

## Earth's Changing Surface

### Lesson 5a: Changing Landforms

<b>Grade 2</b>	<b>Length of lesson:</b> 35 minutes	<b>Placement of lesson in unit:</b> 5a of 6 two-part lessons on Earth's changing surface
<b>Unit central questions:</b> What does the surface of Earth look like? Does it ever change?		<b>Lesson focus questions:</b> How quickly or slowly do landforms change over time? How do we know?
<b>Main learning goal:</b> Earth's surface is always changing. Some changes happen very slowly over a long period of time.		
<b>Science content storyline:</b> The land hasn't always looked the way it does today. It's changing all the time. Some changes happen very slowly over a long period of time, such as the formation of a river delta or the erosion that carves out a canyon.		
<b>Ideal student response to the focus questions:</b> Landforms change over time. Sometimes changes happen very slowly. For example, the Mississippi River slowly carries dirt and rocks to the delta and drops them off there. This makes the delta bigger over time.		
<b>Preparation</b>		
<b>Materials Needed</b> <ul style="list-style-type: none"> <li>• Science notebooks</li> <li>• Chart paper and markers</li> </ul> <b>Student Handouts</b> <ul style="list-style-type: none"> <li>• 5.1 The Grand Canyon (1 per pair)</li> <li>• 5.2 Deltas (1 per pair)</li> </ul>		<b>Ahead of Time</b> <ul style="list-style-type: none"> <li>• Review the content background document.</li> <li>• <b>ELL support:</b> Identify Tier 2 and Tier 3 words in the lesson plan to review in advance with ELL students. Possible terms include <i>delta</i>, <i>measurement</i>, <i>measure</i>, <i>Mississippi River</i>, <i>mouth (of a river)</i>, <i>deposit/deposited</i>, <i>evidence</i>. Create visual references for these words or have students create them.</li> </ul>

## Lesson 5a General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
2 min	<b>Link to previous lesson:</b> Students engage in a discussion about landform changes and consider how long it took the Grand Canyon to form.	<ul style="list-style-type: none"> <li>The land hasn't always looked the way it does today. It's changing all the time. Sometimes landforms change very slowly, like the Grand Canyon.</li> </ul>
5 min	<b>Lesson focus questions:</b> The teacher introduces the focus questions, <i>How quickly or slowly do landforms change over time? How do we know?</i> Then students share their ideas.	
5 min	<b>Setup for activity:</b> The teacher sets up an activity in which students compare two landform examples to determine how quickly or slowly landforms can change.	<ul style="list-style-type: none"> <li>Landform changes happen many ways, such as the formation of deltas and canyons.</li> </ul>
8 min	<b>Activity:</b> Students read about two different landforms. Then they compare the changes taking place in each example and decide whether these changes are happening quickly or slowly.	<ul style="list-style-type: none"> <li>Some landform changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are two examples of changes that happen very slowly over time.</li> </ul>
8 min	<b>Follow-up to activity:</b> Students share their ideas about how quickly or slowly they think the landforms are changing in the two examples.	<ul style="list-style-type: none"> <li>Some landform changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are examples of changes that happen very slowly over time. Flowing water can also cause landforms to change very slowly.</li> </ul>
6 min	<b>Synthesize/summarize today's lesson:</b> The teacher reviews the focus questions, and students share their ideas and evidence. Then the teacher summarizes key science ideas from the lesson.	<ul style="list-style-type: none"> <li>The land hasn't always looked the way it does today. It's changing all the time. Some changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are examples of changes that happen very slowly over time.</li> </ul>
1 min	<b>Link to next lesson:</b> The teacher announces that in the next lesson, students will use what they've learned about landforms to investigate changes that happen quickly.	

<b>Time</b>	<b>Phase of Lesson and How the Science Content Storyline Develops</b>	<b>STeLLA Strategy</b>	<b>Teacher Talk and Questions</b>	<b>Anticipated Student Responses</b>	<b>Possible Probe/Challenge Questions</b>
2 min	<p><b>Link to Previous Lesson</b></p> <p><b>Synopsis:</b> Students engage in a discussion about landform changes and consider how long it took the Grand Canyon to form.</p> <p><b>Main science idea(s):</b></p> <ul style="list-style-type: none"> <li>The land has not always looked the way it does today. It is changing all the time. Sometimes landforms change very slowly, like the Grand Canyon.</li> </ul>	<p>Ask questions to elicit student ideas and predictions.</p> <p>Highlight key science ideas and focus question throughout.</p>	<p><b>Show slides 1 and 2.</b></p> <p>Have you ever seen a landform change?</p> <p>Do you think someone could watch the Grand Canyon change?</p> <p>Well, if we haven't seen landforms change over time, how do we know how fast these changes happen?</p> <p>For example, how do you think scientists know that the Grand Canyon is getting deeper?</p> <p><b>Show slide 3.</b></p> <p>Right! So scientists collect all kinds of data about landforms to see how fast they're changing. Measurements are one kind of data they collect. Each year, scientists measure landforms, and then they compare these measurements with</p>	<p>No!</p> <p>No. If they could, they would have to be very, very old or watch for a very long time!</p> <p>Maybe they measured it to see how deep it is?</p> <p>They could compare the measurements from previous years.</p>	<p>What could they do with these measurements to see if the canyon is changing over time?</p>

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			measurements from other years to see if they're different. They also take pictures and look at maps to see whether a landform has changed over time.		
5 min	<p><b>Lesson Focus Questions</b></p> <p><b>Synopsis:</b> The teacher introduces the focus questions, <i>How quickly or slowly do landforms change over time? How do we know?</i> Then students share their ideas.</p>	<p>Set the purpose with a <u>focus question</u> or goal statement.</p> <p>Ask questions to elicit student ideas and predictions.</p>	<p><b>Show slide 4.</b></p> <p>We saw how water is carving out the Grand Canyon, so we know that landforms can change. But how long did it take that water to carve out the canyon?</p> <p>Today we'll think about the focus questions, <i>How quickly or slowly do landforms change over time? How do we know?</i></p> <p>Write these questions in your science notebooks and draw a box around them.</p> <p><b>NOTE TO TEACHER:</b> <i>Write the questions on the board for students to refer to throughout the lesson.</i></p> <p>So what do you think? Do landforms change at the same speed? Do all landforms change very slowly like they do in Grand Canyon?</p> <p><b>NOTE TO TEACHER:</b> <i>As students share their ideas, record them on chart paper.</i></p> <p><b>ELL support:</b> As ELL students share their ideas, note any surprising responses or confusion. Encourage them to respond to one another and try</p>	<p>Changes must happen slowly because we can't see them.</p> <p>The mountains have been the same since</p>	

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			<p>to make sense of what others are saying.</p> <p>So it sounds like most of us think that landforms change very slowly. Let's find out whether we're right.</p>	<p>I was little, so they must be changing slowly like the Grand Canyon.</p> <p>All landforms might change at the same speed, but I don't know.</p>	
5 min	<p><b>Setup for Activity</b></p> <p><b>Synopsis:</b> The teacher sets up an activity in which students compare two landform examples to determine how quickly or slowly landforms can change.</p> <p><b>Main science idea(s):</b></p> <ul style="list-style-type: none"> <li>Landform changes happen in many ways, such as the formation of deltas and canyons.</li> </ul>	<p>Make explicit links between science ideas and activities <b>before</b> the activity.</p> <p>Ask students questions to elicit student ideas and predictions.</p> <p>Highlight key science ideas and focus question throughout.</p>	<p>Today we'll explore two different examples of landforms and see how quickly they change over time.</p> <p><b>Show slide 5.</b></p> <p>Look at the first example on the slide. What do you notice about this landform? How would you describe the land?</p> <p>The landform in this picture is a delta. Deltas form at the end or mouth of a river. The delta on this slide formed where the Mississippi River meets the Gulf of Mexico.</p> <p>How do you think the delta in this picture formed? Where did all that mud come from? Think about what you already know about landforms.</p>	<p>It's very muddy and wet.</p> <p>I don't know.</p> <p>It must come from</p>	<p>Where do you think the mud comes from?</p>

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			<p>Right! Deltas form when rivers carry dirt and rocks and drop them off where the river meets an ocean or other large body of water like the Gulf of Mexico. Over a long period of time, all this dirt piles up to form land.</p> <p>Can you see where the land is building up in the photo?</p> <p><b>NOTE TO TEACHER:</b> <i>If students don't mention it, remind them of all the soil and rock that the Colorado River carried out of the Grand Canyon and deposited in Lake Mead.</i></p> <p><b>Show slide 6.</b></p> <p>Our second landform example is the Grand Canyon. What did we learn about how canyons form?</p>	<p>the river! Like the dirt and rocks the Colorado River carried to Lake Mead when it carved out the Grand Canyon.</p> <p>The Colorado River carries soil and rocks out of the canyon, and that makes the canyon deeper.</p>	<p>How long did it take for the river to carry 2 centimeters</p>

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			So are the changes in the canyon happening slowly or quickly?	It took 50 years!  They're happening very slowly, except when there's a flood!	of rock and soil out of the canyon? What did the scientist in our clue find out?
8 min	<p><b>Activity</b></p> <p><b>Synopsis:</b> Students read about two different landforms. Then they compare the changes taking place in each example and decide whether these changes are happening quickly or slowly.</p> <p><b>Main science idea(s):</b></p> <ul style="list-style-type: none"> <li>Some landform changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are two examples of changes that happen very slowly over time.</li> </ul>	<p>Make explicit links between science ideas and activities <b>during</b> the activity.</p> <p>Engage students in analyzing and interpreting data and observations.</p>	<p><b>Show slide 7.</b></p> <p>For today's investigation, you'll pair up with an elbow partner and read two short essays about the Grand Canyon and the Mississippi River delta. You'll also look at photos and maps of each landform.</p> <p>Read the information on the handouts together and talk about how fast these landforms are changing. Then decide whether the changes are happening slowly or quickly. Look for evidence in the readings to support your ideas. And be ready to share your ideas and evidence with the class.</p> <p><b>ELL support:</b> Since landform changes are easier to observe than the rate of change, have ELL students start the investigation by comparing the kinds of landform changes that are happening before they decide whether the changes are happening quickly or slowly.</p>		


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			<p><b>NOTE TO TEACHER:</b> <i>Have students pair up; then distribute handouts 5.1 (The Grand Canyon) and 5.2 (Deltas) to each pair. Pairs should read the text together, study the photograph, maps, and data, and decide whether the changes are happening slowly or quickly. During the investigation, circulate among the pairs and answer any questions.</i></p>		
8 min	<p><b>Follow-Up to Activity</b></p> <p><b>Synopsis:</b> Students share their ideas about how quickly or slowly they think the landforms are changing in the two examples.</p> <p><b>Main science idea(s):</b></p> <ul style="list-style-type: none"> <li>Some landform changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are examples of changes that happen very slowly over time. Flowing water can also cause landforms to change very slowly.</li> </ul>	Engage students in communicating in scientific ways.	<p><b>Show slide 8.</b></p> <p>Now that you've learned about these two landforms, let's hear your ideas about how quickly or slowly you think each landform is changing.</p> <p>Who would like to share which landform you think is changing slowly?</p> <p>First, tell us what you learned about in the reading and what you saw in the photos or maps. Then tell us what evidence you found that helped you decide whether the landform is changing quickly or slowly.</p> <p><b>ELL support:</b> Provide explicit examples of what evidence is and what counts as evidence.</p> <p><b>NOTE TO TEACHER:</b> <i>During this share-out, encourage students to agree or disagree with others' ideas, add on, or ask questions.</i></p>	<p>We think the Grand Canyon is changing slowly.</p> <p>It says that it took millions of years for the canyon to form. That's really, really</p>	<p>What evidence from the reading helped you make that decision?</p>



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			<p>Does anyone have another idea or evidence to share?</p> <p>What about the delta? Do you think it's changing quickly or slowly? Make sure to share your reasons and evidence.</p> <p><b>NOTE TO TEACHER:</b> <i>The delta example is difficult because students have to use the maps to see where the land is building up and think about the time points on the maps (AD 0 and AD 2000). This will be challenging for 2nd graders, so make sure they aren't just guessing. They should understand that the delta is changing because the land mass on the AD 2000 map is bigger than it is on the AD 0 map. These changes happened over a period of 2 thousand years. To determine which landform is changing more slowly, students should compare the time frames of the changes in both examples (thousands of years for the Mississippi River delta compared with millions of years for the Grand Canyon).</i></p>	<p>slow!</p> <p>We think that because the Grand Canyon is so big, maybe that's why it's changing so slowly. Because it would take a really long time for the river to carve it out!</p> <p>We think the delta is changing slowly because the map says thousands of years. That's really slow too.</p> <p>Well, the land is kind of small on the first map, but it gets bigger on the second map [Student points first to the AD 0 map and then to the AD 2000 map].</p>	<p>Can you show me on the map where you see the delta change?</p> <p>So the land is getting bigger. How did it get bigger? Where did the land come from?</p>

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		<p>Engage students in constructing explanations and arguments.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Summarize key science ideas.</p>	<p>So both the Grand Canyon and the Mississippi River delta are changing slowly. Which landform do you think is changing the slowest? How do you know?</p> <p>What caused the changes in the Grand Canyon?</p> <p>What caused the changes in the delta?</p> <p><b>ELL support:</b> Make a T-chart to help ELL students visualize the differences between the two landforms. You might also include images from the handouts.</p> <p>And what is moving the dirt and rocks in both rivers?</p> <p>So it took millions of years for the Colorado River to carve out the Grand Canyon, and it took thousands of years for the Mississippi River to form a delta.</p>	<p>The river brought the land there and dropped it off.</p> <p>Thousands of years!</p> <p>The Grand Canyon, because it took millions of years to form instead of just thousands.</p> <p>The Colorado River.</p> <p>The Mississippi River.</p> <p>The water!</p>	<p>And how long did it take for the land to build up on the delta?</p>

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			<p>When might rivers change the land very quickly?</p> <p><b>Show slide 9.</b></p> <p>Let's review what we've learned so far.</p> <ul style="list-style-type: none"> <li>• Flowing water can cause landforms to change very slowly, like the Grand Canyon and the Mississippi River delta.</li> <li>• Flowing water can also cause landforms to change very quickly, like during a flood.</li> </ul> <p>So changes don't always happen at the same speed. It just depends on how much water is flowing. During a flood, there's a lot of powerful, fast-moving water that can change the land very quickly. But most of the time, rivers cause changes to happen very slowly over time.</p>	<p>When there's a big flood!</p> <p>There's a lot of water, and it moves very fast.</p>	<p>What happens in a big flood? Have you ever seen that on TV?</p>
6 min	<p><b>Synthesize/Summarize Today's Lesson</b></p> <p><b>Synopsis:</b> The teacher reviews the focus questions, and students share their ideas and evidence. Then the teacher</p>	<p>Highlight key science ideas and focus question throughout.</p>	<p><b>Show slide 10.</b></p> <p>Let's review our focus questions for today: <i>How quickly or slowly do landforms change over time? How do we know?</i></p> <p>How would you answer these questions based on what we learned today?</p>	<p>I think landforms</p>	

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	<p>summarizes key science ideas from the lesson.</p> <p><b>Main science idea(s):</b></p> <ul style="list-style-type: none"> <li>The land hasn't always looked the way it does today. It's changing all the time. Some changes happen so slowly, we can't see them. The formation of a river delta and the erosion of the Grand Canyon are examples of changes that happen very slowly over time.</li> </ul>	<p>Engage students in making connections by synthesizing and summarizing key science ideas.</p>	<p>Let's hear some other ideas and evidence.</p> <p> <b>Embedded Assessment Task</b></p> <p><b>Show slide 11.</b></p> <p>Now I'd like you to answer these focus questions in your science notebooks using the sentence starter on the slide.</p>	<p>change very slowly over a long time.</p> <p>The Colorado River took millions of years to carve out the Grand Canyon.</p> <p>It took thousands of years for the Mississippi River to form the delta.</p> <p>The river carried dirt and rocks down to the delta, just like the Colorado River carried dirt and rocks to Lake Mead.</p>	<p>Tell us more about why you think landforms can change very slowly. Do you have evidence that supports your idea?</p> <p>And where did all that land in the delta come from?</p>

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		Summarize key science ideas.	<p><i>I think landforms change [slowly/quickly/both]. My evidence is _____.</i></p> <p>Circle one of the options in the sentence starter to show whether you think the changes happen slowly, quickly, or both slowly and quickly. Make sure to use evidence from today’s readings to support your ideas.</p> <p><b>ELL support:</b> ELL students benefit from verbalizing their thoughts before writing them down. Allow students to talk with a partner about their ideas before the express them in writing.</p> <p><b>Whole-class share-out:</b> Who would like to share how you completed the sentence on the slide? Do you think landforms change slowly, quickly, or both slowly and quickly over time? How do you know?</p> <p><b>Show slide 12.</b></p> <p>Let’s review what we’ve learned so far about landforms:</p> <ul style="list-style-type: none"> <li>• Landforms change over time.</li> <li>• Some changes happen quickly, like during a flood.</li> <li>• Some changes happen very slowly over time, like when deltas or canyons form.</li> <li>• We can’t always see these changes happening.</li> </ul>		

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1 min	<p><b>Link to Next Lesson</b></p> <p><b>Synopsis:</b> The teacher announces that in the next lesson, students will use what they've learned about landforms to investigate changes that happen quickly.</p>	Link science ideas to other science ideas.	<p><b>Show slide 13.</b></p> <p>So today we learned about landform changes that happen very slowly over time, such as when rivers form deltas or carve out canyons.</p> <p>Next time, we'll investigate changes that can happen very quickly.</p>		