2nd Grade Unit 2
12 weeks

Earth's Systems:
Processes that Shape the Earth

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Essential Questions

What are the different landforms and bodies of water on the surface of the Earth and how do they change over time?

What evidence can we find to prove that the Earth changes quickly and slowly and how can we prevent these changes?

Earth's Systems: Processes that Shape the Earth

Students who demonstrate understanding can:

2-ESS1-1 **Use information from several sources to provide evidence that Earth events can occur quickly or slowly.** [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

2-ESS2-1 **Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*** [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

2-ESS2-2 **Develop a model to represent the shapes and kinds of land and bodies of water in an area.** [Assessment Boundary: Assessment does not include quantitative scaling in models.]

2-ESS2-3 **Obtain information to identify where water is found on Earth and that it can be solid or liquid.**

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

Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a model to represent patterns in the natural world. (2-ESS2-2)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)
- Compare multiple solutions to a problem. (2-ESS2-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

ESS2.A: Earth Materials and Systems

- Wind and water can change the shape of the land. (2-ESS2-1)

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (2-ESS2-1)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed. (2-ESS2-2, 2-ESS2-3)

Stability and Change

- Things may change slowly or rapidly. (2-ESS1-1, 2-ESS2-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Developing and using technology has impacts on the natural world. (2-ESS2-1)

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

- Scientists study the natural and material world. (2-ESS2-1)

Connections to other DCIs in second grade: **2.PS1.A** (2-ESS2-3)

Connections to other DCIs across grade levels: **K-2.ETS1.A** (2-ESS2-1); **3.LS2.C** (2-ESS1-1); **4.ESS1.C** (2-ESS1-1); **4.ESS2.A** (2-ESS1-1, 2-ESS2-1); **4.ESS2.B** (2-ESS2-2); **3-5.ETS1.A** (2-ESS2-1); **3-5.ETS1.B** (2-ESS2-1); **3-5.ETS1.C** (2-ESS2-1); **5.ESS2.A** (2-ESS2-1); **5.ESS2.C** (2-ESS2-2, 2-ESS2-3)

Earth's Systems: Processes that shape the Earth

Background knowledge videos:

ESS1.C The History of Planet Earth

ESS2.A Earth Materials and Systems

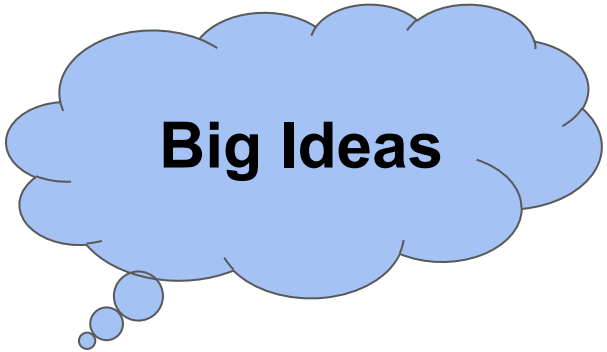
ESS2.B Plate Tectonics/Large-Scale System Interactions

ESS2.C The Roles of Water in Earth's Surface Processes

These videos are designed to assist in providing background knowledge with the associated DCI. The information in the videos follows the progression through high school.

How does the surface of the Earth change over time?

What evidence can we find to prove that the Earth changes quickly and slowly?



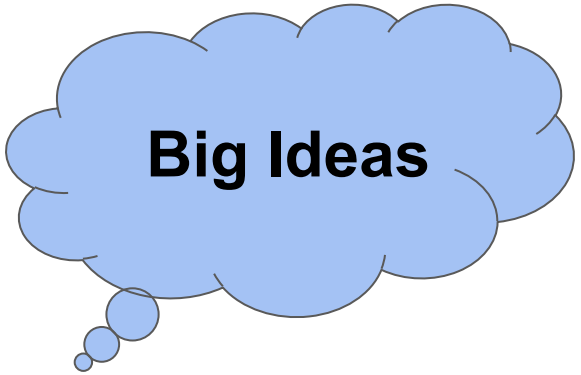
★ Some events happen very quickly, while other events occur very slowly over time.

★ Some events occur over a time period much longer than one can observe.

★ Wind and water can change the shape of the land.

★ Engineers develop solutions to prevent damage to Earth's surface.

What are the different landforms and bodies of water?



- ★ Maps show where things are located.
- ★ Maps can show the shapes and kinds of land and water in an area.
- ★ Water is found in the ocean, rivers, lakes, and ponds.
- ★ Water, as part of Earth's landforms, exists as solid ice and in liquid form.

Identify and CLARIFY the STANDARDS

Earth's Systems: Processes that Shape the Earth

Students who demonstrate understanding can:

2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth
- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

ESS2.A: Earth Materials and Systems
- Wind and water can change the shape of the land. (2-ESS2-1)

ETS1.C: Optimizing the Design Solution
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (2-ESS2-1)

Clarifications:

- Information can be obtained through a variety of sources: texts, text features (headings, table of contents, glossaries, etc) and other media sources
- Evidence can be obtained through a variety of sources including: observations, notes, text, measurements, and other data sources
- Students should be involved in designing and testing multiple solutions for slowing/preventing wind or water changes on the shape of the land in order to compare the solutions.

Earth's Systems: Processes that Shape the Earth

Students who demonstrate understanding can:

2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.

[Assessment Boundary: Assessment does not include quantitative scaling in models.]

2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Identify and CLARIFY the STANDARDS

Disciplinary Core Ideas

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

Clarifications:

- Models include: diagrams, drawings, physical replications, dioramas, dramatizations, storyboards, etc. that represent concrete ideas/events
- Information can be obtained through a variety of sources: texts, text features (headings, table of contents, glossaries, etc) and other media sources

Gather and study the RESOURCES

Discovery Education Science Techbook Units

Helpful Hint:

To access the Science Techbook links in the unit plan, make sure you are logged into Discovery Education before clicking on the link in this PowerPoint.

Gather and study the RESOURCES

By the end of grade 2 students should know...

1.) Some events on Earth occur in cycles, like day and night, and others have a beginning and an end, like volcanic eruption. Some events, like an earthquake, happen very quickly; others, such as the formation of the Grand Canyon, occur very slowly, over a period much longer than one can observe.

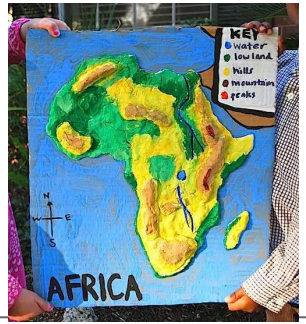
2.) Wind and water can change the shape of the land. The resulting landforms, together with the materials on the land, provide homes for living things.

3.) Rocks, soils, and sand are present in most areas where plants and animals live. There may also be rivers, streams, lakes, and ponds. Maps show where things are located. One can map the shapes and kinds of land and water in any area.

4.) Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. It carries soil and rocks from one place to another and determines the variety of life forms that can live in a particular location.

Week	Performance Expectation/ DCI	5E Model	Other Resources
1	2-ESS-2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid. 2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.	**Engage:** Create stations with a variety of paper and digital maps (including topographic) and have students discuss/write about what they observe and the map's purpose in groups *Possible Discussion Questions-* What does the map show? How do you know? What do you think its purpose is? Which ones show us information about the Earth's surface (land and water)? How do maps show things in the real world? What is a solid or a liquid on a map? How do you know? How is a map like/different than the real world? What patterns in the real world can maps show? Why is a map also considered a model? How do you know? DE	**Types of Maps** (optional use as review) Google Earth Engage - Student Graphic Organizer **Smart Notebook Resources:** (from SMART Exchange) Kinds of Maps Different Types Of Maps

Week	Performance Expectation/ DCI	5E Model	Other Resources
2	ESS2.B Plate Tectonics and Large Scale System Interaction Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2) (2-ESS-2-3) Obtain information to identify where water is found on Earth and that it can be solid or liquid	**Explore:** **Landforms Video** (turn sound off) *The purpose of this lesson is to ask students what they notice about landforms (this also includes bodies of water) and to compare and contrast the various landforms. This is meant to be an inquiry based lesson where the students are the ones guiding the discussion. Two examples of how you can use this lesson: 1. You can stop the video when it compares 4 pictures of landforms at once. 2. You can use the pictures (see resources in next column) and write on them- take notes of what the students notice about each type of landform.	More Landforms Information Landform Pictures PPT PDF - stills from landform song video Images of Landforms PPT PDF - variety of pictures of the main types of landforms - including pictures from Arkansas

Week	Performance Expectation/ DCI	5E Model	Other Resources
3-5	2-ESS-2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid 2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.	**Please watch the video in "other resources" to get an understanding of what a relief map is. **Please note that for the map salt dough or clay can be used **You will need to make one as the students are making theirs to use as a class model for future lessons. **Explain:** Have students work in groups/pairs to create a raised relief map depicting the landforms and/or bodies of water based on a topical map representation of the feature. Have students create a blueprint/plan first as an outline and then create a model. DE How maps show things in the real world.	Salt Dough Map May take a couple days to dry. You may want to account for that when planning your lessons. Raised Relief Map from DE Video See sample of a salt dough map(size may vary): 

DIVIDE the unit into weeks and DISTRIBUTE the standards

Week	Performance Expectation/ DCI	5E Model	Other Resources
6-7	2-ESS-2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid 2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.	**Elaborate:** Give students an opportunity to research the landform/body of water/region they created for their relief map and create a presentation to share with the class. **Evaluate:** Students share their work with an audience (fellow classmates or other groups in the school) *Some options for student presentation could include: Board Builder, SOS Strategies from Discovery Education, photo story, voicethread, power point, etc.*	

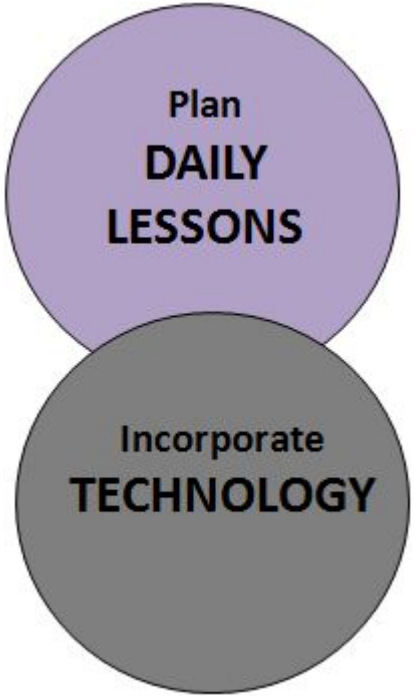
Week	Performance Expectation/ DCI	5E Model	Other Resources
8 (Day 1)	2ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	**Engage:** Show students a map of Pangea and a current world map. Ask them if they recognize the two images? Engage in a quick discussion of similarities and differences. Ask them: How do you think the earth's surface and bodies of water have changed over time? Discuss the time aspect of the earth's formation… before the dinosaurs, etc. Create a chart of students' ideas of what has caused the Earth to change to revisit/revise as they learn more about Earth's changes in future lessons.	Pangea You Tube video on the progression of how the Earth's plates have shifted over millions of years. Changes in a Glacier over time PPT PDF

Week	Performance Expectation/ DCI	5E Model	Other Resources
8 (Days 2-5)	2ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. *look at the inside of caves and how that has formed over millions of years and how things are changing inside the	**Engage:** Show students a series of side by side pictures of areas before and after a slow/quick change. Have students brainstorm "How did this happen?" "Was this a quick change?" *You will probably need to guide the students, "How can things change slowly?" • Hurricanes • Tornadoes • The effects of water over time in a cave • Creation of valleys • Flooding **Explore:** Students will be exploring outside to find areas that have been affected by weathering over time. Some examples: where gutter water hits the ground, streams, weathering on pipes, rocks, soil. Playgrounds have areas where the wood chips have eroded over time because of lots of use. **Explain:** Create a chart of what they noticed and whether they seem to be caused by wind, water, or both.	The following notes are for your background knowledge as a teacher. Students are not expected to know these terms in depth. They are expected to understand how wind and water affect the Earth. The formal terms for these changes are: **Weathering:** The breaking down or disintegration of substances such as rocks and minerals by wind, water, plants, etc. Substances are worn away or broken into smaller pieces. **Erosion:** When the broken down rocks and sediments are picked up and moved to another place by ice, water, or wind. The movement of sediment or soil from one location to another. Station options for students to discover effects of wind, water, and ice on Earth's surfaces Slow land changes - BrainPop Jr.

DIVIDE the unit into weeks and DISTRIBUTE the standards

Week	Performance Expectation/ DCI	5E Model	Other Resources
9	2ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. 2ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*	**Sand Castle Investigations** **What causes more change: wind or water?** Investigation #1 **Explore:** Students will investigate what happens to landforms (sand castle) when affected by wind and water. **Explain:** Students will discuss which caused more change… the wind or water? Would they classify these changes as quick or slow? Why? Students will construct an argument about which caused more change based on the evidence they collected. **Engage:** 11 Year Old Inventor of salt water sandless sandbags **Elaborate/Evaluate:** STEM Activity Sand Castle Investigation #2 - Engineering Design Constructed Response: Weather and Erosion DE	Teaching Channel - Sand Castles Investigations Video (see lesson in action) Erosion - article from PebbleGo -can be used for further evidence or learning

Week	Performance Expectation/ DCI	5E Model	Other Resources
10-12	2ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. 2ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*	**Engage:** Refer back to pictures of changes that happened quickly to Earth's surface. Remember to how it is a quick change to the surface. **Explore:** Choose from activities in other resources section. You will be going back and forth from Engage to Explore with the videos. This can be spread out over multiple days. **Explain:** Discuss the quick changes that can occur to Earth's surface. Fast Land Changes Brain Pop video **Elaborate:** *Stem Challenge Shelter from the Storm	Model how quickly water can make a change to the land: Here Today, Gone Tomorrow! DE Tsunami Activity Hurricane Activity Winds of Hurricane Clip Hurricane Katrina



Additional Resources:

Weathering & Erosion STEM This is a TpT idea but there are enough pictures to get the idea of how to do the lesson. Use the Design Loop

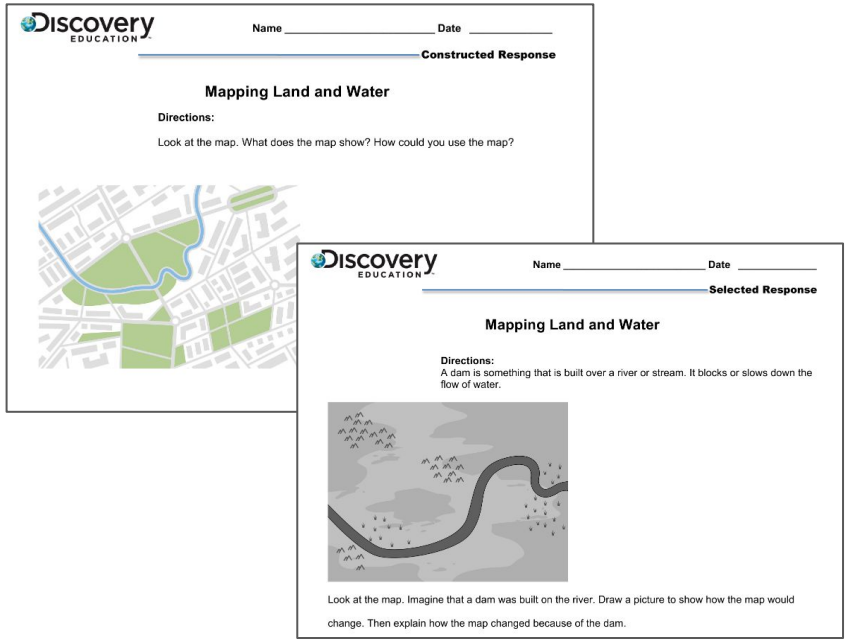
Anchor Chart idea or for Science Notebook

Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

Assessments from Science Techbook Unit Concept: Mapping Land and Water

Selected Response

Constructed Response



Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

Assessments from Science Techbook Unit Concept: Weathering and Erosion

Selected Response

Discovery EDUCATION SCIENCE

Name _____ Date _____

Selected Response

Weathering and Erosion

Multiple Choice. Fill in the correct answer choice.

1) What is weathering?

❍ a kind of rain
❍ planting trees
❍ the breaking down of rocks
❍ the movement of pieces of rock

2) What is erosion?

❍ rain or snow
❍ planting trees
❍ the breaking down of rocks
❍ the movement of pieces of rock

3) What are three things that can cause erosion?

❍ soil, rock, air
❍ wind, water, ice
❍ sunlight, clouds, stars
❍ trees, grasses, flowers

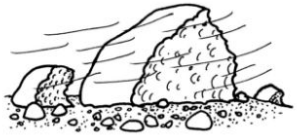
Discovery EDUCATION SCIENCE

Name _____ Date _____

Selected Response

Weathering and Erosion

4) Look at the picture. What process is shown in the picture?



❍ a flood
❍ erosion
❍ weathering
❍ a fossil forming

5) What process could cause pieces of rock to move over time?

❍ erosion
❍ freezing
❍ weathering
❍ plants growing

Constructed Response

Discovery EDUCATION SCIENCE

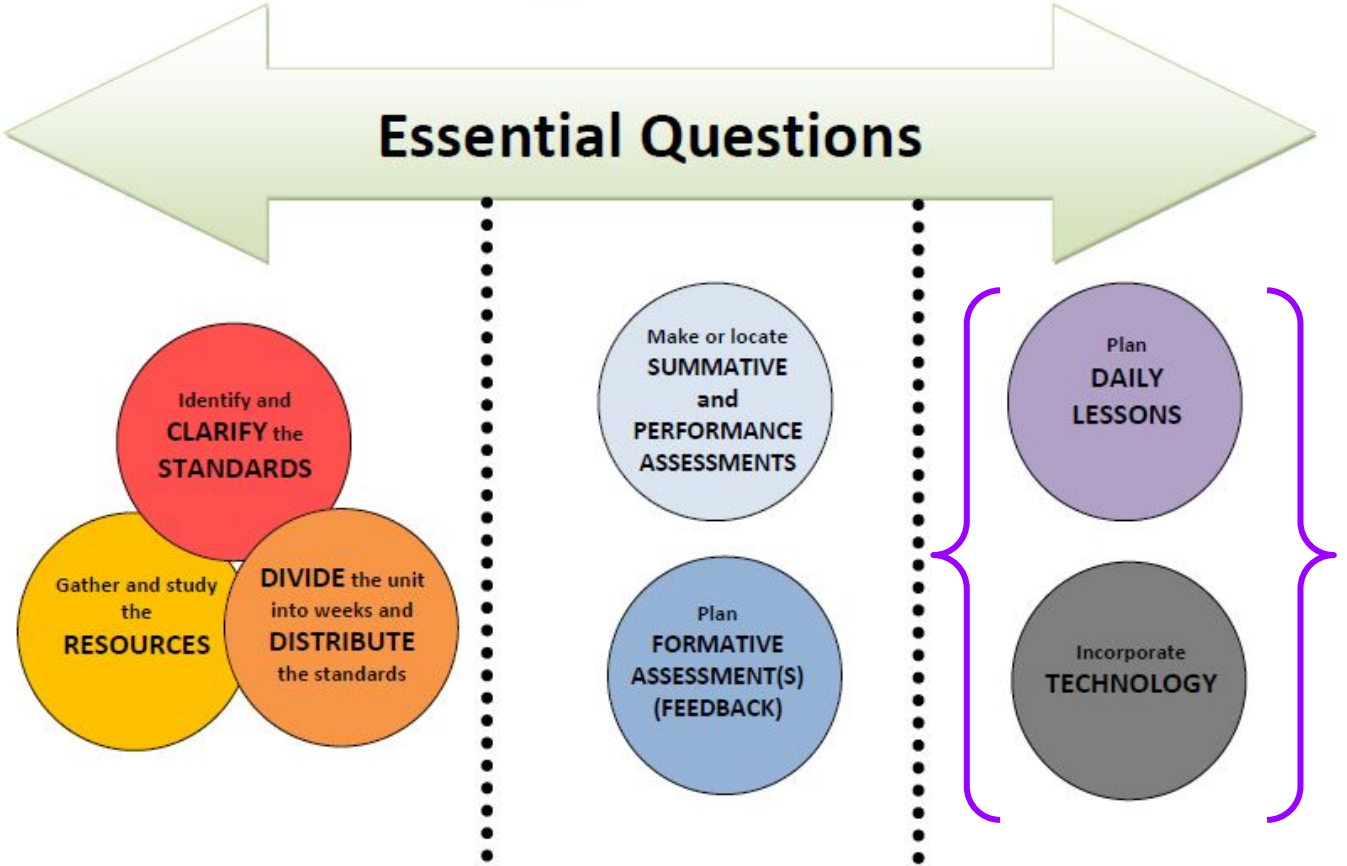
Name _____ Date _____

Constructed Response

Weathering and Erosion

Directions:
On the left, draw a picture of land with no plants. On the right, draw another picture of land covered in grass and bushes. The pictures show two different places. In which place will there be less erosion? Explain why.

Backward Unit Planning 1.0



Now you're ready to plan your daily lessons!