Core Knowledge Science Program—Domain Map

Science Content
Geographical features of the Earth's surface • The shape of the earth, the horizon • Oceans and continents • North Pole and South Pole, equator **Inside the Earth** • What's inside the Earth: Layers: crust, mantle, core High temperatures • Volcanoes and geysers • Rocks and minerals: Characteristics of different kinds of rocks: metamorphic, igneous, sedimentary Introduction to the formation of different kinds of rocks Important minerals in the Earth (such as quartz, gold, sulfur, coal, diamond, iron ore) Introduction to the composition of soil

This unit contributes to meeting or exceeding the following Next Generation Science Standards:

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	***Rationale:*** This unit will explicitly build upon learning that was started in the previous Unit 2 *Astronomy*, which directly addresses the concept of patterns in the day-night cycle as suggested by **1-ESS1-2**. This Unit 3 will continue the progression of students' understanding of ESS1.B (Earth and the Solar System) by extending learning about the shape of the Earth and its features, such as the North and South Poles and the Equator.
2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.	As students build their knowledge of geography and geology content, such as the oceans, continents, volcanoes, and geysers, they will be explicitly preparing to meet this Grade 2 standard as they develop and use maps of the Earth. At the center of this particular standard is the early grade band endpoint for DCI ESS2.B (Plate Tectonics & Large-scale Systems), which will be extended in Grade 4 Unit 4 *Geology* to help prepare students for the NGSS Grade 4 Topic *Earth's Systems*.

*2-ESS2-3. Obtain information to **identify where water is found on Earth** and that it can be solid or liquid.*	***Rationale:*** This unit—coupled with the later Grade 1 units *Living Things & Their Environments* (Unit 4 re: water habitats) and *Matter* (Unit 5 re: different states of matter, using water as an example)—will directly support the core idea ESS2.C (Roles of Water in Earth's Surface Processes). Students also have the opportunity to learn about water's importance and prevalence on Earth's surface during Grade 2 Unit 1 *Cycles in Nature* when students will review where they can find water and explore the concept that most of Earth's surface is covered in water. This core idea will be investigated during that unit while expanding their knowledge to include early study of the water cycle.
This unit offers the opportunity to foreshadow learning that will support the following Next Generation Science Standards:	
2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	***Rationale:*** This unit offers the opportunity to introduce and/or foreshadow the core idea central to this standard, ESS1.C (History of the Earth), as students begin to investigate the process of how rocks are formed. New learning about rocks, volcanoes, and even geysers can be compared and contrasted against the timescale/cycles of phenomena studied during previous units (e.g., the day-night cycle as well as the seasons). This approach directly relates to the early learning progression for ESS1.C which states, "Some events on Earth occur in cycles, like day and night, and others have a beginning and an end, like a volcanic eruption" (*Framework*, page 178). **2-ESS1-1** will also be explicitly addressed during Grade 2 Unit 1 *Cycles in Nature*.

5-ESS2-1**. Develop a model using an example to **describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. ***4-ESS3-1**. Obtain and combine information to **describe that energy and fuels are derived from natural resources** and their uses affect the environment.*	***Rationale:*** An early introduction to the process of rock formation offers the opportunity to foreshadow DCI ESS2.A (Earth Materials & Systems) which is an excellent example of how Earth's systems interact (e.g., the geosphere, hydrosphere, and atmosphere). This unit also offers an excellent opportunity to connect the study of important minerals and foreshadow additional learning about ESS3.A (Natural Resources), which was introduced in Kindergarten within units such as Unit 5 *Taking Care of the Earth*. These core ideas will also be explicitly extended during the study of oceans in Unit 4 *Living Things & Their Environments*, as well as in Grade 4 Unit 4 *Geology*, Unit 5 *Meteorology*, and Grade 5 Unit 7 *Matter & Change*.

Potential Skills & Cross-Curricular Integrations

The connections listed below are intended as ideas for possible integration across this unit. Finding connections in math, in language arts, and in works of poetry, art, and music, may help you as you create meaningful learning experiences for your students. Connections such as these can help your students make links between various disciplines and deepen their understanding of this domain.

POTENTIAL CCSS Math Connections

MP.2 Reason abstractly and quantitatively. *(1-ESS1-2 & 2-ESS2-2)*

MP.4 Model with mathematics. *(1-ESS1-2 & 2-ESS2-2)*

MP.5 Use appropriate tools strategically. *(1-ESS1-2)*

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. *(1-ESS1-2)*

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many are in each category, and how many more or less are in one category than in another. *(1-ESS1-2)*

1.NBT.B Understand place value. *(2-ESS2-2)*

POTENTIAL CCSS ELA Connections

SL.1.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. *(2-ESS2-2)*

W.1.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(2-ESS2-3)*

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). *(1-ESS1-2)*

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. *(1-ESS1-2 & 2-ESS2-3)*

POTENTIAL Cross-Curricular Connections

Potential Links:
Geography: Spatial Sense—Working with maps, globes, and other geographic tools

Mathematics: Geometry—Know and use terms of orientation and relative position, such as: *around, on, under, over, far from, near, in front, in back (behind), above, below, between, in the middle of to the right of, to the left of, next to, beside, here, there, inside, outside, closed, open*
Shapes—identify and describe solid shapes (i.e., characteristics of a sphere)

Visual Arts: Texture—Describe qualities of texture, for example: r*ough, smooth, bumpy, scratchy, slippery, etc.*

Prior Knowledge

Core Knowledge Kindergarten Sequence
Geography & An Overview of the Seven Continents

- Maps and globes: what they represent, how we use them
- Rivers, lakes, and mountains: what they are and how they are represented on maps/globes
- Locate the Atlantic and Pacific Oceans
- Locate the North and South Poles
- Identify and locate the seven continents on a map and globe
- Name and locate the town, city, or community, as well as the state where you live
- Locate North America, the continental United States, Alaska, and Hawaii

Core Knowledge Science (Previously taught units in the CK Science program)
Kindergarten Unit 4 *Seasons & Weather*

- Identify a tool that can be used to measure temperature
- Use thermometers to measure water and air temperature (ongoing)
- Predict when objects will have hotter and cooler temperatures
- Describe how the sun affects the temperature

Kindergarten Unit 5 *Taking Care of the Earth*

- Identify everyday objects that are made up of natural resources
- Describe how humans use the Earth's natural resources (K-ESS3-1)
- Identify common resources that are limited and nonrenewable
- Classify resources as renewable or nonrenewable
- Describe how humans have changed the environment around them in order to meet their needs (K-ESS3-2)

Grade 1 Unit 2 *Astronomy*

- Describe characteristics of the Earth
- Using a model, demonstrate how the Earth spins
- Explain what causes day and night

CKLA Grade 1 Objectives

The following objectives are addressed through the Core Knowledge Language Arts program (CKLA), which builds students' background knowledge in certain domains of literature, science, and history. To learn more about how and why the Listening & Learning Strand of CKLA approaches science content through read-alouds and ELA instruction, read more about the CKLA program.

Domain Anthology, *The History of the Earth*

- Identify geographical features of the earth's surface: oceans and continents
- Locate the North Pole, the South Pole, and the equator on a globe
- Describe the shape of the earth
- Explain that much of our knowledge of the earth and its history is the result of the work of many scientists
- Identify the layers of the earth: crust, mantle, and core (outer and inner)
- Describe the crust
- Describe the mantle and core inside the earth
- Describe volcanoes and geysers
- Describe how heat, pressure, and time cause many changes inside the earth
- Identify common minerals in the earth
- Explain how minerals are used by people
- Identify the three types of rocks: igneous, sedimentary, and metamorphic
- Describe how heat, pressure, and time cause the formation of igneous, sedimentary, and metamorphic rocks
- Describe fossils
- Explain how fossils provide information about the history of the earth
- Explain how we know about dinosaurs
- Describe various dinosaurs

What Students Will Learn in Future Grades

Core Knowledge Sequence
Grade 4 Geology: The Earth and Its Changes

Earth's Layers
- Crust, mantle, core (outer core and inner core)
- Movement of crustal plates
- Earthquakes:
  Faults, San Andreas fault
  Measuring intensity: seismograph and Richter scale
  Tsunamis
- Volcanoes:
  Magma
  Lava and lava flow
  Active, dormant, or extinct
  Famous volcanoes: Vesuvius, Krakatoa, Mount St. Helens
- Hot springs and geysers: Old Faithful (in Yellowstone National Park)
- Theories of how the continents and oceans were formed: Pangaea and continental drift

How Mountains are Formed
- Volcanic mountains, folded mountains, fault-block mountains, dome-shaped mountains
- Undersea mountain peaks and trenches (Mariana Trench)
- Major mountain ranges on different continents:
  South America: Andes
  North America: Rockies and Appalachians
  Asia: Himalayas and Urals
  Africa: Atlas Mountains
  Europe: Alps
- High mountains of the world:
  Asia: Everest
  North America: McKinley
  South America: Aconcagua
  Europe: Mont Blanc
  Africa: Kilimanjaro

Rocks
- Formation and characteristics of metamorphic, igneous, and sedimentary rocks

Weathering and Erosion
- Physical and chemical weathering
- Weathering and erosion by water, wind, and glaciers
- The formation of soil: topsoil, subsoil, bedrock

Core Vocabulary

*The following list contains the core vocabulary words suggested for purposeful integration across this Grade 1 unit. **Boldfaced** terms could be introduced and/or reviewed with students using a Word Work activity, as modeled by the Core Knowledge Language Arts program (CKLA). The inclusion of the words on this list does not mean that students are immediately expected to be able to use all of these words on their own. However, through repeated exposure across the lessons, students should acquire a good understanding of most of these words and begin to use some in conversation.*

Earth's Geographical Features

***surface**, exterior, shape, **horizon**, east, west, north, south, ocean, **continent**, Africa, Asia, Antarctica, Australia, Europe, North America, South America, equator, North/South Pole, water, land, liquid, solid, peninsula, harbor, bay, island, geology, **geologist**, geography, geographer, map, globe, **model**, picture, representation, volcano, molten, rock, lava, **magma**, heat, cool, **eruption**, destructive, Ring of Fire, geyser, plume, Old Faithful, Yellowstone*

Inside the Earth

interior**, inside, **layer**, section, crust, mantle, outer/inner core, liquid, solid, gas, pressure, **temperature**, heat, earthquake, seismic, **seismologist**, Richter Scale, measure, record, slip, fault, **natural hazard

Rocks, Minerals, and Soil

***mineral**, rock, stone, boulder, gravel, pebble, sand, soil, dirt, peat, substance, material, **matter**, solid, particle, piece, characteristic, trace, gemstone, gem, diamond, jade, crystal, geode, artifact, igneous, metamorphic, sedimentary, **cycle**, sediment, erode, wash away, break down, **weather**, compress, squeeze, heat, melt, solidify, crystallize, debris, air bubble/pocket, **fossil**, preserve, impression, paleontologist, **excavate**, extinct, fossilized, **fossil record**, dinosaur, meteor, meteorite*

Potential Misconceptions

Students have been shown to learn significantly more science when their teachers demonstrate strong knowledge of potential student errors, and when the teacher plans accordingly (Sadler & Sonnert, 2016). The following incorrect statements serve as a sampling of the "intuitive theories" or "alternative conceptions" that students and teachers may actively use to describe their thinking, and which might interfere with the process of learning. The details following each statement are not intended to imply the scope of instruction for this grade, but instead provide a clearer sense of what students (of all ages) often misunderstand and/or overgeneralize when investigating and describing scientific ideas.

Misconception: "The sun revolves around the Earth causing day and night."
As is to be introduced in Unit 2 *Astronomy*, this unit offers an extended opportunity for students to explore the shape of the Earth and the phenomenon of the horizon. Many students find it counter-intuitive that it is the Earth that moves (rotates/spins) to cause day and night, and not the sun. The sun's apparent movement across the sky during the day can lead students to this common misconception. This concept can be a good opportunity for teachers and students to discuss the scope and timeframe of an investigation. That is, day-to-day observations of the sun from relatively the same location may not be enough to convince someone of the true relationship between the sun and the Earth. Instead, knowledge of time/daylight differences across the globe, discussions of the horizon and the shape of the Earth, and patterns of seasonal change in the day-night cycle can help to build a correct understanding over time.

Misconception: "Bricks are rocks."
Bricks are created by humans using natural materials, and may *contain* rock, but they are not considered to be rock in geological terms. Geologically, rocks are naturally occurring inorganic substances with a definite chemical composition of minerals. Students have been shown to have trouble distinguishing naturally occurring objects from those created and/or altered by humans (Happs, 1985; Keeley, 2013). Student understanding of natural versus human-made things can be explored by offering students time to develop an operational definition of the term *rock* before introducing the scientific definition (Keeley, 2013).

Misconception: "Soil is tiny pieces of rock."
This statement is an overgeneralization that omits a key ingredient of soil—living and once-living organisms. Soil is a mixture of both organic and inorganic matter such as bacteria, fungi, plant matter, minerals, and more. Researchers, such as Happs (1982), have found that the most common misconception regarding soil is that it is "just dirt" and that students do not understand the key roles that living organisms play in soil. Young children may think decaying plants and animals just disappear over time while some recognize that decaying matter fertilizes the soil, but do not understand that organic material becomes a part of the soil (Driver, et. al., 1994; Keeley, 2013). It is recommended that teachers help students to distinguish between the words *dirt* and *soil* (e.g., *dirt* is *soil* in places where humans do not want it). You may also help students understand soil by investigating various soils to observe the different mixtures and to discuss the component pieces of various samples (Keeley, 2013).

Key points for instruction:
Consider reading more about common misconceptions and key points for instruction offered by Ohio State University's College of Education and Human Ecology: Common Misconceptions about Rocks and Minerals. For example, "A major source of geologic misconceptions is the discrepancy between the use of geologic terms in everyday language versus scientific communication. In everyday usage, the term *rock* refers to a single, particular specimen; to a geologist, the term *[rock]* is used for a category of rock types. A single specimen, geologically speaking, is a *clast*." The OSU project, *Beyond Penguins and Polar Bears*, is an excellent resource for teachers to learn more about misconceptions and broader implications for learning about a variety of scientific topics.

Misconception: "Earth's mantle is liquid."
The Earth's mantle is mostly solid rock. The misconception of a liquid mantle arises from expressions such as "tectonic plates sinking into the mantle" or "continental drift," which implicitly refer to or are associated with liquid substances. The mantle is also described as "creeping" due to convection forces on a long-term timescale, which can strengthen the misconception of a liquid mantle without special instruction to avoid this misunderstanding. Student understanding of volcanoes is also likely to affect their descriptions of Earth's interior. Many students may assume that, because what they see coming from the interior of the Earth is a liquid (i.e., lava), this represents what is generally found beneath the surface of our Earth. Teachers should consider learning more about magma and how it is created to help avoid misconceptions and overgeneralizations about Earth's interior layers.

Potential Objectives for this Grade 1 Unit

The organization of the following objectives reflects the order in which they are expected to be addressed. The proposed timing within the unit ("beginning," "middle," or "end") and aligned NGSS are also noted. In addition to daily lessons focused on each objective, days have been built into the unit for review and assessment.

Beginning

- Describe the shape of the Earth
- Use a model to describe the Earth's surface (ESS1.B)
- Locate the North Pole, South Pole, and equator on a globe
- Describe the weather and climate of different regions of the Earth
- Identify and describe landforms and bodies of water in our local area
- Develop a model that represents the landforms and bodies of water in our local area (2-EE2-2)

Middle

- Identify three layers of the Earth
- Develop a model that describes the Earth's crust
- Describe the temperature of the Earth's mantle and core
- Compare and contrast volcanoes and geysers
- Develop a model that describes the Earth's mantle and core

End

- Describe how minerals are used in our everyday lives
- Describe how the minerals in soil help plants
- Sort rocks based on similar features
- Describe features of metamorphic, igneous, and sedimentary rocks
- Describe how metamorphic, igneous, and sedimentary rocks are formed
- Classify rocks as metamorphic, igneous, and sedimentary
- Describe how fossils tell us about the past

Potential Big Guiding Questions

Essential Questions:

- **How does the shape of the Earth affect your everyday life?**
- **What clues do volcanoes and geysers tell us about the interior of the Earth?**
- **What evidence do rocks and minerals offer us about the history of the Earth?**
- **Why is soil so important to living things?**

RE: Features of the Earth

- Why can't you reach the horizon?
- How close is your school to the equator?
- How far away are the North and South Poles from your school?
- Are there rocks in the Arctic?

RE: Inside the Earth

- Why can't you dig a hole to the other side of the Earth?
- What causes a volcano to erupt?
- Are there volcanoes on other planets?
- What causes geysers?

RE: Rocks, Minerals, and Soil

- If all rocks contain minerals, why do they have different features?
- How do you use rocks and minerals in your everyday life?
- What is a cycle?
- Do all plants need soil to grow?
- How do fossils tell us about the past?

Potential Assessment Opportunities

The following assessment tasks serve as a sampling of how students can demonstrate mastery of lesson objectives. Each aligned objective and NGSS is noted in parentheses. In addition, the proposed timing ("beginning," "middle," or "end") is noted in order to indicate the approximate point in time the assessment would take place.

Example #1: (Beginning of Unit 3)

{**Evaluates Student Mastery of Objective:** Use a model to describe the Earth's surface} (ESS1.B)

Advance Preparation:

- Provide each small group of students with a globe or map of the world. The models should clearly label oceans, the seven continents, and other large bodies of water (e.g., the Mediterranean Sea, the Nile River, etc.,).
- Post-it Flags (2 colors per group). Prior to passing out the flags, it may be important to model how they should be used to mark an area on a globe/map (e.g., one Post-it Flag for the region of North America, one for the Atlantic Ocean, etc.,)
- Anecdotal record sheet to capture student responses.

Task Assessment: Ask each group to take their (yellow) Post-it Flags and affix them to the land they see on the Earth's surface. As students mark their globes/maps, walk around the room and ask them questions, such as:

- **How do you know this is land and not water?**
- **What do you notice about this area of land (e.g., large/small, shape, surrounded by water, etc.)?**
- **What do you call these large areas of land?**

Ask several groups of students to share their findings with the class.

Now ask students to use their (blue) Post-It Flags to mark large and smaller bodies of water. As students locate oceans, seas, lakes, and rivers, ask each group questions, such as:

- **Where can we find water on the Earth's surface?**
- **What do you notice about the size of an ocean compared to a lake or river?**
- **Can water ever be found in the form of a solid? What is the weather like when water is frozen?**
- **What do you notice about the water on the Earth's surface compared to the land?**

After you have met with each group, call on several groups to describe water on the Earth's surface. Ask students to move to a central location in the classroom (e.g., on the carpet).

T - We learned a lot about the Earth's surface by taking a close look at the land and bodies of water found there. Think about how you would describe the Earth's surface. Let's try to come up with 3–4 sentences that describe the water and land found on the Earth. As students share thoughts, record ideas on chart paper.

Example #2: (End of Unit 3)

{**Evaluates Student Mastery of Objective:** Classify rocks as metamorphic, igneous,and sedimentary}

Advance Preparation:

You will need a metamorphic (e.g., soapstone), igneous (e.g., obsidian), and sedimentary rock (e.g., limestone).

Task Assessment: Present students with three rocks (e.g., obsidian, sandstone, and soapstone) and ask them to determine which is an example of igneous rock, sedimentary rock, and which is metamorphic. Have students select one rock at a time and take a few moments to examine its features. Ask students to

share which type of rock they believe it is and why. If students need prompting, ask them to tell you what they know about igneous/sedimentary/metamorphic rocks and guide them in identifying which of the rocks in front of them falls in line with those characteristics.

Potential Activities & Procedures

The following activities or procedures serve as a sampling of what instruction could look like in this unit. Each example was specifically designed to contribute to one or more of the aforementioned objectives. In addition, the proposed timing ("beginning," "middle," or "end") is noted in order to indicate the approximate point of instruction it would be delivered. Aligned NGSS are noted in parentheses.

Example #1: (End of Unit 3)

{**Contributes to the Objective:** "Sort rocks based on similar features"}

Advance Preparation:

- Assortment of **metamorphic rocks** (e.g., gneiss, phyllite, quartzite, schist, soapstone)
- Assortment of **igneous rocks** (e.g., scoria, pumice, peridotite, basalt, obsidian)
- Assortment of **sedimentary rocks** (e.g., breccia, conglomerate, limestone, rock salt, sandstone)
- Paper for each small group of students

Activity: Provide each small group of students with one rock.

T - As a group, you will closely observe your rock. What are some characteristics that we should look for? Guide students through a discussion that highlights the types of descriptive features they should examine and note about their rocks (e.g., the feel of the surface, the color(s), observable patterns, the shape, etc.). You may also include sentence starters (e.g., "It feels…, the shape is…, the colors are…, etc.) and/or the option of including illustrations as a means of supporting students with recording these observations.

After students have finished capturing their ideas on paper, call on a group to present the unique features of their rock. Ask the remaining students to look at their rocks and descriptions to see if they notice similarities.

T - Which of you believe that your rock shares similar features?

After these groups share their descriptions, guide the class with identifying what is similar and different about these rocks compared to the one shared by the first group. Ask the class if they think these may be the same type of rock. If they agree, place the rock in the same group as the first. If they believe it holds more differences, place the rock in a 'new' group (e.g., group 2). Explain that students can change their minds about what rocks belong in specific groups as more are reviewed. Continue this process with the groups that believe their rocks have similar features to the one presented first.

Call on one of the remaining groups to present what they observed about their rock. After students have shared their description, place that rock in a new group. Ask a remaining group if they believe their rock belongs in this group. Repeat this process until all of the rocks have been presented and added to a group.

Return to the groups of rocks. Guide students with pointing out similar features of each group. If you have 5 or more groups, support students with observing the rocks through a broader lens in order to reorganize

them into 3 or 4 groups. As students suggest specific rocks should be regrouped, ask them to explain their thinking.

T - Today you will be learning about three different types of rocks: igneous, sedimentary, and metamorphic. Each rock we looked at today is either an igneous, sedimentary, or metamorphic rock. Let's examine each of type of rock and then decide which of our rocks fall into that category...

Example #2: (End of Unit 3)

{**Contributes to the Objective:** "Describe how fossils tell us about the past"}

Advance Preparation

- In this activity, you will create casts of students' hands or feet in order to replicate the process of fossilization as well as concretely illustrate how closely a "fossil" resembles the structure of the original. Decide how many casts you will create (e.g., several volunteers or entire class). This will determine how much of the following you will need:
  - Homemade plaster
  - Sand
  - Cardboard boxes
- Images of fossils (e.g., dinosaurs, fish, ammonite, trilobites, etc.,)

Activity: Engage students in an activity that replicates the formation of fossils. Partially fill a shallow cardboard box with sand, and have several volunteers put a handprint or footprint in the sand. Pour plaster over the sand and explain that the plaster acts in the same way as sediment does to cover and preserve the prints. Let the plaster solidify and harden and then remove it from the box. Children should see an exact replica of their hand/foot print in the plaster.

Ask the students what the "fossil" of their hand or footprint would tell someone about them (e.g., they have five fingers/toes, their shoe size, that they are most likely to be a child compared to an adult., etc.).

Show images of a variety of fossils.

T - These are images of fossils of living things from long ago. How do you think paleontologists use fossils to learn about the past?

Websites & Media

NASA's Space Place: http://spaceplace.nasa.gov/

During this unit, consider reviewing NASA's Space Place section on our planet Earth. Information and media linked to this page can help you to connect this unit to previous learning with questions such as, "Are there volcanoes on other planets?"

National Geographic Society—Magma and How It Forms:
http://nationalgeographic.org/encyclopedia/magma/

Consider reviewing this webpage to learn about the formation of magma between Earth's crust and the mantle. Read about the ways magma can escape these boundaries and reach Earth's surface with tremendous and treacherous effects.

Supplemental Trade Books

- Digging Up Dinosaurs (Let's-Read-and-Find-Out Science 2), by Aliki (HarperCollins, 1988) ISBN 0064450783
- Dinosaurs (Magic Tree House Guide), by Will Osborne, Mary Pope Osborne, and Sal Murdocca (Random House Books for Young Readers, 2000) ISBN 0375802967
- Dinosaurs Before Dark (Magic Tree House, No. 1), by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1992) ISBN 0679824111
- Earthquake in the Early Morning (Magic Tree House, No. 24), by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 2001) ISBN 067989070X
- Earthquakes (Let's-Read-and-Find-Out Science 2), by Franklyn M. Branley and Megan Lloyd (HarperCollins, 2005) ISBN 0064451887
- Fossils Tell of Long Ago (Let's-Read-and-Find-Out Science 2), by Aliki (HarperCollins, 1990) ISBN 0064450937
- Hill of Fire, by Thomas P. Lewis (HarperCollins, 1983) ISBN 0064440400
- How to Dig a Hole to the Other Side of the Earth, by Faith McNulty (HarperCollins, 1992) ISBN 0874992338
- If You Find a Rock, by Peggy Christian (Sandpiper, 2008) ISBN 0152063544
- Let's Go Rock Collecting (Let's-Read-and-Find-Out Science 2), by Roma Gans and Holly Keller (HarperCollins, 1997) ISBN 0064451704
- Mountains of Fire, by Lily Richardson (National Geographic Society, 2003) ISBN 0792242831
- Planet Earth/Inside Out, by Gail Gibbons (Morrow Junior Books, 1995) ISBN 0688096808
- Rocks in His Head, by Carol Otis Hurst and James Stevenson (HarperCollins, 2001) ISBN 0060294035
- Sabertooths and the Ice Age: A Nonfiction Companion to Sunset of the Sabertooth, by Mary Pope Osborne, Natalie Pope Boyce, and Sal Murdocca (Random House Books for Young Readers, 2005) ISBN 0375823808
- Sunset of the Sabertooth (Magic Tree House, No. 7), by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1996) ISBN 0679863737
- Soil, by George Wong (National Geographic Society, 2001) ASIN B0006S4Y26
- The Magic School Bus in the Time of the Dinosaurs, by Joanna Cole (Scholastic, 1995) ISBN 0590446894
- The Pebble in My Pocket: A History of Our Earth, by Meredith Hooper (Viking Juvenile, 1996) ISBN 0670862592

- Vacation Under the Volcano (Magic Tree House, No. 13), by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1998) ISBN 0679890505
- Volcanoes (Let's-Read-and-Find-Out Science 2), by Franklyn M. Branley and Megan Lloyd (Collins, 2008) ISBN 0064451895
- Volcanoes: Mountains That Blow Their Tops, by Nicholas Nirgiotis (Grosset and Dunlap, 1996) ISBN 0448411431