



## UNIT 3

## EARTH'S SYSTEMS



## Unit 3: Earth's Systems

**9 weeks**

In this unit, students develop an understanding of how the Earth's major systems (geosphere, biosphere, hydrosphere, and atmosphere) interact and affect the Earth's surface materials and processes. Students will understand what each system includes, how it interacts with and could influence surrounding ecosystems, climate, or landforms on Earth. They will understand the role that our oceans play in shaping landforms, influencing climate, and supporting a variety of ecosystems. They will understand how winds and clouds in the atmosphere interact with landforms to determine patterns of weather. Investigation will lead students to the development of a model that will describe the interactions among systems.

Students will also develop an understanding of the roles of water in Earth's processes. They will investigate the distribution of water on Earth, describing and graphing the amounts of salt water and fresh water as evidence about its distribution. Students will understand that nearly all of Earth's available water is in the ocean, while most of the fresh water is in glaciers or underground, with only a small fraction being in streams, lakes, wetlands, and the atmosphere.

Students will research and gather information about humans impact Earth's systems. They will investigate how human activities in agriculture, industry, and everyday life have had major effects on the Earth's systems. They will also investigate what individuals and communities are doing to help protect Earth's resources and environments.

### Unit 3 Performance Expectations

- ❖ **5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; or the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]
- ❖ **5-ESS2-2 Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]
- ❖ **5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**

### Unit 3 Essential Questions:

- ❖ How is water distributed throughout the Earth?
- ❖ How do the Earth's systems interact with each other?
- ❖ How do humans protect Earth's resources?



**In Unit 3, students will understand...**

- ❖ Earth's major systems are the:
  - Geosphere - solid and molten rock, soil and sediments
  - Hydrosphere - water and ice
  - Atmosphere - air
  - Biosphere - living things, including humans
- ❖ These systems interact in multiple ways to affect Earth's surface materials and processes.
- ❖ The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate.
- ❖ Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.
- ❖ Nearly all of the Earth's available water is in the ocean.
- ❖ Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.
- ❖ Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.
- ❖ Individuals and communities are doing things/can do things to help protect Earth's resources and environments.

**Foundational Knowledge:**

Prior to 5<sup>th</sup> grade, students should have knowledge, understanding of, and experiences with the following ideas:

- ❖ Wind and water can change the shape of the land.
- ❖ Water is found in the ocean, rivers, lakes and ponds.
- ❖ Water exists in solid ice and in liquid form.
- ❖ Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.
- ❖ Rainfall helps to shape the land and affects the types of living things found in a region.
- ❖ Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

*With the implementation of new standards, students may not have had opportunities to engage in these foundational understandings and ideas before 5<sup>th</sup> grade. You may need to provide opportunities for students to experience these ideas as you move forward.*



**Additional Content Connections:**

\*These connections provide opportunities to score to other content standards with focused instruction.

**ELA:**

## ❖ Speaking and Listening

- SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- SL.5.3 Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.

## ❖ Writing

- W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly
- W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources: summarize or paraphrase information in notes and finished work; provide a list of sources
- W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Math:**❖ Represent and Interpret Data (\*3<sup>rd</sup> grade standard)

- 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled picture graphs and scaled bar graphs.

**Unit Vocabulary:****Foundational Vocabulary**

weathering	liquid
erosion	ocean
climate	river
sediment	lake
solid	pond

**Unit Vocabulary**

geosphere	water cycle
biosphere	accumulation
hydrosphere	evaporation
atmosphere	condensation
estuary	transpiration
groundwater	precipitation
runoff	



**Earth's Systems**

Students who demonstrate understanding can:

**5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; or the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

**5-ESS2-2 Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

**5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Developing and Using Models</b> Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> <li>Develop a model using an example to describe a scientific principle. (5-ESS2-1)</li> </ul> <p><b>Using Mathematics and Computational Thinking</b> Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.</p> <ul style="list-style-type: none"> <li>Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)</li> </ul> <p><b>Obtaining, Evaluating, and Communicating Information</b> Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.</p> <p>Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)</p>	<p><b>ESS2.A: Earth Materials and Systems</b></p> <ul style="list-style-type: none"> <li>Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)</li> </ul> <p><b>ESS2.C: The Roles of Water in Earth's Surface Processes</b></p> <ul style="list-style-type: none"> <li>Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)</li> </ul> <p><b>ESS3.C: Human Impacts on Earth Systems</b> Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)</p>	<p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>Standard units are used to measure and describe physical quantities such as weight, and volume. (5-ESS2-2)</li> </ul> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>A system can be described in terms of its components and their interactions. (5-ESS2-1, 5-ESS3-1)</li> </ul> <p>-----</p> <p><b>Connections to Nature of Science</b></p> <p><b>Science Addresses Questions About the Natural and Material World</b></p> <ul style="list-style-type: none"> <li>Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)</li> </ul>

