, 7, 8) Identify controlled (kept the same) variables in an investigation.
- c) (6, 7, 8) Identify the manipulated (changed) variable in an investigation.
- d) (6, 7, 8) Identify the responding variable in an investigation.
- e) (6, 7, 8) Construct a logical plan for a controlled or field investigation with the following attributes:
  - Hypothesis (prediction with related reason)
  - Appropriate materials, tools, and available computer technology
  - Controlled (kept the same) variables
  - One manipulated (changed) variable
  - One responding variable
  - Consistently gather and record data from multiple trials using appropriate units, charts, and/or graphs
- f) (6, 7, 8) Identify, describe, or explain appropriate safety rules for an investigation.

#### Classroom Evidences of Learning

- g) (6, 7, 8) Complete a planned controlled or field investigation following all safety rules.
- h) (6, 7, 8) Identify or describe materials, equipment, and tools to gather data and extend the senses (e.g., microscopes, metric rulers, balances, scales, thermometers) **Moved from WASL to Classroom Only.**

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# Science WASL Specifications

## **Grade Level Expectation: IN02 2.1.2 Planning and Conducting Safe Investigations** (continued)

*For explaining the reasons for the steps of a procedure, go to IN09 Evaluating Methods of Investigations*

### **Grades 9-10**

Understand how to plan and conduct systematic and complex scientific investigations.

#### **WASL Evidences of Learning**

Given a description of a scientific investigation, items may ask students to:

- a) (9, 10) Hypothesize (a prediction with a cause-effect reason) the relationship between the manipulated and the responding variable of an investigation.
- b) (9, 10) Identify controlled variables in an investigation.
- c) (9, 10) Identify the manipulated variable in an investigation.
- d) (9, 10) Identify the responding variable in an investigation.
- e) (9, 10) Construct a logical plan for a systematic and complex scientific controlled or field investigation with the following attributes:
  - Hypothesis (prediction with cause-effect reasons)
  - Appropriate materials, tools, and available computer technology
  - Controlled variables
  - One manipulated variable with three or more conditions/values
  - One responding variable
  - Consistently gather and record data from multiple trials using appropriate units, charts, and/or graphs
  - Experimental control condition when appropriate
  - Additional validity measures
- f) (9, 10) Identify, describe, or explain appropriate safety rules for an investigation.

#### **Classroom Evidences of Learning**

- g) (9, 10) Complete a planned systematic and complex scientific controlled or field investigation following all safety rules.
- h) (9, 10) Identify or describe materials, equipment, and tools to gather data (e.g. video microscopes, motion sensors, micropipettes, force sensors, pH probes) **Moved from WASL to Classroom Only.**

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# Science WASL Specifications

## **Core Concept: Explaining**

### **Grade Level Expectation: IN03 2.1.3 Explaining**

#### **Grades K-2**

Understand how to construct a reasonable explanation using evidence.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Categorize and order observational data from multiple trials.
- b) (K, 1, 2) Explain an event or phenomenon using observations as evidence (e.g. shape, texture, size, weight, color, motion).

#### **Grades 3-5**

Understand how to construct a reasonable explanation using evidence.

#### **WASL Evidences of Learning**

Given a description of a scientific investigation or adequate description of a system, items may ask students to:

- a) (3, 4, 5) Identify or write a conclusion including supporting data from an investigation. (E.g. Grass grows taller with more light. With only 2 hours of light, grass grew 2 centimeters in two weeks but with 6 hours of light, grass grew 8 centimeters. See 2004 WASL Release.)
- b) (3, 4, 5) Identify or describe a reason for a given conclusion using evidence from an investigation.
- c) (4, 5) Identify or write a scientific explanation of an observed phenomenon using given data or information.
- d) (5) Predict what logically might occur if the investigation lasted longer or was changed.

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# Science WASL Specifications

## Core Concept: Explaining

### Grade Level Expectation: IN03 2.1.3 Explaining (continued)

#### Grades 6-8

Apply understanding of how to construct a scientific explanation using evidence and inferential logic.

#### WASL Evidences of Learning

Given a description of a scientific investigation or adequate description of a system, items may ask students to:

- (6, 7, 8) Identify or write a scientific conclusion, including supporting data from an investigation, using inferential logic. (E.g. Chewing gum loses more mass than bubble gum after being chewed for 5 minutes. Chewing gum lost 2.00 grams while bubble gum only lost 1.47 grams. See 2003 WASL Release.)
- (6, 7, 8) Identify or describe a reason for a given conclusion using evidence from an investigation.
- (6, 7, 8) Identify or write a scientific explanation of an observed phenomena using given data or information.
- (6, 7, 8) Predict what logically might occur if the investigation lasted longer or was changed.
- (6, 7, 8) Identify or describe the difference between evidence (data) and conclusions.

#### Grades 9-10

Synthesize a revised scientific explanation using evidence, data, and inferential logic.

#### WASL Evidences of Learning

Given a description of a scientific investigation or adequate description of a system, items may ask students to:

- (9, 10) Identify or write a scientific conclusion, including supporting data from an investigation, using inferential logic. (E. g. The fertilizer did help the plants grow faster but had little effect on the number of seeds that germinated. With the fertilizer, the plants matured 35 days sooner than plants without the fertilizer. Almost all the 30 seeds used germinated, 13 seeds in the fertilized soil and 14 seeds in the soil without fertilizer. See 2004 WASL Release.)
- (9, 10) Identify or describe a reason for a given conclusion using evidence from the investigation.
- (9, 10) Identify or write a scientific explanation of an observed phenomenon using given data or information.
- (9, 10) Predict and/or explain what logically might occur if the investigation lasted longer or was changed.
- (9, 10) Identify, describe, or explain the difference between evidence (data) and conclusions.
- (9, 10) Identify, describe, or explain how scientific evidence supports or refutes explanations of phenomena.
- (10) Revise a scientific explanation to better fit the evidence and defend the logic of the revised explanation.

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# Science WASL Specifications

## Grade Level Expectation: IN04 2.1.4 Modeling

### Grades K-2

Understand that models represent real objects, events, or processes.

#### **Classroom Evidences of Learning**

- a) (2) Describe how a model (e.g. diagram, map, physical model) is similar to and different from a real object, event, or process (e.g. size, shape, color).
- b) (2) Make a simple model of a common object, event, or process.

### Grades 3-5

Understand how to use simple models to represent objects, events, systems, and processes.

#### **WASL Evidences of Learning**

Given an appropriate phenomenon or model for a phenomenon, items may ask students to:

- a) (3, 4, 5) Identify or describe the similarities and/or differences between a model and what the model represents (e.g. a hinge and an elbow; a spinning globe and Earth's rotations; steam from a tea kettle and clouds or fog).
- b) (3, 4, 5) Identify or describe how a simple model (e.g. physical model, computer model, simulation of a process) can be used to investigate phenomena.
- c) (5) Identify or describe reasons for using a model to investigate phenomena (e.g. processes that happen very slowly or quickly; things that are too small or too large for direct observation; phenomena that cannot be controlled or are potentially dangerous).

#### **Classroom Evidences of Learning**

- d) (3, 4, 5) Make a simple model (e.g. diagram and /or physical model) to represent simple objects, events, systems, or processes.

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# Science WASL Specifications

## **Grade Level Expectation: IN04 2.1.4 Modeling** (continued)

### **Grades 6-8**

Analyze how models represent and are used to investigate objects, events, systems, and processes.

#### **WASL Evidences of Learning**

Given an appropriate phenomenon or model for a phenomenon, items may ask students to:

- a) (6) Compare models or computer simulations of a phenomenon to the actual phenomenon.
- b) (6) Identify, describe, or explain how models or computer simulations are used to investigate and/or predict the behaviors of objects, events, systems, or processes.
- c) (8) Identify, describe, or explain the advantages and/or limitations of investigating with a model.

#### **Classroom Evidences of Learning**

- d) (6, 7, 8) Make a model or computer simulation to investigate and predict the behavior of objects, events, systems, or processes (e.g. phases of the moon using a solar system model).

### **Grades 9-10**

Analyze how physical, conceptual, and mathematical models represent and are used to investigate objects, events, systems, and processes.

#### **WASL Evidences of Learning**

Given an appropriate phenomenon or model for a phenomenon, items may ask students to:

- a) (9, 10) Compare how a model or different models represent the actual behavior of an object, event, system, or process.
- b) (9, 10) **Identify, describe, or** explain or evaluate how well a model describes or predicts the behavior of an object, event, system, or process.
- c) (9, 10) Describe or explain how a model can be used to investigate, predict, and/or explain the behavior of objects, events, systems, or processes (e.g. DNA replication).

#### **Classroom Evidences of Learning**

- d) (9, 10) Make a model to investigate, predict, and explain the behavior of objects, events, systems, or processes (e.g. DNA replication using a model).

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# Science WASL Specifications

## Grade Level Expectation: IN05 2.1.5 Communicating

### Grades K-2

Understand how to record and report investigations, results, and explanations.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Report observations of simple investigations using drawings and simple sentences.
- b) (K, 1, 2) Report safety procedures used during the investigation.
- c) (1, 2) Describe and draw the materials used in the investigation (e.g. numbers, shapes, colors).
- d) (2) Report the process used and results of the investigation (e.g. verbal, visual, written, and mathematical formats).

### Grades 3-5

Understand how to report investigations and explanations of objects, events, systems, and processes.

#### **WASL Evidences of Learning**

Given a description of a system or scientific investigation, items may ask students to:

- a) (3, 4, 5) Identify or describe the observations or data of a simple investigation without making inferences.
- b) (3, 4, 5) Identify or write a summary of an investigation that includes some or all of the following:
  - reasons for selecting the investigative plan
  - materials used in the investigation
  - observations, data, results
  - explanations in written, mathematical, oral, and/or information technology presentation formats
  - safety procedures used

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# Science WASL Specifications

## **Grade Level Expectation: IN05 2.1.5 Communicating** (continued)

### **Grades 6-8**

Apply understanding of how to report investigations and explanations of objects, events, systems, and processes.

#### **WASL Evidences of Learning**

Given a description of a system or scientific investigation, items may ask students to:

- a) (6, 7, 8) Identify or describe the observations or data of an investigation without making inferences.
- b) (6, 7, 8) Identify or write a summary of an investigation that includes some or all of the following:
  - reasons for selecting the investigative plan
  - materials used in the investigation
  - observations, data, results
  - explanations in written, mathematical, oral, and/or information technology presentation formats
  - safety procedures used
- c) (6, 7, 8) Identify or describe the difference between an objective summary of data and an inference made from data.

### **Grades 9-10**

Apply understanding of how to report complex scientific investigations and explanations of objects, events, systems, and processes; and how to evaluate scientific reports.

#### **WASL Evidences of Learning**

Given a description of a system or scientific investigation, items may ask students to:

- a) (9, 10) Identify or describe the observations of an investigation without making inferences.
- b) (9, 10) Identify or write a summary of an investigation that includes some or all of the following:
  - reasons for selecting the investigative plan
  - materials used in the investigation
  - observations, data, results
  - explanations in written, mathematical, oral, and/or information technology presentation formats
  - safety procedures used
- c) (9, 10) Identify or describe the difference between an objective summary of data and an inference made from data.
- d) (9, 10) Critique a scientific report for completeness, accuracy and objectivity.

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# Science WASL Specifications

## **2.2 Nature of Science**

Understand the nature of scientific inquiry.

### **Grade Level Expectation: IN06 2.2.1 Intellectual Honesty**

#### **Grades K-2**

Understand that all scientific observations are reported accurately even when the observations contradict expectations.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Record what is observed and explain how the observation was done accurately and honestly.
- b) (1, 2) Keep records and explain that the records have not been changed, even when the records did not match initial expectations.

#### **Grades 3-5**

Understand that all scientific observations are reported accurately and honestly even when the observations contradict expectations.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (3, 4, 5) Identify, describe, or explain why scientific observations are recorded accurately and honestly.
- b) (3, 4, 5) Identify, describe, or explain why scientific records of observations are not changed even when the records do not match initial expectations.
- c) (3, 4, 5) Identify, describe, or explain why honest acknowledgement of the contributions of others and information sources are necessary.

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# Science WASL Specifications

## **Grade Level Expectation: IN06 2.2.1 Intellectual Honesty** (continued)

### **Grades 6-8**

Apply curiosity, honesty, skepticism, and openness when considering explanations and conducting investigations.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (6, 7, 8) Identify, describe, or explain why an honest response to questionable results, conclusions, or explanations is important to the scientific enterprise.
- b) (6, 7, 8) Identify or describe a flaw in a claim or a conclusion (e.g. limited data, flawed procedure, or overgeneralization).
- c) (6, 7, 8) Identify or describe how scientists accurately and honestly record, report, and share observations and/or measurements without bias.
- d) (6, 7, 8) Identify, describe, or explain why honest acknowledgement of the contributions of others and/or information sources are necessary.

### **Grades 9-10**

Analyze why curiosity, honesty, cooperation, openness, and skepticism are important to scientific explanations and investigations.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (9, 10) Identify, describe, or explain why honesty ensures the integrity of scientific investigations (e.g. lack of honesty can result in explanations and conclusions not supported by credible evidence).
- b) (9, 10) Identify, describe, or explain why a claim or a conclusion is flawed (e.g. limited data, lack of controls or weak logic can lead to flawed conclusions).
- c) (9, 10) Identify, describe, or explain why scientists are expected to accurately and honestly record, report, and share observations and/or measurements without bias.
- d) (9, 10) Identify, describe, or explain why honest acknowledgement of the contributions of others and/or information sources are necessary (e.g. undocumented sources of information or plagiarism undermine the credibility of explanations and investigations).
- e) (9, 10) Identify, describe, or explain why peer review is necessary in the scientific reporting process.

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# Science WASL Specifications

## Grade Level Expectation: IN07 2.2.2 Limitations of Science and Technology

### Grades K-2

Understand that observations and measurements are used by scientists to describe the world.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Raise questions about the natural world and seek answers by making careful observations and trying things out.
- b) (1, 2) Make observations and measurements about natural phenomena.

### Grades 3-5

Understand that scientific facts are measurements and observations of phenomena in the natural world that are repeatable and verified by expert scientists.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (3) Identify or describe how new scientific facts are established every day.
- b) (4, 5) Identify or describe whether a measurement or observation is a scientific fact.
- c) (4, 5) Identify or describe whether a report of an observation is a scientific fact or an interpretation (e.g. seeing a light in the night sky is an observation versus interpreting that light to be a star).

### Grades 6-8

Understand that scientific theories explain facts using inferential logic.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (6, 7, 8) Identify or describe how a principle or theory logically explains a given set of facts.
- b) (7, 8) Identify or describe how new facts or evidence may result in the modification or rejection of a theory (e.g. rejections of the caloric theory of heat and the theory of acquired characteristics).

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# Science WASL Specifications

## **Grade Level Expectation: IN07 2.2.2 Limitations of Science and Technology** (continued)

### **Grades 9-10**

Analyze scientific theories for logic, consistency, historical and current evidence, limitations, and capacity to predict, to be investigated, and to be modified.

### **WASL Evidences of Learning**

Given clear descriptions of systems, investigations, or theories, items may ask students to:

- a) (9, 10) Identify or describe how a theory logically explains a set of facts, principles, concepts and/or knowledge.
- b) (9, 10) Identify or describe a theory that best explains and/or predicts phenomena and/or investigative results.
- c) (9, 10) Identify, describe, or explain how scientific theories are open to investigation and have the capacity to predict and/or to be modified.

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# Science WASL Specifications

## Grade Level Expectation: IN08 2.2.3 Evaluating Inconsistent Results

### Grades K-2

Understand that similar investigations may not produce similar results.

#### **Classroom Evidences of Learning**

- a) (2) Observe the procedures of two similar investigations and describe that the investigations produced different results.

### Grades 3-5

Understand why similar investigations may not produce similar results.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (3, 4, 5) Identify or describe reasons why two similar investigations can produce different results (e.g. identify possible sources of error).
- b) (4, 5) Identify, describe, or explain whether sufficient information has been obtained to make a conclusion.

### Grades 6-8

Analyze inconsistent results from scientific investigations to determine how the results can be explained.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (6, 7, 8) Compare two or more similar investigations and identify, describe, or explain why different results were produced (e.g. insufficient data could be interpreted as inconsistent results).
- b) (6, 7, 8) Identify, describe, or explain whether sufficient information has been obtained to make a conclusion.
- c) (7, 8) Identify, describe, or explain why the results from a single investigation or demonstration are not sufficient to describe a phenomenon.

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# Science WASL Specifications

## Grade Level Expectation: IN08 2.2.3 Evaluating Inconsistent Results

### Grades 9-10

Evaluate inconsistent or unexpected results from scientific investigations using scientific explanations.

### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (9, 10) Identify, explain, or evaluate similar investigations with inconsistent or unexpected results.
- b) (9, 10) Identify, describe, or explain whether sufficient data has been obtained to make an explanation or conclusion (e.g. reference previous and current research; incorporate scientific concepts, principles, and theories).
- c) (9, 10) Identify, describe, or explain why results from a single investigation or demonstration are not conclusive about a phenomenon.

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# Science WASL Specifications

## **Core Concept: Evaluating**

### **Grade Level Expectation: IN09 2.2.4 Evaluating Methods of Investigation**

**Grades K-2** (No GLE at this grade level)

#### **Grades 3-5**

Understand how to make the results of scientific investigations reliable.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (3, 4, 5) Identify or describe how the method of investigation ensures reliable results (i.e. reliability means that repeating an investigation gives similar results).
- b) (4, 5) Identify or describe how to increase the reliability of the results of an investigation (e.g. multiple trials of an investigation increase the reliability of the results).

#### **Grades 6-8**

Understand how to make the results of scientific investigations reliable and how to make the methods of investigation valid.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (6) Identify or describe how the method of an investigation ensures reliable results (e.g. multiple trials ensure more reliable results).
- b) (6, 7, 8) Identify or describe how to increase the reliability of the results of an investigation (e.g. repeating an investigation exactly the same way increases the reliability of the results).
- c) (7, 8) Identify or describe how the method of an investigation is valid (i.e. validity means that the investigation answered the investigative question with confidence; the manipulated variable caused the change in the responding variable).
- d) (7, 8) Identify or describe the purpose of the steps and/or materials of an investigation's procedure in terms of the validity of the investigation.
- e) (8) Identify, describe, or explain how to modify an investigation to improve the validity of the investigation (e.g. more controlled variables, better measuring techniques, increased sample size).

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# Science WASL Specifications

## **Core Concept: Evaluating**

### **Grade Level Expectation: IN09 2.2.4 Evaluating Methods of Investigation** (continued)

#### **Grades 9-10**

Analyze scientific investigations for validity of method and reliability of results.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (9, 10) Identify or describe how the method of investigation ensured reliable results (e.g. multiple trials ensure more reliable results).
- b) (9, 10) Identify, describe, or explain how to increase the reliability of the results of an investigation (e.g. repeating the investigation exactly the same way increases the reliability of the results).
- c) (9, 10) Identify or describe how the method of an investigation ensured validity (i.e. validity means that the investigation answered the investigative question with confidence; the manipulated variable caused the change in the responding variable).
- d) (9, 10) Identify, describe, or explain the purpose of the steps of an investigation in terms of the validity of the investigation.
- e) (9, 10) Identify, describe, or explain how to improve the validity of an investigation (e.g. more controlled variables, better measuring technique, increased sample size, control for sample bias, include experimental control condition when appropriate, include a placebo group when appropriate).
- f) (10) Identify, describe, or explain an appropriate type of investigation to ensure reliability and validity for a given investigative question (e.g. descriptive, controlled, correlational, comparative).

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# Science WASL Specifications

## Grade Level Expectation: IN10 2.2.5 Evolution of Scientific Ideas

### Grades K-2

Know that ideas in science change as new scientific evidence arises.

#### **Classroom Evidences of Learning**

- a) (1, 2) Know how scientific inquiry results in facts, unexpected findings, ideas, evidence, and explanations.

### Grades 3-5

Understand that scientific comprehension of systems increases through inquiry.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (3, 4, 5) Identify or describe how scientific inquiry results in facts, unexpected findings, ideas, evidence, and explanations.
- b) (4, 5) Identify or describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world.
- c) (5) Identify, describe, or explain how ideas about the natural and/or constructed world have changed because of scientific inquiry.

### Grades 6-8

Understand that increased comprehension of systems leads to new inquiry.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (6, 7, 8) Identify or describe how scientific inquiry results in new facts, evidence, unexpected findings, ideas, and explanations.
- b) (7, 8) Identify or describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world.
- c) (6, 7, 8) Identify or describe ~~how increased understanding of systems leads to~~ new questions to be investigated **as a result of increased understanding of a system.**
- d) (7, 8) Identify or describe how new ideas need repeated inquiries before acceptance.
- e) (8) Identify or describe how new investigative questions arise at the completion of scientific inquiry.

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# Science WASL Specifications

## Grade Level Expectation: IN10 2.2.5 Evolution of Scientific Ideas (continued)

### Grades 9-10

Understand how scientific knowledge evolves.

#### **WASL Evidences of Learning**

Given a description of a system or investigation, items may ask students to:

- a) (9, 10) Identify, describe, or explain how scientific inquiry results in new facts, evidence, unexpected findings, ideas, explanations, and revisions to current theories.
- b) (9, 10) Identify, describe, or explain how results of scientific inquiry may change our understanding of the systems of the natural and constructed world.
- c) (9, 10) Identify, describe, or explain ~~how increased understanding of systems leads to~~ new questions to be investigated **as a result of increased understanding of a system.**
- d) (9, 10) Identify, describe, or explain how new ideas need repeated inquiries before acceptance.

#### **Classroom Evidences of Learning**

- e) (9, 10) Explain how existing ideas were synthesized from a long, rich history of scientific explanations and how technological advancements changed scientific theories.
- f) (9, 10) Use new tools to investigate a system to discover new facts about the system that lead to new ideas and questions.

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# Science WASL Specifications

## **EALR 3: Application of Science Strand**

The student knows and applies science concepts and skills to develop solutions to human problems in societal contexts.

### **3.1 Designing Solutions**

Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges.

### **Grade Level Expectation: AP01 3.1.1 Identifying Problems**

#### **Grades K-2**

Know and understand problems that can be solved or have been solved by using scientific design.

#### **Classroom Evidences of Learning**

- a) (2) Identify and explain problems that can be solved through investigations and/or with tools.
- b) (2) Identify and describe a problem in a given situation (e.g. “I want to make the plant grow faster”).

#### **Grades 3-5**

Understand problems found in ordinary situations in which scientific design can be or has been used to design solutions.

#### **WASL Evidences of Learning**

Given a human problem or challenge, items may ask students to:

- a) (3, 4, 5) Identify or describe the scientific concepts involved in a human problem (e.g. growing plants indoors requires a source of light energy).
- b) (3, 4, 5) Identify or describe the scientific information that could be gathered about a human problem (e.g. find an acceptable information source, do an investigation to collect data).

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# Science WASL Specifications

## Grade Level Expectation: AP01 3.1.1 Identifying Problems (continued)

### **Grades 6-8**

Analyze common problems or challenges in which scientific design can be or has been used to design solutions.

#### **WASL Evidences of Learning**

Given a human problem or challenge, items may ask students to:

- a) (6, 7, 8) Identify, describe, or explain the scientific concepts/principles relevant to a human problem (e.g. understanding the process of erosion can be relevant to flooding problems).
- b) (6, 7, 8) Identify, describe, or explain the scientific information that could be gathered about a human problem (e.g. find scientific information sources, do a controlled investigation to collect relevant data).

### **Grades 9-10**

Analyze local, regional, national, or global problems or challenges in which scientific design can be or has been used to design a solution.

#### **WASL Evidences of Learning**

Given a human problem or challenge, items may ask students to:

- a) (9, 10) Identify, describe, explain, or analyze the scientific concepts/principles relevant to regional human problems (e.g. understanding the relationship between atmospheric carbon dioxide and heat energy may be relevant to global warming).
- b) (9, 10) Identify, describe, explain, or evaluate the scientific information that could be gathered about local, regional, and/or global human problems (e.g. find information sources for long-term scientific data, do a field investigation to collect relevant local or regional data).

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# Science WASL Specifications

## **Core Concept: Designing Solutions**

### **Grade Level Expectation: AP02 3.1.2 Designing and Testing Solutions**

#### **Grades K-2**

Understand how to construct and test a solution to a problem.

#### **Classroom Evidences of Learning**

- a) (2) Propose, construct, and test a solution to a problem.
- Give examples of possible solutions to the problem.
  - Select and construct a solution to the problem.
  - Test a solution to the problem.

#### **Grades 3-5**

Understand how the scientific design process is used to develop and implement solutions to human problems.

#### **WASL Evidences of Learning**

Given the stages of a scientific design process for a similar problem or challenge, items may ask students to:

- a) (3, 4, 5) Propose and document the stages of a scientific design process used to solve a problem or challenge.
- Define the problem.
  - Scientifically gather information and/or collect measured data.
  - Explore ideas.
  - Summarize the plan.
  - List steps to do the plan.
  - Diagram the solution.
  - Scientifically test the solution.

Given a common, straightforward problem(s), items may ask students to:

- b) (3, 4, 5) Identify or describe possible solutions to a problem (e.g. preventing an injury on the playground by creating a softer landing at the bottom of a slide).

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# Science WASL Specifications

## Core Concept: Designing Solutions

### Grade Level Expectation: AP02 3.1.2 Designing and Testing Solutions (continued)

#### Grades 6-8

Apply a scientific design process to develop and implement solutions to problems or challenges.

#### **WASL Evidences of Learning**

Given the stages of a scientific design process for a similar problem or challenge, items may ask students to:

- a) (6, 7, 8) Propose and document the stages of a scientific design process used to solve a problem or challenge.
- Define the problem.
  - Scientifically gather information and/or collect measured data.
  - Explore ideas.
  - Summarize the plan.
  - List steps to do the plan.
  - Diagram the solution.
  - Scientifically test the solution.

Given a common, straightforward problem(s), items may ask students to:

- b) (6, 7, 8) Identify, describe, or explain possible solutions to a problem (e.g. use pulleys instead of levers to lift a heavy object).

#### Grades 9-10

Evaluate a scientific design process used to develop and implement solutions to problems or challenges.

#### **WASL Evidences of Learning**

Given the stages of a scientific design process for a similar problem or challenge, items may ask students to:

- a) (9, 10) Research, propose, and document the stages of a scientific design process used to solve a problem or challenge.
- Define the problem.
  - Scientifically gather information and/or collect measured data.
  - Explore ideas.
  - Summarize the plan.
  - List steps to do the plan.
  - Diagram the solution.
  - Scientifically test the solution.

Given a common, straightforward problem(s), items may ask students to:

- b) (9, 10) Identify, describe, explain, or evaluate possible solutions to a problem (e.g. describe how to clean up a polluted stream)

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# Science WASL Specifications

## **Core Concept: Evaluating Solutions**

### **Grade Level Expectation: AP03 3.1.3 Evaluating Potential Solutions**

#### **Grades K-2**

Understand how well a design or a product solves a problem.

#### **Classroom Evidences of Learning**

- a) (2) Choose and justify at least one reason why a design or product would or would not work to solve a specific problem.

#### **Grades 3-5**

Analyze how well a design or a product solves a problem.

#### **WASL Evidences of Learning**

Given a problem, attempted solution, results, and criteria for evaluation, items may ask students to:

- a) (3, 4, 5) Identify the criteria for an acceptable solution to a problem or challenge.
- b) (3, 4, 5) Identify or describe the reason(s) for the effectiveness of a solution to a problem or challenge using scientific concepts/principles.
- c) (3, 4, 5) Identify or describe the consequences of a solution to a problem or challenge (e.g. sharpening a crayon results in using up crayons faster).
- d) (3, 4, 5) Identify or describe how to change a system to solve a problem or improve a solution to a problem.

#### **Classroom Evidences of Learning**

- e) (3, 4, 5) Test how well a solution solves a problem based on criteria, scientific concepts/principles, and data.

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# Science WASL Specifications

## **Core Concept: Evaluating Solutions**

### **Grade Level Expectation: AP03 3.1.3 Evaluating Potential Solutions** (continued)

#### **Grades 6-8**

Analyze multiple solutions to a problem or challenge.

#### **WASL Evidences of Learning**

Given a problem, attempted solution(s), and results, items may ask students to:

- a) (6, 7, 8) Identify or describe the criteria to evaluate an acceptable solution to a problem or challenge.
- b) (6, 7, 8) Identify or describe the reason(s) for the effectiveness of a solution to a problem or challenge using scientific concepts/principles.
- c) (7, 8) Identify or describe the consequences of a solution to a problem or challenge (e.g. using rocks on the edge of a stream to prevent erosion may destroy habitat).
- d) (7, 8) Identify or describe how to change a system to solve a problem or improve a solution to a problem.
- e) (8) Compare the effectiveness of different solutions to a problem or challenge based on criteria, using scientific concepts/principles.

#### **Grades 9-10**

Evaluate consequences, constraints, and applications of solutions to a problem or challenge.

#### **WASL Evidences of Learning**

Given a problem, attempted solution(s), and results, items may ask students to:

- a) (9, 10) Identify, describe, or explain the criteria to evaluate solution(s) to a problem or challenge.
- b) (9, 10) Identify, describe, or explain the effectiveness of solution(s) to a problem or challenge using scientific concepts/principles.
- c) (9, 10) Identify, describe, or explain the consequences of solution(s) to a problem or challenge (e.g. doubling the fertilizer will probably not double the plant growth and could cause harm to the ecosystem).
- d) (9, 10) Identify, describe, or explain how to change a system to solve a problem or improve solutions to problems.
- e) (9, 10) Compare or evaluate the effectiveness of different solutions to a problem or challenge based on criteria, using scientific concepts/principles.

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# Science WASL Specifications

## **3.2 Science, Technology, and Society**

Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

### **Grade Level Expectation: AP04 3.2.1 All Peoples Contribute to Science and Technology**

#### **Grades K-2**

Know that science and technology are practiced by all people around the world.

#### **Classroom Evidences of Learning**

- a) (1) Identify ways that people around the world use science and technology.
- b) (2) Identify ways that people around the world use science and technology to invent things and ideas.

#### **Grades 3-5**

Understand that science and technology have been practiced by all peoples throughout history.

#### **Classroom Evidences of Learning**

- a) (3, 4, 5) Describe how individuals of diverse backgrounds have made significant scientific discoveries or technological advances.
- b) (3, 4, 5) Describe how advancements in science and technology have developed over time and with contributions from diverse peoples.

#### **Grades 6-8**

Analyze how science and technology have been developed, used, and affected by many diverse individuals, cultures, and societies throughout human history.

#### **Classroom Evidences of Learning**

- a) (6, 7, 8) Explain how the contributions of diverse individuals have led to the development of science and technology.
- b) (8) Explain how science and technology have affected individuals, cultures, and societies throughout human history.

#### **Grades 9-10**

Analyze how scientific knowledge and technological advances discovered and developed by individuals and communities in all cultures of the world contribute to changes in societies.

#### **Classroom Evidences of Learning**

- a) (9) Explain how life has changed throughout history because of scientific knowledge and technological advances from a variety of peoples.
- b) (10) Compare the impacts of diverse cultures and individuals on science and technology.

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# Science WASL Specifications

## Grade Level Expectation: AP05 3.2.2 Relationship of Science and Technology

### Grades K-2

Know that people have invented tools for everyday life.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Describe ways in which common tools help people in their everyday lives.

### Grades 3-5

Understand that people have invented tools for everyday life and for scientific investigations.

#### **WASL Evidences of Learning**

Given an adequate description of a system, items may ask students to:

- a) (3) Identify or describe tools (technology) invented to advance scientific investigations (e.g. thermometers, rulers, microscopes, telescopes).
- b) (4) Identify or describe how scientific tools help people design solutions to human problems (e.g. hand lenses to see the detailed structure of leaves).
- c) (5) Identify or describe how common tools help people design ways to adapt to different environments (e.g. sewing needle to make clothes).
- d) (5) Identify or describe how scientific ideas and discoveries are used to design solutions to human problems, extend human ability, or help humans adapt to different environments (e.g. prosthetics used to replace lost limbs).

### Grades 6-8

Analyze scientific inquiry and scientific design and understand how science supports technological development and vice versa.

#### **WASL Evidences of Learning**

Given a clear description of a scientific inquiry and/or a scientific design, items may ask students to:

- a) (7, 8) Identify or describe how scientific investigations and scientific research support technology (e.g. investigations into materials led to Gore Tex and Kevlar).
- b) (7, 8) Identify or describe how technology supports scientific investigations and research (e.g. microscopes led to the discovery of unicellular organisms).
- c) (7, 8) Identify or describe how a scientifically designed solution to a human problem can lead to new tools that generate further inquiry (e.g. microscopes, telescopes, and computers).
- d) (7, 8) Compare the processes of scientific inquiry and scientific design in terms of activities, results, and/or influence on individuals and/or society.

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# Science WASL Specifications

## **Grade Level Expectation: AP05 3.2.2 Relationship of Science and Technology** (continued)

### **Grades 9-10**

Analyze how the scientific enterprise and technological advances influence and are influenced by human activity.

### **WASL Evidences of Learning**

Given an adequate description of a scientific inquiry and/or a scientific design, items may ask students to:

- a) (9, 10) Identify or describe how science and/or technology have led to a given social or economic development.
- b) (10) Identify, describe, or explain risks associated with investigations involving living things (e.g. drug trials on animals, testing of genetically engineered plants, release of African snails into the environment after experimentation).
- c) (10) Identify the limits of scientific research in solving a given social, environmental, and/or economic problem.
- d) (10) Compare advantages and/or disadvantages of using new technology or science in terms of ethics, politics, and/or environmental considerations.

### **Classroom Evidences of Learning**

- e) (10) Explain the concept of proprietary discovery (e.g. patents on genes).

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# Science WASL Specifications

## **Grade Level Expectation:**

### **AP06 3.2.3 Careers and Occupations Using Science, Mathematics, and Technology**

#### **Grades K-2**

Know how knowledge and skills of science, mathematics, and technology are used in common occupations.

#### **Classroom Evidences of Learning**

- a) (1) Tell at least one way that science, mathematics, or technology is used by a person in a job.

#### **Grades 3-5**

Understand how knowledge and skills of science, mathematics, and technology are used in common occupations.

#### **Classroom Evidences of Learning**

- a) (3, 4, 5) Identify science, mathematics, and technology skills used in a career.
- b) (3, 4, 5) Identify occupations using scientific, mathematical, and technological knowledge and skills.

#### **Grades 6-8**

Analyze the use of science, mathematics, and technology within occupational/career areas of interest.

#### **Classroom Evidences of Learning**

- a) (6, 7, 8) Examine scientific, mathematical, and technological knowledge and skills used in an occupation/career.
- b) (6, 7, 8) Research occupations/careers requiring knowledge of science, mathematics, and technology.

#### **Grades 9-10**

Analyze the scientific, mathematical, and technological knowledge, training, and experience needed for occupational/career areas of interest.

#### **Classroom Evidences of Learning**

- a) (9, 10) Research and report on educational requirements associated with an occupation(s)/career(s) of interest.
- b) (9, 10) Examine the scientific, mathematical, and technological knowledge, training, and experience needed for occupational/career areas of interest.

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# Science WASL Specifications

## **Core Concept: Environmental Issues**

### **Grade Level Expectation: AP07 3.2.4 Environmental and Resource Issues**

#### **Grades K-2**

Understand how humans depend on the natural environment.

#### **Classroom Evidences of Learning**

- a) (K, 1, 2) Describe what humans obtain from their environment (e.g. a school garden yields vegetables for food, a sheep yields wool used to make a sweater).
- b) (1, 2) Describe what organisms obtain from their environment (e.g. a plant needs water and sunlight).

#### **Grades 3-5**

Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (3, 4, 5) Identify or describe how resources can be conserved through reducing, reusing, and recycling.
- b) (3, 4, 5) Identify or describe the effects conservation has on the environment.
- c) (3, 4, 5) Identify or describe the effects of humans on the health of an ecosystem.
- d) (3, 4, 5) Identify or describe how humans can cause changes in the environment that can affect the livability of the environment for humans.
- e) (3, 4, 5) Identify or describe the limited resources humans depend on and how changes in these resources affect the livability of the environment for humans.

#### **Grades 6-8**

Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

#### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (6, 7, 8) Discriminate between renewable and nonrenewable resources in an ecosystem.
- b) (6, 7, 8) Identify, describe, or explain the effects that the conservation of natural resources has on the quality of life and the health of ecosystems.
- c) (6, 7, 8) Identify, describe, or explain the effects of various human activities on the health of an ecosystem and/or the ability of organisms to survive in that ecosystem (e.g. consumption of natural resources; waste management; urban growth; land use decisions; use of pesticides, herbicides, or fertilizers).

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# Science WASL Specifications

## **Core Concept: Environmental Issues**

**Grade Level Expectation: AP07 3.2.4 Environmental and Resource Issues** (continued)

### **Grades 9-10**

Analyze the effects human activities have on Earth's capacity to sustain biological diversity.

### **WASL Evidences of Learning**

Given an adequate description of an appropriate system, items may ask students to:

- a) (9, 10) Identify, describe, or explain how the use of renewable and nonrenewable natural resources affects the sustainability of an ecosystem.
- b) (9, 10) Identify, describe, or explain how human activities affect Earth's capacity to sustain biological diversity (e.g. global warming, ozone depletion).

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# Science WASL Specifications

## Expected Scientific Vocabulary

The reading level of the science WASL is two grade levels below the assessed grade level. However, there are some grade-level terms used in the science EALRs to describe scientific concepts and processes. The following lists are the grade-level terms used on the Science WASL without definitions. More terms may be used with definitions or examples. The plural form of all these words is assumed useable. However, other forms of these words are not accepted unless specified. Every word from a lower grade level may be used at a higher grade level. **Science words meeting the two-grade-level-below test may not be included in this vocabulary list.**

Terms that build through the grade levels are listed below, and appear in the Science WASL as shown with the higher grade term in parenthesis.

### 5th Grade

variable kept the same (controlled)  
changed (manipulated) variable  
measured (responding) variable  
energy of motion (kinetic)  
learned (acquired) characteristic  
state of matter

### 8thGrade

controlled (kept the same) variable  
manipulated (changed) variable  
responding (dependent) variable  
kinetic energy  
acquired (learned) characteristic  
phase (state) of matter

### 10th Grade

controlled variable  
manipulated variable  
responding variable  
kinetic energy  
acquired characteristic  
phase of matter

These words are not meant to be the exclusive terms used in a science curriculum. The science curriculum should build in-depth understanding of these concepts and processes using many instructional activities and other supporting terms.

Memorizing these terms would not help students perform better on the science WASL. There will never be science WASL items asking students to define a term. Science WASL items ask students to use concepts named by these terms. Students, therefore, need to build understanding in the context of studying and investigating systems then use that understanding to design solutions to human problems.

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# Science WASL Specifications

## Expected Scientific Vocabulary (continued)

### A

#### 5<sup>th</sup> Grade

absorb  
affect  
air  
amount  
amount of time  
axis

#### 8<sup>th</sup> Grade

accuracy  
acid  
acidity  
acquired (learned)  
characteristic  
adaptation  
air pressure  
artery  
atmosphere  
atom  
attract

#### 10<sup>th</sup> Grade

absorption  
acceleration  
acquired characteristic  
amplitude  
asexual  
atmospheric  
atomic number

### B

#### 5<sup>th</sup> Grade

balance  
bone  
brain

#### 8<sup>th</sup> Grade

bacteria  
blood vessel  
body of water

#### 10<sup>th</sup> Grade

bacterium  
biomass

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### C

##### 5<sup>th</sup> Grade

cause  
cell  
centimeter (cm)  
characteristic  
chart  
classify  
climate  
color  
compost  
conclude  
conclusion  
condensation  
condense  
conserve  
consumer  
conversion  
continent  
cycle

##### 8<sup>th</sup> Grade

camouflage  
carbohydrates  
carbon dioxide  
cell  
charge  
chemical  
circuit  
cleavage of minerals  
cold-blooded  
compare  
compound  
conduction  
contrast  
controlled variable (kept the same)  
convection  
core  
crust

##### 10<sup>th</sup> Grade

celestial  
cell membrane  
cell nucleus  
cell wall  
chlorophyll  
chloroplast  
circulatory system  
concentration  
constraint  
continental plates  
contraction  
controlled variable  
criteria

#### D

##### 5<sup>th</sup> Grade

data  
decomposer  
decrease  
demonstrate  
depend  
describe  
design  
diagram  
diameter  
direction  
dissolve

##### 8<sup>th</sup> Grade

density  
description  
dew point  
digest  
digestive system

##### 10<sup>th</sup> Grade

diffusion  
diversity

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### E

##### 5th Grade

Earth  
earthquake  
echo  
ecosystem  
effect  
egg  
electrical  
electricity  
energy  
energy of motion (kinetic)  
erode  
erosion  
eruption  
evaporate  
evaporation  
event  
evidence  
explain  
explanation

##### 8th Grade

eclipse  
effective  
electron  
element  
embryo  
environment  
evolution  
extinct

##### 10th Grade

electric current  
electrical charge  
electrical force  
electrical resistance  
electron shell  
emit  
endocrine system  
energy chain  
estuary  
expansion  
experiment  
experimental control condition

#### F

##### 5<sup>th</sup> Grade

fair test  
feet  
flower  
food  
food chain  
force  
forest  
fossil remains  
fossil  
freeze  
friction  
frictional force  
function

##### 8<sup>th</sup> Grade

factor  
fat  
filter  
frequency

##### 10<sup>th</sup> Grade

family of elements  
fungus

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### G

##### 5th Grade

gas  
germinate  
glacier  
gram (g)  
graph  
grassland  
gravitational  
gravity

##### 8th Grade

gender  
genetic  
germination  
glucose  
groundwater

##### 10th Grade

galaxy

#### H

##### 5<sup>th</sup> Grade

habitat  
hand lens  
hardness  
heart  
heat energy

##### 8<sup>th</sup> Grade

herbicide  
hypothesis

##### 10<sup>th</sup> Grade

honesty  
hormone  
host  
hydrosphere

#### I

##### 5<sup>th</sup> Grade

identify  
inch (in)  
increase  
inherited  
input  
invent  
invention  
investigate  
investigation  
investigative question

##### 8<sup>th</sup> Grade

igneous  
image  
insoluble  
interpret  
interpretation  
intestine  
impact  
issue

##### 10<sup>th</sup> Grade

inconsistent  
infer  
inference  
interference

#### J

##### 5<sup>th</sup> Grade

##### 8<sup>th</sup> Grade

##### 10<sup>th</sup> Grade

joules (J)

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### K

##### 5<sup>th</sup> Grade

kilogram (kg)  
kilometer (km)

##### 8<sup>th</sup> Grade

kinetic energy

##### 10<sup>th</sup> Grade

#### L

##### 5<sup>th</sup> Grade

lake  
lamp  
landslide  
lava  
leaf  
learned (acquired) characteristic  
liquid  
liter (L)  
living  
logical  
lung

##### 8<sup>th</sup> Grade

landform  
landform profile  
landslide see G5  
landmass  
leverage  
lunar  
luster of minerals

##### 10<sup>th</sup> Grade

law

#### M

##### 5<sup>th</sup> Grade

machine  
magma  
magnetic  
magnifying glass  
mass  
material  
matter  
measured (responding) variable  
melt  
meter (m)  
mile (mi)  
milliliter (mL)  
mineral nutrient  
model  
Moon  
mountain  
muscle

##### 8<sup>th</sup> Grade

magnetic pole  
magnetism  
manipulated (changed) variable  
mantle  
metamorphic  
meter stick  
microorganism  
microscope  
millimeter (mm)  
mixture  
mold  
molecule

##### 10<sup>th</sup> Grade

manipulated variable  
meteorology  
mutate  
mutation

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### N

##### 5<sup>th</sup> Grade

newtons (N)  
nonliving  
nutrient (mineral)

##### 8<sup>th</sup> Grade

natural selection  
nerves  
neutron  
nitrogen  
nucleus

##### 10<sup>th</sup> Grade

neurological system  
nuclear energy  
nuclear fission  
nuclear force  
nuclear fusion

#### O

##### 5<sup>th</sup> Grade

object  
observe  
observation  
ocean  
orbit (as a noun)  
orbit (as a verb)  
organism  
organize  
ounce  
output  
oxygen

##### 8<sup>th</sup> Grade

offspring  
opinion  
organ  
organic

##### 10<sup>th</sup> Grade

oceanic plates  
ova  
ozone

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### P

##### 5<sup>th</sup> Grade

part  
particle  
pattern  
picture  
pitch  
plan  
planet  
pollen  
pollinate  
pollution  
pound  
precipitation  
predict  
prediction  
problem  
procedure  
process  
producer  
property  
pull  
push

##### 8<sup>th</sup> Grade

pattern  
pesticide  
pH  
phase (state) of matter  
phase of the moon  
phenomena  
phenomenon  
pollination  
potential energy  
predator  
pressure  
prey  
probe  
protein  
proton

##### 10<sup>th</sup> Grade

parasite  
periodic table  
phase change  
phase of matter  
photosynthesis  
photosynthesize  
pistil  
principle

#### Q

##### 5<sup>th</sup> Grade

question

##### 8<sup>th</sup> Grade

##### 10<sup>th</sup> Grade

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### R

##### 5<sup>th</sup> Grade

radius  
rate  
recycle  
reduce  
report  
reproduce  
reproduction  
result  
river  
root

##### 8<sup>th</sup> Grade

radiation  
reaction  
reflect  
reflection  
relationship  
relative position  
relative speed  
reliable  
repel  
report  
resource  
respiration  
respiratory system  
responding (dependent) (measured)  
variable  
reuse  
river system  
rock cycle

##### 10<sup>th</sup> Grade

radioactivity  
refract  
refraction  
reliability  
reproduce  
~~reproduction~~ see G5  
~~reproductive system~~ see G5  
research question  
~~respiratory system~~ see G8  
responding variable

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# Science WASL Specifications

## Expected Scientific Vocabulary (continued)

### S

#### 5<sup>th</sup> Grade

scale  
scavenger  
scientific  
scientist  
sea  
sediment  
seed  
shadow  
shape  
size  
skeleton  
soil  
solar  
solid  
solution  
solve  
sort  
sound  
special  
speed  
spin (rotate)  
spring scale  
sprout  
state of matter  
stem  
stream  
strength  
structure  
substance  
summary  
Sun  
system

#### 8<sup>th</sup> Grade

salinity  
sedimentary  
skeletal system  
solar system  
soluble  
specialized  
sphere  
stomach  
subsystem  
summarize

#### 10<sup>th</sup> Grade

salinity see G8  
scattering  
seismic  
sensor  
sexual  
skeptical  
solubility  
sperm  
spherical  
spinal cord  
spore  
stamen  
subduction of tectonic plates  
succession

### T

#### 5<sup>th</sup> Grade

table  
telescope  
temperature  
texture  
thaw  
thermometer  
tool  
transfer  
transform  
transformation

#### 8<sup>th</sup> Grade

tissue  
~~transformation~~ see G5  
transmit

#### 10<sup>th</sup> Grade

tectonic plates  
theory  
thermal  
toxin  
transmission

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## Science WASL Specifications

### Expected Scientific Vocabulary (continued)

#### U

5<sup>th</sup> Grade

8<sup>th</sup> Grade  
unexpected

10<sup>th</sup> Grade

#### V

5<sup>th</sup> Grade

vapor  
variable  
variable changed (manipulated)  
variable kept the same (controlled)  
versus (vs.)  
vibration  
volcano  
volume

8<sup>th</sup> Grade

valid  
vein

10<sup>th</sup> Grade

validate  
validity  
virus

#### W

5<sup>th</sup> Grade

waste  
water  
weather  
weight  
wind

8<sup>th</sup> Grade

warm-blooded  
watershed  
water table  
wavelength  
wind direction  
wind speed

10<sup>th</sup> Grade

work

#### X, Y, and Z

5<sup>th</sup> Grade

8<sup>th</sup> Grade

10<sup>th</sup> Grade

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## Science WASL Specifications

### **It Scoring Rule for deciphering student responses on the Science WASL**

When scoring student responses, the scorer must replace all pronouns with nouns according to the following rule.

When a response uses a pronoun like 'it' in a sentence, the pronoun must be changed into a noun before the sentence can be deciphered. If there is no clear reference to a noun in the sentence, the meaning of the pronoun must be inferred from any contextually appropriate noun that exists either in the preceding sentence of the response or the given item prompt. Once the meaning of a pronoun has been established, the noun shall replace **all** subsequent uses of that pronoun in the sentence. A compound sentence with the same pronoun in each part may be read as two separate sentences.

#### Examples:

1. *"The force was applied to the object. It forced it to speed up."*  
The two uses of the term "it" must be read as the same noun, "**It** (the object) forced **it** (the object) to speed up" or "**It** (the force) forced **it** (the force) to speed up". The second sentence of this response cannot be read as "*The applied force forced the object to speed up.*" The use of an "it" for the subject and predicate of a sentence is a common error.
2. *"Then we stuck a candle in the clay and lit it and put a jar over it and timed it until it burned out and recorded how long it took."*  
The first "**it**" of the five uses of the term "it" is "the candle" so all subsequent uses of the term "*it*" are replaced with "the candle". Also, this is a compound sentence so we can read the response as four sentences. The sentence is deciphered as follows: "*Then we stuck a candle in the clay and lit **it** (the candle). Put a jar over **it** (the candle). Timed **it** (the candle) until **it** (the candle) burned out. Recorded how long **it** (the candle) took.*"
3. *"Organisms may get sick from polluted water because it is what they live in."*  
These two different pronouns can be referenced with different nouns in the sentence. The "*it*" refers to the polluted water and the "*they*" refers to the organisms. The sentence is deciphered as follows: "*Organisms may get sick from polluted water because **it** (polluted water) is what **they** (organisms) live in.*"
4. *"The CO<sub>2</sub> is so cold it makes the air reach its dew point."*  
The terms "*it*" and "*its*" clearly refer to the nouns "*CO<sub>2</sub>*" and "*air*" in the sentence. The sentence is deciphered as follows: "*The CO<sub>2</sub> is so cold **it** (the CO<sub>2</sub>) makes the air reach **its** (the air's) dew point.*"

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## Science WASL Specifications

### **IDEA** Definition of Action Words in Science Items

The action words guiding students to respond to items on the science WASL will be used and scored as indicated in the I.D.E.A. chart below.

#### I.D.E.A

Action Word	Definition of the Student Action that is used for Scoring
Identify	Name or point out
Describe	Name or point out, and give details
Explain	Name or point out, give details; and give reasons
Analyze	Name or point out, give details, and give reasons for how the parts affect each other

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