Resources to Support NC Third Grade Science–Earth's Surface

Standard
NC Third Grade Science ESS.3.2: Understand the structures of the Earth's surface using models.

The Earth's surface is made up of a variety of water and land features that shape our planet. Third graders explore these features using models—representations that help them visualize and compare structures that are too big, small, or complex to observe directly. This standard emphasizes understanding saltwater and freshwater features and landforms, and how models can illustrate their differences and similarities.

Teacher Background
Science Content
Earth's water is distributed unevenly:

- Saltwater makes up about 97% of Earth's water, mostly in oceans and seas. Includes:
  - Ocean: Largest body of saltwater, covering most of Earth's surface. While we have named different oceans, there is one large, interconnected ocean with water moving freely throughout
  - Seas: Smaller bodies of saltwater compared to oceans, partially enclosed by land.
- Freshwater accounts for about 3%, found in rivers, lakes, ponds, streams, and glaciers. Includes:
  - Rivers: Flowing freshwater that moves toward oceans or lakes.
  - Lakes & Ponds: Standing freshwater surrounded by land on all sides; lakes are larger and deeper.
  - Streams: Small, narrow flowing freshwater.
  - Glaciers: Large masses of ice (frozen freshwater) moving slowly down a slope or spreading over land; form on land from fallen snow that has been compressed over many years. Glaciers have the ability to flow like a slow river. Ice sheets and ice caps are kinds of glaciers.
  - Icebergs: Chunks of floating ice (freshwater) broken off from a glacier.

Earth's landforms vary in size, shape, and formation processes:

- Volcanoes: An opening in the earth's surface through which hot rock, lava, or gas come out; formed by molten rock erupting from Earth's interior.
- Mountains: High land areas rising above surrounding terrain.
- Valleys: Low, wide, flat or gently sloped areas between hills or mountains; shaped by erosion, soil displacement, water, and time, over very long periods of time (geological epochs).
- Canyons: Narrows areas of land with steep sides, often between mountains; shaped by strong water current (often a river) carving through rock, at a faster pace than valleys are formed.
- Caverns: Enclosed space inside a mountain or area of land. Can be below the surface of the ground. Geologists often call them caves rather than caverns.

Common Misconceptions

- *Landforms are static and unchanging.*
- *All water on Earth is fresh.*
- *Saltwater and freshwater look different.*
- *Islands float on water.*
- *Mountains and volcanoes are the same.*
- *All mountains are pointy.*
- *Canyons and valleys are identical.*
- *Glaciers are found in the ocean.*
- *Models show exact size.*

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Objectives and Information from NC K-12 Science Support Document

Objective: ESS.3.2.1 Use models to compare Earth's saltwater and freshwater features (including oceans, seas, rivers, lakes, ponds, streams, and glaciers).	
Proficiency Criteria	**Academic Language/Sentence Starters**
• Students know the Earth's surface is made up of land and water and is surrounded by air. • Students know that there are bodies of water on the surface of the earth. • Students infer some bodies of water are salty, some are fresh, and some are frozen in ice sheets and glaciers. • Students describe the characteristics and locations of Earth's saltwater (e.g. oceans, seas) and freshwater (e.g. rivers, lakes, ponds, streams, glaciers). • Students compare the characteristics and locations of Earth's saltwater (e.g. oceans, seas) and freshwater (e.g. rivers, lakes, ponds, streams, glaciers). • Students know different types of organisms are suited to live in these different bodies and types of water. • **Develop and Use Models**- Develop a model using an analogy, example, or abstract representation to describe and compare Earth's saltwater and freshwater.	**Questions/Sentence Stems that utilize academic language:** • Earth's surface is made up of _____ and _____. (land, water) • Name three different bodies of water found on the Earth's surface. (e.g. stream, ocean, lake, river, pond, sea, river) • What are some of the similarities and differences in saltwater and freshwater? (both are water, saltwater has a higher salt content than freshwater, only specific organisms can live in each type) **Words to support student discourse:** models, maps, physical features, saltwater, freshwater, lakes, streams, ponds, glaciers, oceans, seas, rivers, organisms, plants, animals

Objective: ESS.3.2.2 Use models to compare Earth's land features (including volcanoes, mountains, valleys, canyons, caverns, and islands).	
Proficiency Criteria	**Academic Language/Sentence Starters**
• Students know the Earth's surface is made up of land and water and is surrounded by air. • Students know the surface of the Earth has many different types of physical features and that these features are named according to their structure. • Students know representations for any given land feature and its attributes can be shown with (e.g. models, maps, diagrams, photos, etc.). • Students compare Earth's land features (including volcanoes, mountains, valleys, canyons, caverns, and islands). • **Develop and Use Models**- Develop a model using an analogy, example, or abstract representation to describe and compare Earth's land features (including volcanoes, mountains, valleys, canyons, caverns, and islands)	**Questions/Sentence Stems that utilize academic language:** • Describe the characteristics of a volcano. (an opening in the earth's surface, much like a mountain, out of which magma from inside the earth flows when it erupts) • Describe the characteristics of a mountain. (they are large land masses that rise significantly above the surrounding area) • How does a _____ compare to a _____? (canyon/cavern - A canyon is an open space between mountains or areas of land. A cavern is an enclosed space inside a mountain or area of land. They can both be below the surface of the ground) • How is _____ the same as _____? (island/mountain - Islands jut up out of the water and mountains jut up out of the surrounding land; valley/canyon - A valley is a crevice or space between two mountains, and a canyon is a crevice or space between two land masses.) **Words to support student discourse:** models, maps, physical features, land mass, mountains, volcanoes, valleys, canyons, caverns, islands, earth, surface

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Formative Assessment Probe(s)

While there are none found on the DPI spreadsheet aligning standards with probes, some with potential for ESS.3.2.1 come from: Keeley, P. & Tucker, L. (2016). *Uncovering student ideas in earth and environmental science: 32 new formative assessment probes.* National Science Teachers Association. They include:

- "Land or Water"
    - Question: Is Earth's surface is mostly land, mostly water, or evenly split
- "Where is most of Earth's fresh water"
    - Question: Is most of earth's water is within snow/glaciers, rivers/lakes, or oceans/seas
- *How Many Oceans and Seas*
    - Question: How many oceans and seas does earth have?

None identified for EES.3.2.2.

Possible Units/Activities

- **Buncombe County Schools Third Grade Science Unit 1: Earthrise**: This unit includes eleven tasks and is designed to last approximately four weeks. It begins with a series of three tasks that include an anchoring phenomenon (students predict if there is more land or water on Earth, observe and draw pictures from satellite images of Earth, and notice and wonder, Task 1), collect and analyze related data through a game (Task 2), and observe old maps of Earth and create a related Driving Question Board that will be revisited throughout the unit (Task 3). Students engage in activities related to bodies of water (Tasks 4-8) and move on to learn about landforms (Tasks 9-10). The unit culminates with students creating a visual model showing different landforms and bodies of water (Task 11). There are detailed lesson plans, slides, student handouts, and assessments. This unit is best taught in its entirety but, if necessary, you could select some activities to teach on their own. There are strong interdisciplinary connections with potential to integrate literacy strategies.

- **PBL Unit Draft: Our Carolina Earth: Building a Model of Land and Water Wonders:** In this hands-on Project Based Learning unit created using AI by Robin Welker (Robbinsville Elementary School, Graham County), students become "GeoModel Designers" hired by a local nature center to create interactive 3D models that show Earth's major landforms and bodies of water. Students use research, real-world comparisons (especially local features like the Blue Ridge Mountains and local rivers), and physical modeling to explain the similarities and differences between saltwater and freshwater features—and among various landforms. This resource includes a teacher overview, student packet, rubric, literacy integration, and a lesson sequence that would last approximately 4 weeks. This is best used as a thought-provoking guide for a unit.

- **Field Trips (in person and virtual):** Some of the landforms and bodies of water covered in this unit are in our region. Other landforms and bodies of water are not in our region, but students could learn about them through virtual field trips. If possible, visit and observe them, perhaps partnering with a nonformal education organization. See a list of possible places to visit

- **Moore County Schools Structures of the Earth Unit**: Moore County has compiled many activities and resources to support ESS.3.2 including a third grade pacing guide, Earth's land features, and Earth's water features. These materials provide a lot to pick and choose from.

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Regional and Virtual Connections

Many of the landforms and bodies of water connected to this standard can be observed in Western North Carolina. Local mountains, rivers, waterfalls, gorges, valleys, and caverns can help students connect science learning to the places around them.

Possible connections include:

- local rivers and streams
- the Blue Ridge Mountains
- waterfalls and gorges
- state parks and national parks
- nature centers and nonformal education partners
- virtual field trips to features not found in our region, such as glaciers, volcanoes, seas, and oceans

As this resource develops, the WNC Elementary Science/STEM Community of Practice can continue building a shared list of regional field trip sites, virtual experiences, and community partner contacts.

Planning Notes

When planning instruction for ESS.3.2, consider how students will use models to compare features rather than simply name them. Models may include drawings, diagrams, maps, photographs, physical models, digital simulations, or 3D representations.

Strong learning experiences may ask students to:

- observe and compare models
- sort land and water features
- explain similarities and differences
- connect models to real-world examples
- build or revise their own models
- discuss what a model shows and what it leaves out

Resources

- NC K-12 Science Standards Resource Hub
- Buncombe County Schools 3rd grade Science Curriculum
- PBLUnit Draft: Our Carolina Earth: Building a Model of Land and Water Wonders
- Moore County Curriculum Third Grade Science Pacing Guide
    - Moore County Curriculum ESS.3.2.1
    - Moore County Curriculum: ESS.3.2.2
- Keeley, P. & Tucker, L. (2016). *Uncovering student ideas in earth and environmental science: 32 new formative assessment probes.* National Science Teachers Association
- SchoolNet Test Bank for ESS.3.2.2

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