

Earth's Changing Surface

Lesson 1b: Modeling Landforms

Grade 2	Length of lesson: 35 minutes	Placement of lesson in unit: 1b of 6 two-part lessons on Earth's changing surface
Unit central questions: What does the surface of Earth look like? Does it ever change?		Lesson focus question: How can we make models out of sand to show the shapes of different landforms?
Main learning goal: Earth's surface has many different types of landforms.		
Science content storyline: The surface of Earth has many features called <i>landforms</i> . Landforms include mountains, hills, plateaus, valleys, plains, and canyons. Bodies of water, such as lakes and rivers, are also landforms because they're natural features of Earth's surface. We can make models out of sand to show the different shapes of these landforms. Some landforms rise high above Earth's surface, and others cut deep into Earth's surface.		
Ideal student response to the focus question: There are many different landforms on Earth's surface. Mountains, hills, valleys, canyons, plateaus, and plains are all landforms. Bodies of water, like lakes, ponds, streams, and rivers, are landforms too. We used models made out of sand to show how some landforms, like mountains and plateaus, rise high above Earth's surface, and some cut deep into Earth's surface, like canyons and rivers.		

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Globe
- Crayons or colored pencils (for drawing landforms)
- Blue plastic tablecloths (1 per group)
- 3 bags of play sand, dampened and divided equally among the groups
- A basin or sink of water for students to wash their hands after the activity
- Paper towels for students to dry their hands

Student Handouts

- 1.1 Landform Picture Cards (4 laminated cards per group) (from lesson 1a)
- 1.2 Landform Labels (4 labels per group corresponding to the picture cards)

Ahead of Time

- Review the content background document.
- Make sure a set of laminated landform picture cards are displayed on the word wall for students to refer to throughout the unit.
- Arrange desks or tables for groups of four students and place a blue plastic tablecloth across the grouped desks or tables. Prepare sand for each group. In the middle of the grouped desks or tables, pour enough damp sand to make four landforms. Then cover them with the tablecloth so that students won't see them until the activity.
- Divide up the laminated landform picture cards (from handout 1.1) so that each group will have four different landforms for the model-building activity. To make sure all nine landform cards are assigned, you'll either need to swap cards for one group or omit a landform card that students can't build (e.g., a lake).

Lesson 1b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
2 min	Link to previous lesson: The teacher reviews the unit central questions, <i>What does the surface of Earth look like? Does it ever change?</i>	<ul style="list-style-type: none"> There are many ways to describe Earth’s surface.
2 min	Lesson focus question: The teacher introduces the focus question, <i>How can we make models out of sand to show the shapes of different landforms?</i>	
8 min	Setup for activity: The teacher prepares students for building landform models out of sand.	<ul style="list-style-type: none"> Earth’s surface has many types of landforms. Landforms have different shapes that can be described using models. Scientists use models to better understand things that are too big or too far away to study firsthand.
8 min	Activity: Students build models of different landforms out of sand and label them.	<ul style="list-style-type: none"> Earth’s surface has many types of landforms with different shapes. Landforms include mountains, hills, plateaus, valleys, plains, and canyons. Bodies of water, such as lakes and rivers, are also landforms because they’re natural features of Earth’s surface.
6 min	Follow-up to activity: Students share their landform models with the class.	
8 min	Synthesize/summarize today’s lesson: The teacher reviews the focus question and asks students to share their answers and ideas. Then students draw pictures of their favorite landform in their science notebooks.	<ul style="list-style-type: none"> Earth’s surface has many types of landforms with different shapes that can be described using models.
1 min	Link to next lesson: The teacher foreshadows the next lesson in which students consider whether landforms look the same everywhere.	

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2 min	<p>Link to Previous Lesson</p> <p>Synopsis: The teacher reviews the unit central questions, <i>What does the surface of Earth look like? Does it ever change?</i></p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • There are many ways to describe Earth’s surface. 		<p>Show slides 1 and 2.</p> <p>In our last lesson, we started thinking about two important questions: <i>What does the surface of Earth look like? Does it ever change?</i></p> <p>We’ll keep these central questions in mind throughout this unit on Earth’s changing surface.</p> <p>We also talked about what Earth’s surface is. What ideas did we come up with?</p> <p>NOTE TO TEACHER: <i>Hold up the globe during this review and ask students to come up and point to what they think constitutes Earth’s surface.</i></p>	<p>Earth’s surface is the outside part of Earth.</p> <p>The top.</p> <p>The sides.</p> <p>The bottom.</p> <p>All around the outside.</p>	<p>Say more about “the outside part of Earth.” What do you mean by “outside part”?</p> <p>Is Earth’s surface anywhere else?</p> <p>What do you mean by “the sides”?</p> <p>Is Earth’s surface anywhere else?</p> <p>Can you point out on the globe where you think</p>

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		<p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p>	<p>OK, so we think that Earth’s surface is the outermost part of Earth, including all of the land and all of the water on the land.</p> <p>Could we say that Earth’s surface is the part of Earth we see when we look at a globe?</p> <p>Show slide 3.</p> <p>Do you remember these pictures from our last lesson? How would you describe the surface of Earth in each picture? Start your sentence with “The landform I see is ...”</p> <p>NOTE TO TEACHER: <i>Encourage students to use landform names in their descriptions (e.g., mountains, plains, rivers). Ask probe and challenge questions to clarify student thinking. Make sure students recognize that the body of water in one picture is considered part of the landscape but isn’t a landform. The trees, grass, and snow aren’t landforms.</i></p>	<p>Yes!</p> <p>The landform I see is mountains.</p> <p>The landform I see is a plain.</p> <p>There are lots of trees and plants.</p> <p>The landforms I see are trees and plants.</p> <p>Trees and plants aren’t landforms</p>	<p>Earth’s surface is?</p> <p>How do you know the landform is a plain?</p> <p>Please start your sentence with “The landform I see is ...”</p> <p>Does anyone disagree or have something to add?</p>

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			Do you see any other landforms in these photos?	<p>because they grow on the land. They aren't the land itself.</p> <p>The landform I see is a river.</p> <p>I disagree. I think it's a lake.</p> <p>I disagree, because a river is water, so it's not made out of land.</p>	<p>Does anyone disagree or want to add on?</p> <p>Are you saying you don't think the river is a landform? What do others think?</p>
2 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher introduces the focus question, <i>How can we make models out of sand to show the shapes of different landforms?</i></p>	Set the purpose with a <u>focus question</u> or goal	<p>Show slide 4.</p> <p>So last time, we learned the names and shapes of nine different landforms. [<i>Point to the landform pictures on the word wall.</i>]</p> <p>Earth's surface is made up of all of the land and all of the water on the land.</p> <p>We also talked about how we might build these different landforms out of sand.</p> <p>Today our focus question is <i>How can we make models out of sand to show the shapes of different landforms?</i></p>		

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		statement.	Copy this question into your science notebooks and draw a box around it. NOTE TO TEACHER: <i>Write the focus question on the board for students to refer to throughout the lesson.</i>		
8 min	Setup for Activity Synopsis: The teacher prepares students for building landform models out of sand. Main science idea(s): <ul style="list-style-type: none"> • Earth’s surface has many kinds of landforms. • Landforms have different shapes that can be described using models. • Scientists use models to better understand things that are too big or too far away to study firsthand. 	Make explicit links between science ideas and activities before the activity. Ask questions to challenge student thinking.	Show slide 5. Before we begin today’s activity, let’s talk about some of the landforms we learned about last time. NOTE TO TEACHER: <i>Ask challenge questions to push students to use the new vocabulary terms introduced in the last lesson, to use adjectives to describe landform shapes, and to explain why they think something is or isn’t a landform.</i> Who can tell me what a landform is? Who can name one of the landforms we talked about?	Something made out of the land. Mountains. They’re made of rocks and land.	How do you know that mountains are a landform? What are they made of? How would you describe the shape

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			<p>How could we make a model of mountains out of sand?</p> <p>ELL support: Make sure to include adjectives like <i>pointy</i>, <i>steep</i>, and <i>high</i> with word-wall resources for ELL students to refer to. You might also create landform labels in students' home languages.</p> <p>Mountains are a good example of a landform.</p> <p>What's another example of a landform?</p> <p>NOTE TO TEACHER: <i>Discuss all nine landforms from the set of landform picture cards (handout 1.1) and point out the pictures on the word wall throughout the discussion. Make sure to ask students how each landform could be made out of sand.</i></p>	<p>They're pointy and steep.</p> <p>We could make the sand pointy and high.</p> <p>Hills are a landform.</p> <p>Rivers are a landform.</p> <p>They're made by cutting into the land.</p> <p>The bottom of a</p>	<p>of mountains?</p> <p>What do you mean by "pointy"?</p> <p>How could we make a hill out of sand?</p> <p>How would it be different from a mountain?</p> <p>How do you know that rivers are a landform?</p>

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			<p>Why do you think we need models to learn about all of these landforms? Why can't we just go see them?</p> <p>Yes, some landforms might be too far away for us to visit. It might also be too dangerous to explore some of them. But the most important reason for building models is that they can help understand landforms better! This is the same reason scientists use models.</p> <p>So today you'll become landform builders and make models of all the different landforms we've been learning about.</p> <p>NOTE TO TEACHER: <i>Divide the class into groups of four students. Distribute a laminated set of four different landform picture cards (from handout 1.1) to each group, along with the corresponding</i></p>	<p>river is made of land like rocks and soil.</p> <p>We could pile up some sand and then dig a ditch in it to make the river.</p> <p>We'd have to go far away to see some of them, because I don't think we have any plateaus near here.</p>	<p>How could we make a river out of sand?</p>

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			<p><i>landform labels (from handout 1.2). Make sure all nine landforms are assigned unless you omit one that students would be unable to build (such as a lake).</i></p> <p>I've given each group four picture cards showing different landforms. Each of you will build one landform using the sand on your table. So let's get started!</p>		
8 min	<p>Activity</p> <p>Synopsis: Students build models of different landforms out of sand and label them.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Earth's surface has many types of landforms with different shapes. • Landforms include mountains, hills, plateaus, valleys, plains, and canyons. Bodies of water, such as lakes and rivers, are also landforms because they're natural features of Earth's surface. 	Select content representations and models matched to the learning goal and engage students in their use.	<p>NOTE TO TEACHER: <i>Have groups remove the tablecloth covering the sand on their grouped desks or tables. If you didn't arrange the desks or tables and set up the tablecloth and sand in advance, do so now. (See Ahead of Time.)</i></p> <p>Show slide 6.</p> <p>The sand in the middle of your group's table is the land you'll work with to make your landform models. But don't do anything with the sand yet. Listen carefully to the instructions first.</p> <p>Each of you will choose a different landform to make out of sand. You'll shape the sand into one of the different landforms on your landform picture cards.</p> <p>NOTE TO TEACHER: <i>Make sure to describe all parts of the model explicitly so that students understand what each item represents in the real world. Record the</i></p>		

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			<p><i>mapping from the model to the real world so that students can refer to this as needed during the activity.</i></p> <p>Small-group discussion (1 min): Now quickly talk with your teammates and decide which landform each of you will make. Then I'll go over a few more instructions before you begin building your models.</p> <p>NOTE TO TEACHER: <i>After groups have decided which landform each member will make, ask for a show of hands to make sure all nine landforms have been assigned ("Raise your hand if you're making [name of landform]."). If any are missing, swap out one of the students' landforms with the missing one.</i></p> <p>As you're working, use your landform picture as a guide to help you make your model. Your group will make a total of four different landforms, but each of you will make only one landform. Ask your teammates to help if you aren't sure how to make your landform.</p> <p>Make sure to put the right landform label on your model. For example, if you made a hill, put the printed landform label that says <i>Hill</i> on top of your model.</p> <p>After everyone in your group has finished building your landforms, look at your</p>		

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			<p>teammates’ models and compare them with yours.</p> <p>Do you have any questions before we begin?</p> <p>NOTE TO TEACHER: <i>During the activity, remind students to brush the sand off onto the tablecloth for easier cleanup. Circulate among the groups as students work on their models. Ask about the landforms students are building, especially how they’re shaping the land. For example, if a student is making a canyon, ask, “How did you decide to build the canyon?” “Did you cut into the land?” “How would you describe its shape?” Ask other general questions as well, such as “Is this landform rising high above the ground, or is it cutting into the ground?” These types of questions will help students think about the shapes of the landforms they’re building.</i></p> <p>ELL support: Listen carefully to ELL students’ conversations during the activity, paying special attention to anything they seem surprised or confused about. Make a note to unpack the concepts with the class in a follow-up conversation. Rich conversations often occur when students experience sensemaking tensions.</p>		
6 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students share their landform models</p>		<p>Show slide 7.</p> <p>Let’s see the wonderful landform models you built.</p>		

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	<p>with the class.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Earth’s surface has many types of landforms with different shapes. • Landforms include mountains, hills, plateaus, valleys, plains, and canyons. Bodies of water, such as lakes and rivers, are also landforms because they’re natural features of Earth’s surface. 		<p>Who would like to share your landform with the class? Tell us what landform you made, how you made it with the sand, and what shape it is.</p> <p>NOTE TO TEACHER: <i>Have students come up to the front of the class and share one of the nine landform models until all of the landforms have been presented. Ask students to name their landforms and describe how they made them. Make sure they describe the landform’s shape and what they did with the sand to mold it into that shape.</i></p> <p>Did anyone else make a valley? Does it look like this one?</p> <p>Who made a different landform? Tell us what you made and how you shaped it.</p> <p>You all did an excellent job as landform builders today! Together you made all nine of the landforms we’ve been learning about.</p>	<p>I made a valley.</p> <p>I made a U shape in the sand.</p> <p>I made a plateau.</p> <p>I made it high but flat on the top.</p>	<p>How did you make the valley? What shape is it?</p> <p>How did you make the plateau? What did you do with the sand?</p>
8 min	Synthesize/Summarize Today’s Lesson		NOTE TO TEACHER: <i>Before the synthesize and summarize activity, have</i>		

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	<p>Synopsis: The teacher reviews the focus question and asks students to share their answers and ideas. Then students draw pictures of their favorite landform in their science notebooks.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Earth’s surface has many types of landforms with different shapes that can be described using models. 	<p>Highlight key science ideas and focus question throughout.</p>	<p><i>students carefully fold up the edges of their tablecloths so they have room for their notebooks.</i></p> <p>Show slide 8.</p> <p>Let’s think about our focus question again: <i>How can we make models out of sand to show the shapes of different landforms?</i></p> <p>What did we do today that helped us answer this question?</p> <p>What different landform models did you make out of sand? How did you make your models?</p> <p>So do you think our sand models did a good job of showing the shapes of real landforms?</p>	<p>We made landform models out of sand.</p> <p>We made models of rivers and lakes.</p> <p>We made models of valleys and canyons.</p> <p>I made a mountain, and [Sharif] made a hill.</p>	<p>How did you make the rivers and lakes with the sand?</p> <p>How did you make the valleys and canyons? What did you have to do to the sand?</p> <p>How did you make the mountain and hill with the sand?</p>

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			<p>NOTE TO TEACHER: <i>During this summarizing activity, you may want to briefly discuss how students' models are like and unlike the real thing.</i></p> <p>Next, I want you to think about your favorite landform and why it's your favorite. Which landform would you most like to visit? What do you think it would be like to see it in real life?</p> <p>Open to a new page in your notebooks and write the name of your favorite landform at the top. Then draw the landform using different-colored crayons <i>[or colored pencils]</i> and write a sentence telling why you would like to go see it.</p> <p>NOTE TO TEACHER: <i>Give students 5 minutes to draw their favorite landforms and complete their writings.</i></p> <p>Whole-class share-out: Who would like to share your drawing with the class and tell us why you'd like to visit your favorite landform?</p> <p>ELL support: Give ELL students an opportunity to practice sharing their drawings and writings with a partner before sharing them with the class.</p> <p>Who else would like to share?</p>	<p>I drew a canyon because I think it would be fun to walk along the bottom and look up at the cliffs and the sky.</p>	

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			<p>NOTE TO TEACHER: <i>As time allows, encourage as many students as possible to share their drawings and writings.</i></p> <p>Today you made models of nine kinds of landforms out of sand to show their different shapes. I'd say you're well on your way to becoming landform experts!</p>		
1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher foreshadows the next lesson in which students consider whether landforms look the same everywhere.</p>	<p>Summarize key science ideas.</p> <p>Link science ideas to other science ideas.</p>	<p>Show slide 9.</p> <p>So far we've learned that Earth's surface has many different features called <i>landforms</i>, and there are many ways to describe them. Building models is one of the ways we can learn more about landforms and describe them.</p> <p>But are landforms the same everywhere, or are they different in different places?</p> <p>That's what we'll think about next time.</p>		