



## Science Standards

# Grade 6

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*It is essential that these standards be addressed in contexts that promote scientific inquiry, use of evidence, critical thinking, making connections and communication.*

### Core Standards:

6.1 - Structure and Function: Living and non-living systems are organized groups of related parts that function together and have characteristics and properties.

6.2 - Interaction and Change: The related parts within a system interact and change.

### Content Standards:

#### PHYSICS

**7.2P.1 - Identify and describe types of motion and forces and relate forces qualitatively to the laws of motion and gravitation.**

##### *Motion and Forces*

- Descriptive rather than calculated
- Newton's laws (inertia, acceleration, momentum) (e.g. use of vehicle seatbelts, amusement park rides, which object would have greater momentum, soccer ball/bowling ball).
- Mass
- Velocity
- Friction
- Vocabulary: velocity, speed, force acceleration, momentum, friction, inertia, mass, acceleration

*Possible learning targets: Underline the literacy component of each learning target.*

Show the relationship between the concept of forces and Newton's laws of motion and gravity.

Identify and describe the types of motion and forces.

Relate forces qualitatively to the laws of motion and gravity.

#### CHEMISTRY:

**6.1P.1 - Describe physical and chemical properties of matter and how they can be measured.**

##### *Physical Properties*

- State of matter, temperature, density, solubility, conductivity, magnetic, malleability, ductility, color, freezing and boiling points, etc.

##### *Chemical Properties*

- Flammability, corrosiveness, explosiveness, oxidation, etc.

##### *Examples of science measuring tools*

- Balance, metric ruler, beaker, graduated cylinder, thermometer, conductivity probe, etc.

##### *Qualitative understanding of density*

- E.g. heavy for its size

- Vocabulary: displacement, heterogeneous mixture, homogeneous mixture, reaction, solution, sublimation, suspension

*Possible learning targets: Underline the literacy component of each learning target.*

Describe physical properties of matter.

Describe chemical properties of matter.

Examine the ability of substances to react in the presence of other substances.

Describe how physical properties can be measured.

Describe how chemical properties can be measured.

### **EARTH/SPACE:**

#### **7.2E.2 - Describe the composition of Earth's atmosphere, how it has changed over time, and implications for the future.**

##### *Earth's Atmosphere*

- The atmosphere of the Earth has several layers.
- The Layers of the Atmosphere have different compositions.

##### *Past*

- The current atmosphere is different than the early atmosphere of the Earth.
- The early atmosphere had no oxygen.
- Early life changed the atmosphere and the rocks of the Earth (e.g. banded iron formations showing rust)
- Plants interact with the atmosphere and the atmosphere interacts with plants
- Animals interact with the atmosphere and the atmosphere interacts with animals.

##### *Future*

- Human civilization has an impact on the atmosphere (e.g. smog, ozone layer).
- Natural cycles change the atmosphere over long periods of time (e.g. ice ages, warming/cooling)
- Vocabulary: greenhouse effect, acid rain, global warming ozone depletion, stratosphere, troposphere, mesosphere, exosphere, thermosphere, ionosphere

*Possible learning targets: Underline the literacy component of each learning target.*

Describe the composition of the Earth's atmosphere and how it has changed over time.

Distinguish between the different layers of the atmosphere.

Summarize the effects of global warming, ozone depletion on the atmosphere and their implications for the future.

#### **6.2E.1 - Explain the water cycle and the relationship to landforms and weather.**

##### *Water Cycle Processes*

- Evaporation
- Condensation
- Cloud formation and nucleation
- Precipitation
- Run-off
- Transpiration

##### *Landforms*

- Rain shadow
- Climate

##### *Weather*

- Humidity, Dew point and temperature
- Air pressure
- Precipitation
- Vocabulary: evaporation, condensation, precipitation, collection/runoff, rain shadow effect, altitude, biome, elevation, latitude, ozone, sedimentation, solubility, thermal, transpiration.

*Possible learning targets: Underline the literacy component of each learning target.*

Explain the water cycle.

Explain the relationship of landforms to cloud formation and rain shadow effect.

## **LIFE SCIENCE**

### **6.2L.1 - Describe the relationships and interactions between and among cells, tissues, organs, and organ systems.**

#### *Relationships*

- Similar cells interact to form tissues that interact to form organs that interact to form organ systems.
- The various levels of organization can be described by their particular functions.

#### *Interactions & Change*

- Organ systems interact and change based on the activities of the organism (e.g. running increases respiration and circulation based on muscular needs).
- Vocabulary: skeletal system (skeleton), muscular system (muscles), digestive system (digestion, stomach), circulatory system (heart), respiratory system (respiration, lungs), excretory system (excretion, kidney), nervous system (brain), endocrine system, immune system, reproductive system

*Possible learning targets: Underline the literacy component of each learning target.*

Describe the relationships and interactions between and cells and tissues.

Describe the relationships and interactions between cells and organs.

Describe the relationships and interactions between cells and organs systems.

Describe the relationships and interactions between tissues and organs.

Describe the relationships and interactions between tissues and organs systems.

Describe the relationships and interactions between organs and organ systems.

Describe the interactions among cells, tissues, organs and organ systems.

### **6.2L.2 - Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.**

#### *Populations of Organisms*

- A population is a group of organisms of a single given species.
- Population size changes with growth, stability (equilibrium), or decline.
- Carrying capacity is the population size determined by the limiting factors found in a particular habitat.

#### *Interactions among populations can be described*

- Energy interactions occur between different populations: predator, prey; producer, consumer; parasite, host.
- Relationships (beneficial, harmful, competitive, shared)

#### *Changes in populations are related to resources*

- Ecosystems consist of biotic and abiotic factors (e.g. – quantity of light & water, range of temperatures, soil composition).
- Limiting resources/factors are those that restrict the growth and size of populations, (e.g., food supply, disease, predation)
- Vocabulary: niche, food chain/web, energy pyramid, symbiosis, mutualism

*Possible learning targets: Underline the literacy component of each learning target.*

Identify producers and consumer as well as their roles in an ecosystem.

Explain how individual organisms and populations in an ecosystem interact.

Explain how changes in a population are related to resources.

**6.3 Scientific Inquiry:** Scientific inquiry is the investigation of the natural world based on observation and science principles that includes proposing questions or hypotheses, and developing procedures for questioning, collecting, analyzing, and interpreting accurate and relevant data to produce justifiable evidence-based explanations

6.3S.1 - Based on observation and science principles propose questions or hypotheses that can be examined through scientific investigation. Design and conduct an investigation that uses appropriate tools and techniques to collect relevant data.

*Scientific Investigation*

- Propose questions or hypotheses
- Use observations and scientific principles
- Design a scientific investigation
- Identify appropriate tools and techniques
- Collect data relevant to the question or hypothesis

*Vocabulary:*

- Relevant data

6.2S.2 - Organize and display relevant data, construct an evidence-based explanation of the results of an investigation, and communicate the conclusions.

*Results of an investigation*

- Relevant data is organized and displayed (e.g. tables, graphs)
- Explanation of results is based on evidence obtained from the investigation
- Conclusions are communicated in a manner that relates to the original question or hypothesis

*Vocabulary*

- evidence-based

6.3S.3 - Explain why if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one variable.

*Variables*

- Investigation should deal with only one variable at a time.
- More than one variable may yield an outcome that is not clearly related to or caused by any individual variable.
- Independent variable (manipulated variable)
- Dependent variable/responding variable

*Vocabulary*

- variable
- control

**6.4 Engineering Design:** Engineering design is a process of identifying needs, defining problems, developing solutions, and evaluating proposed solutions

6.4D.1 - Define a problem that addresses a need and identify science principles that may be related to possible solutions.

*Problem/solutions*

- A need is identified and a problem defined to address that need
- Related scientific principles are identified that relate to possible solutions

*Vocabulary*

- Control

6.4D.2 - Design, construct, and test a possible solution to a defined problem using appropriate tools and materials. Evaluate proposed engineering design solutions to the defined problem.

*Test a solution*

- A solution (or possible solutions) to the defined problem should be designed, constructed, and then tested.
- Appropriate tools and materials are identified.
- The design solutions are evaluated as to how well they solve the problem.

*Vocabulary*

- design
- materials
- test

6.4D - Describe examples of how engineers have created inventions that address human needs and aspirations.

*Necessary and desired Inventions*

- Various descriptions of inventions created by engineers to address human needs and/or aspirations.

*Vocabulary*

- aspiration

**Deconstruction of State Content Standards**  
Salem-Keizer School District  
**Science 6**

<p><b>State Core Standard:</b> 6.2 - Interaction and Change: The related parts within a system interact and change.</p> <p><b>State Content Standard:</b> 6.2L.1 - Describe the relationships and interactions between and among cells, tissues, organs, and organ systems.</p>
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What does this standard require students to ...

<b>KNOW?</b> (Concepts)	<b>DO?</b> (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Relationships and interactions between cells, tissues, organs and organ systems</li> <li>• Vocabulary: skeletal system (skeleton), muscular system (muscles), digestive system (digestion, stomach), circulatory system (heart), respiratory system (respiration, lungs), excretory system (excretion, kidney), nervous system (brain), endocrine system, immune system, reproductive system</li> </ul>	<ul style="list-style-type: none"> <li>• Describe</li> </ul>

**Explanation:**

*Relationships*

- Similar cells interact to form tissues that interact to form organs that interact to form organ systems.
- The various levels of organization can be described by their particular functions.

*Interactions & Change*

- Organ systems interact and change based on the activities of the organism (e.g. running increases respiration and circulation based on muscular needs).

**Possible learning targets:** *Underline the literacy component of each learning target.*

Describe the relationships and interactions between and cells and tissues.

Describe the relationships and interactions between cells and organs.

Describe the relationships and interactions between cells and organs systems.

Describe the relationships and interactions between tissues and organs.

Describe the relationships and interactions between tissues and organs systems.

Describe the relationships and interactions between organs and organ systems.

Describe the interactions among cells, tissues, organs and organ systems.

**Textbook Resources:**

Book C: Cells and Heredity – Chapter 1

Book D: Human and Biology and Health – Chapters 1-7

**Deconstruction of State Content Standards**  
Salem-Keizer School District  
**Science 6**

<p><b>State Core Standard:</b> 6.2 - Interaction and Change: The related parts within a system interact and change.</p> <p><b>State Content Standard:</b> 6.2E.1 - Explain the water cycle and the relationship to landforms and weather.</p>
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What does this standard require students to ...

<b>KNOW?</b> (Concepts)	<b>DO?</b> (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Water cycle</li> <li>• Relationship between water cycle and landforms</li> <li>• Relationship between water cycle and weather</li> <li>• Vocabulary: evaporation, condensation, precipitation, collection/runoff, rain shadow effect, altitude, biome, elevation, latitude, ozone, sedimentation, solubility, thermal, transpiration</li> </ul>	<ul style="list-style-type: none"> <li>• Explain</li> </ul>

**Explanation:**

*Water Cycle Processes*

- Evaporation
- Condensation
- Cloud formation and nucleation
- Precipitation
- Run-off
- Transpiration

*Landforms*

- Rain shadow
- Climate

*Weather*

- Humidity, Dew point and temperature
- Air pressure
- Precipitation

**Possible learning targets:** Underline the literacy component of each learning target.

Explain the water cycle.

Explain the relationship of landforms to cloud formation and rain shadow effect.

**Textbook Resource:**

Book H: Earth's Water – Chapter 1

Book I: Weather and Climate – Chapter 4

Book E: Environmental Science – Chapter 2

**Deconstruction of State Content Standards**  
Salem-Keizer School District  
**Science – 7**

<p><b>State Core Standard:</b> 7.2 - Interaction and Change: The components and processes within a system interact.</p> <p><b>State Content Standard:</b> 7.2E.2 - Describe the composition of Earth’s atmosphere, how it has changed over time, and implications for the future.</p>
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What does this standard require students to ...

<b>KNOW?</b> (Concepts)	<b>DO?</b> (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Composition of the Earth’s atmosphere</li> <li>• Layers of the Earth’s atmosphere</li> <li>• Changes in the atmosphere over time</li> <li>• Implications of global warming and ozone depletion</li>   <li>• Vocabulary: greenhouse effect, acid rain, global warming ozone depletion, stratosphere, troposphere, mesosphere, exosphere, thermosphere, ionosphere</li> </ul>	<ul style="list-style-type: none"> <li>• Describe</li> <li>• Distinguish</li> <li>• Summarize</li> </ul>

**Explanation:**

*Earth’s Atmosphere*

- The atmosphere of the Earth has several layers.
- The Layers of the Atmosphere have different compositions.

*Past*

- The current atmosphere is different than the early atmosphere of the Earth.
- The early atmosphere had no oxygen.
- Early life changed the atmosphere and the rocks of the Earth (e.g. banded iron formations showing rust)
- Plants interact with the atmosphere and the atmosphere interacts with plants
- Animals interact with the atmosphere and the atmosphere interacts with animals.

*Future*

- Human civilization has an impact on the atmosphere (e.g. smog, ozone layer).
- Natural cycles change the atmosphere over long periods of time (e.g. ice ages, warming/cooling)

**Possible learning targets:** Underline the literacy component of each learning target.

Describe the composition of the Earth’s atmosphere and how it has changed over time.

Distinguish between the different layers of the atmosphere.

Summarize the effects of global warming, ozone depletion on the atmosphere and their implications for the future.

**Textbook resources:**

Book I: Weather and Climate – Chapters 1 and 4

Book E: Environmental Science – Chapter 4

**Deconstruction of State Content Standards**  
 Salem-Keizer School District  
 Science – 6

**State Core Standard:**  
 6.1 - Structure and Function: Living and non-living systems are organized groups of related parts that function together and have characteristics and properties.

**State Content Standard:**  
 6.1P.1 - Describe physical and chemical properties of matter and how they can be measured.

What does this standard require students to ...

<b>KNOW?</b> (Concepts)	<b>DO?</b> (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Physical properties</li> <li>• Chemical properties</li> <li>• Ability of substances to react</li>   <li>• Vocabulary: displacement, heterogeneous mixture, homogeneous mixture, reaction, solution, sublimation, suspension</li> </ul>	<ul style="list-style-type: none"> <li>• Describe</li> <li>• Examine</li> <li>• Measure</li> </ul>

**Explanation:**

*Physical Properties*

- State of matter, temperature, density, solubility, conductivity, magnetic, malleability, ductility, color, freezing and boiling points, etc.

*Chemical Properties*

- Flammability, corrosiveness, explosiveness, oxidation, etc.

*Examples of science measuring tools*

- Balance, metric ruler, beaker, graduated cylinder, thermometer, conductivity probe, etc.

*Qualitative understanding of density*

- E.g. heavy for its size

**Possible learning targets:** Underline the literacy component of each learning target.

- Describe physical properties of matter.
- Describe chemical properties of matter.
- Examine the ability of substances to react in the presence of other substances.
- Describe how physical properties can be measured.
- Describe how chemical properties can be measured.

**Textbook Resources:**  
 Book K: Chemical Building Blocks – Chapters 1-2

**Deconstruction of State Content Standards**  
Salem-Keizer School District  
**Science 8**

**State Core Standard:**

8.2 - Interaction and Change: Systems interact with other systems.

**State Content Standard:**

7.2P.1 - Identify and describe types of motion and forces and relate forces qualitatively to the laws of motion and gravitation.

What does this standard require students to ...

KNOW? (Concepts)	DO? (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Newton’s laws of motion and gravity.</li> <li>• Vocabulary: velocity, speed, force acceleration, momentum, friction, inertia, mass, acceleration</li> </ul>	<ul style="list-style-type: none"> <li>• Identify</li> <li>• Describe</li> <li>• Show relationships</li> <li>• Relate</li> </ul>

**Explanation:**

*Motion and Forces*

- Descriptive rather than calculated
- Newton’s laws (inertia, acceleration, momentum) (e.g. use of vehicle seatbelts, amusement park rides, which object would have greater momentum, soccer ball/bowling ball).
- Mass
- Velocity
- Friction

**Possible learning targets:** Underline the literacy component of each learning target.

Show the relationship between the concept of forces and Newton’s laws of motion and gravity.

Identify and describe the types of motion and forces.

Relate forces qualitatively to the laws of motion and gravity.

**Textbook resources:**

Book M: Motion, Forces and Energy – Chapters 1 and 2

**Deconstruction of State Content Standards**  
 Salem-Keizer School District  
**Science 6**

**State Core Standard:**  
 6.2 - Interaction and Change: The related parts within a system interact and change.

**State Content Standard:**  
 6.2L.2 - Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.

What does this standard require students to ...

KNOW? (Concepts)	DO? (Skills&/or Reasoning)
<ul style="list-style-type: none"> <li>• Producers and consumer as well as their roles in an ecosystem</li>   <li>• Vocabulary: niche, food chain/web, energy pyramid, symbiosis, mutualism</li> </ul>	<ul style="list-style-type: none"> <li>• Identify</li> <li>• Explain</li> </ul>

**Explanation:**

*Populations of Organisms*

- A population is a group of organisms of a single given species.
- Population size changes with growth, stability (equilibrium), or decline.
- Carrying capacity is the population size determined by the limiting factors found in a particular habitat.

*Interactions among populations can be described*

- Energy interactions occur between different populations: predator, prey; producer, consumer; parasite, host.
- Relationships (beneficial, harmful, competitive, shared)

*Changes in populations are related to resources*

- Ecosystems consist of biotic and abiotic factors (e.g. – quantity of light & water, range of temperatures, soil composition).
- Limiting resources/factors are those that restrict the growth and size of populations, (e.g., food supply, disease, predation)

**Possible learning targets:** Underline the literacy component of each learning target.

Identify producers and consumer as well as their roles in an ecosystem.

Explain how individual organisms and populations in an ecosystem interact.

Explain how changes in a population are related to resources.

**Textbook Resources:**

Book E: Environmental Science – Chapters 1-2

