Earth's Changing Surface
Lesson 1: Has Earth's surface always looked this way? Why or why not?

Grade: 4	**Length of lesson:** 55 minutes	**Placement of lesson:** 1 of 6 lessons
Anchoring Phenomenon: The Mississippi delta has grown over thousands of years.		
Unit Learning Goal: At any given point in time, Earth's surface is both building up and wearing down. Some processes build up Earth's surface, while other processes wear down Earth's surface. These processes include weathering, erosion, and deposition and cause Earth's surface to look different in different places.		
Lesson Main Learning Goal: Maps can help locate the different land and water features of Earth. While Earth's surface appears stable, it is changing over time. Observing land over time leads us to questions about how Earth's surface changes. **Science and Engineering Practices** Asking Questions • Ask questions that can be investigated and predict ~~reasonable outcomes~~ based on patterns such as cause and effect relationships. **Crosscutting Concepts** Stability and Change • Some systems appear stable, but over long periods of time will eventually change. • Change is measured in terms of differences over time ~~and may occur at different rates~~.		
Unit Central Question: What can cause Earth's surface to look the way it does?		**Lesson Focus Questions:** Has Earth's surface always looked this way? Why or why not?
Science content storyline: Maps can be used to locate land and water features. Water from all over the United States runs off the land and eventually into the Mississippi River. Where the river meets the ocean, there is a delta. Maps from different time periods show that while a system can appear stable, it can actually change over time. The Mississippi delta has grown larger over thousands of years. The river has changed course several times, and at the end of the river, new land forms and other land disappears. We have a lot of questions about how new land can form at the end of a river.		
Ideal student response to the Lesson Focus Questions: Earth's surface has changed over time. The Mississippi delta got bigger and moved around over thousands of years. The delta looks like it makes new land. I wonder where all the land comes from and how it does that.		

Preparation

MATERIALS NEEDED	AHEAD OF TIME
Teacher Resources: • TE1.1 animation of the Mississippi delta located here: http://www.watchthedeltagrow.com/mississippi-river-paths **Student Handouts** • HO1.1 *Communicating in Scientific Ways* (1 per student) • HO1.2 *The Mississippi Delta* (1 per student) • HO1.3 *How does land change to form a delta?* (1 per student) **Other Materials** *per student* • tape or glue stick • 10 sticky notes • 1 fine-point marker *per class* • chart paper and chart markers • Communicating in Scientific Ways poster • computer and projector	• Review the information in the *Content Background* document. • Prepare all handouts. • Prepare the class Know and Wonder T-chart. • Determine where you will post the Communicating in Scientific Ways (CSW) poster and the Driving Question Board. The CSW poster and Driving Question Board will remain posted throughout the unit. • Gather a computer and projector and test playing the animation of the Mississippi delta. You will want to be close to the computer while playing this for the class so that you can stop and pause it. In this first lesson, you will play only the first 33 seconds.

Lesson 1 General Outline

Time	Phase of lesson	How the science content storyline develops
5 min	**Introduction: Unit Central Question:** The teacher introduces a new unit and reminds students that they have access to the CSW chart, which provides support to communicate with one another like scientists. Students share what they know and wonder about Earth's surface.	
5 min	**Lesson Focus Questions:** Students respond to the Lesson Focus Questions—*Has Earth's surface always looked this way? Why or why not?*—using a sentence frame in their notebook. Students share and discuss their initial ideas using the CSW chart.	
8 min	**Setup for Activity:** Students use maps and satellite imagery to locate the Mississippi River and the Mississippi delta. Students read a short text to learn more about Earth's surface in this area. Students consider the focus questions for this lesson: *Has Earth's surface always looked this way? Why or why not?*	Maps can be used to locate land and water features (ESS2.B). Water from all over the United States runs off the land and eventually into the Mississippi River. Where the river meets the ocean, there is a delta.
15 min	**Activity:** Students observe a satellite-imagery animation of the formation of the Mississippi delta over thousands of years. They record their noticings and wonderings at different time points from the animation. Teacher highlights students' observations that new land forms and changes in this location. Students draw and write about how they think new land forms where the Mississippi River meets the Gulf of Mexico.	Maps from different time periods show that while a system can appear stable, it can actually change over time (CCC7). The Mississippi delta has grown larger over thousands of years. The river has changed course several times, and with it, new land forms and other land disappears.
15 min	**Follow-up to Activity and Unit Central Question:** Students share some ideas, and the teacher also draws out questions they have about land forming and changing. Students record their questions on sticky notes. The class makes a Driving Question Board (DQB). The teacher introduces the Unit Central Question as the title of the DQB: *What can cause Earth's surface to look the way it does?*	We have a lot of ideas and ask questions about how new land can form at the end of a river (SEP1).

6 min	**Summarize and Synthesize:** Students summarize what they think so far about how land forms and changes and what they still need to know.	Even though land and water features on maps appear stable, they can change over time. Watching Earth's surface change over time leads us to questions that we can investigate.
1 min	**Link to Next Lesson:** Teacher links science ideas to the next lesson.	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
5 min	**Introduction: Unit Central Question** Synopsis: The teacher introduces a new unit and reminds students that they have access to the CSW chart, which provides support to communicate with one another like scientists. Students share what they know and wonder about Earth's surface.		*Begin the class by saying something like,* We are starting a new unit today. Just like in past units, we have our Communicating in Scientific Ways chart to help us communicate as we explore the world around us. ***NOTE TO TEACHER:*** *Show students the Communicating in Scientific Ways (CSW) poster that you have on the wall and also distribute copies of the chart to students (HO1.1,* Communicating in Scientific Ways). *Have students attach it to their notebook as you have done in the past.* Remember that this chart shows us some of the ways that scientists communicate and can give us ideas for how *we* can think and communicate like scientists in our classroom. Can you remember some of the ways we have used these sentence starters before? As we learn in this unit, I will refer to this chart and suggest row numbers that will help you as you talk in your small groups or with the class. You can make suggestions too! Communicating with one another is an important part of doing science.	Yes! We used "I noticed" and "I see" when observing changes in the car launcher system. **Those are great things to say when you are sharing your observations.**

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		Ask questions to elicit student ideas and predictions.	***NOTE TO TEACHER:*** *Listen to the language students use throughout the unit. As students share their initial ideas about a new phenomenon, focus more on the ideas they are communicating and encourage sharing in multiple ways. As the unit progresses and new language is layered on top of the concepts students figure out, the expectations for language production will grow.* *Introduce the unit by saying something like,* The unit we are starting today is about Earth's surface. Let's begin by thinking about what we know and wonder about Earth's surface. *Provide students a minute or two of individual think time. Have students share their ideas about Earth's surface verbally as you record student ideas on a Know and Wonder T-chart.*	I wondered, "What is Earth's surface made of?" **Great question! What do others think?** I wrote down "grassy" and "rocks" and "dirt" because I can see them outside the window. **You can see rocks, grass, and dirt outside our window. Other ideas?** I wrote down "buildings" and "sidewalks". **Can you say more about how sidewalks are part of the land?**

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			Besides looking at the land around us, how else can we know what Earth's surface looks like?	I wrote down "mountains" and "islands" because I saw them on a map in social studies class. **Has anyone else used a map to learn more about what Earth's surface looks like? What other land and water features have you seen on a map?**
			We have a lot of ideas about Earth's surface. What questions do we have? ***NOTE TO TEACHER:*** *The purpose of this Know and Wonder T-chart is to introduce students to making their thinking public—even ideas about which they are not certain. While other charts will be used in multiple lessons throughout the unit, this chart serves as a formative assessment for the teacher and an opportunity for students to begin to share their ideas with the class.*	Why are there islands in the ocean? Why do some places have a lot of lakes and rivers but other places have less? Why does Earth's surface look different in different places?

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5 min	**Lesson Focus Questions** Synopsis: Students respond to the Lesson Focus Questions—*Has Earth's surface always looked this way? Why or why not?*—using a sentence frame in their notebook. Students share and discuss their initial ideas using the CSW chart.	Set the purpose with a focus question. Engage students in communicating in scientific ways.	*Set the purpose of the lesson by saying something like,* We know a lot about Earth's surface, and we have some wonderings too. Something I am wondering about is whether Earth's surface can change. The purpose of our lesson today is to begin to figure out the answer to the focus questions: *Has Earth's surface always looked this way? Why or why not?* Let's take a moment to write in our notebook what we know about these questions. You may use this sentence frame: *I think that Earth's surface [has / has not] always looked this way because ….* ***NOTE TO TEACHER:*** *Remind students that we are just beginning the lesson, so they may not know the full answer, but they should think about their best ideas about the questions. Share that they will have a chance to revise their ideas as they work through the lesson.* *Ask elicit questions to encourage students to share with the class their best idea so far. Record student ideas underneath the Focus Question box on the Lesson 1 Focus Question chart.* ***NOTE TO TEACHER:*** *for each Lesson Focus Question chart in this unit, use the same color*	I think Earth's surface has always looked this way because mountains are big and cannot change. **What do others think? And see if you can use a sentence starter from the CSW chart when you respond.** I agree with _____. I think that Earth's surface doesn't change because rocks are really hard. I think Earth's surface has not always looked this way because flowers and trees can grow and die.

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			for initial ideas at the beginning of the lesson and the same color for revised ideas at the end of the lesson. For example, "blue" initial ideas and "green" revised ideas on each Lesson Focus Question chart.	I think that Earth's surface has not always looked this way because of volcanoes! **Volcanoes? Can you say more?**
8 min	**Setup for Activity** Synopsis: Students use maps and satellite imagery to locate the Mississippi River and the Mississippi delta. Students read a short text to learn more about Earth's surface in this area. Students consider the focus questions for this lesson: *Has Earth's surface always looked this way? Why or why not?* Main science ideas: Maps can be used to locate land and water features (ESS2.B). Water from all over the United States runs off the land and eventually into the Mississippi River. Where the river meets the ocean, there is a delta.	Make explicit links between science ideas and activities (before the activity).	***NOTE TO TEACHER:*** *Display the map in the PowerPoint slides (same image as map on HO1.2). Distribute HO1.2* The Mississippi Delta *to each student.* As we think about our focus questions—*Has Earth's surface always looked this way? Why or why not?*—let's take a look at a specific area of Earth's surface. Here on the screen and on your handout is a map of a unique place in North America. What do you notice and wonder about the land and water features on this map? What do you notice and wonder about the images? We can use the sentence stems in rows 1 and 2 of our CSW chart to make observations and ask questions about Earth's surface in this area.	I see lots of rivers. **Can you say more about that?** There are lots of smaller rivers with a big river in the middle. I notice that the big river starts at the top of the United States and goes all the way down into the ocean. **What do others notice?**

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		Highlight key science ideas and focus question throughout.	*As students point out land and water features on the map and images, point to those places on the screen. After students share the features they notice, advance to the next slide to show the map labeled with key land and water features of the area.* To help us communicate what we observe on Earth's surface, here are some land and water features that we can refer to as we explore Earth's surface in this area. *Once students have had time to look at the map, turn their attention to the text on the handout to learn more.* Now we are going to read about the Mississippi delta to learn more about Earth's surface in this area. As you read, underline or circle any words you think are important or you want to know more about. Also, think about our focus questions and these land and water features on the map: *Has Earth's surface always looked this way? Why or why not?*	I notice that the pictures at the bottom have both land and water. I wonder how deep the water is.

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		Ask questions to elicit student ideas and predictions.	*Once the reading is done, ask students to share a few ideas or words they highlighted.* What are some things you noticed from the reading? Now that we know more about the land and water in the Mississippi delta, let's return to our focus questions. When looking at this map and images, what do you think? *Has Earth's surface always looked this way? Why or why not?*	I highlighted that it takes three months for water to travel all the way along the river. **Why did you highlight that part of the reading? Why did you think that was important?** I am wondering what it means for rain from 31 states to run off to the Mississippi River. How does that happen? I underlined that it is the largest coastal wetlands in the United States. But what is a coastal wetland anyway? I think this map always looked this way because I do not see any volcanoes to change the land. **What do others think about that idea?** I think it has always looked this way because I have seen maps of the United States and they are all the same shape. I think the map might have changed because new rivers might happen after a lot of rain.

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15 min	**Activity** Synopsis: Students observe a satellite-imagery animation of the formation of the Mississippi delta over thousands of years. They record their noticings and wonderings at different time points from the animation. Teacher highlights students' observations that new land forms and changes in this location. Students draw and write about how they think new land forms where the Mississippi River meets the Gulf of Mexico. Main science ideas: Maps from different time periods show that while a system can appear stable, it can actually change over time (CCC7). The Mississippi delta has grown larger over thousands of years. The river has changed course several times, and with it new land forms and other land disappears.	Make explicit links between science ideas and activities (during the activity).	*Transition to the main activity by saying something like,* You all had some really good noticings from the reading. I am curious about the Mississippi delta and why it looks this way too. So, we are going to look into that a little more closely and remember our focus questions for today: *Has Earth's surface always looked this way? Why or why not?* ***NOTE TO TEACHER:*** *Pass out to each student HO1.3* How does land change to form a delta? *They will complete only part A now. They should wait to complete part B after watching the animation a couple of times. Prepare to play the animation at http://www.watchthedeltagrow.com/mississippi-river-paths. Make sure all students can see it. Before playing the animation, give students an overview of what they will be looking at. Remind students that a bird's or satellite's perspective is the view from above looking back down at the land below. Importantly, a timeline will appear at the bottom of the animation. Orient the students to the timescale by using phrases like "a really, really long time ago".* *Stay close to the computer so that you can* ***stop the animation at 00:33 seconds*** *(students will watch the end of the animation during Lesson 4). Also, during the second viewing, pause the animation a few times for students to jot down*	

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		Engage students in using content representations and models.	*their noticings, again **not** showing the students the animation past 00:33 seconds.* ***NOTE TO TEACHER:** Orient students to the HO1.3 handout. Tell students that part A is where they will record things they notice or have questions about as they watch the animation. Tell students you will pause the animation to give them time to write and that you will play it a couple of times.* *Play the animation for students one time through to 00:33 seconds. They don't need to write any observations the first time—students should just watch. Pause after this and ask students the following:* What are we looking at? What is the dark white line on the animation? What is the timeline at the bottom showing us?	The end of the Mississippi River. **And, what do we call that again?** The delta. The river! **What about the other white lines?** Other rivers. Where the river moves with time.

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		Ask questions to probe student ideas and predictions.	What did you notice?	How long ago it was. I think it is showing how high the river is too because it goes up and down. **Can you say more about what is getting higher*?***
			So, Earth's surface hasn't always looked this way. It has changed over time! But how? Let's take a closer look by watching the animation once more slowly so you can jot down what you notice and wonder.	The map changed! The river and the land changed over time!
		Ask questions to elicit student ideas and predictions.	*Play the animation a second time through to 00:33 seconds. This time, pause the animation at about 5,000 years ago (around 00:06 seconds), 3,000 years ago (around 00:15 seconds), 1,000 years ago (around 00:22 seconds), and near present day (stopping at 00:33 seconds). Each time you pause it, give students about one minute to jot down what they notice or wonder.*	**What do you notice about the lines?** They move when the time changes. The lines seem to get longer at the end of the river.
			Once the animation has been shown the second time, ask students to share a few of their initial observations. Have the animation available in case students need to point to something.	

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		Engage students in using content representations and models.	OK, now I want you to look at part B on your handout. It shows you a map of what the coastline looked like about 2,000 years ago and what it looks like today. Consider the two questions: How did this happen? Where did the new land come from? *Tell students to draw or write words in the empty box to describe their thinking about those two questions. They can also draw on the maps. Encourage students to include questions they have as well.*	**What do you think it means that the lines get longer?** It looks like the river moves around. **Where did you see that in the animation?** The land changed with the river. **Where did you see that? How did it change?**
15 min	**Follow-up Activity and Unit Central Question** Synopsis: Students share some ideas, and the teacher also draws out questions they have about land forming and changing.	Make explicit links between science ideas and activities (after the activity).	*Group students in teams of 3 or 4 for the next task.* So, we watched an animation of what happened to the Mississippi delta over time and found out that Earth's surface has *not* always looked the way it does today. But now we are wondering, How did this happen? What	

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	Students record their questions on sticky notes. The class makes a Driving Question Board (DQB). The teacher introduces the Unit Central Question as the title of the DQB: *What can cause Earth's surface to look the way it does?* Main science idea: We have a lot of ideas and questions about how new land can form at the end of a river (SEP1).	Engage students in communicating in scientific ways.	are your ideas about how the delta formed? Where did the land come from? Work with your group to come up with a few ideas to share with the class. You can use CSW rows 4, 6, and 7 as you listen and share. ***NOTE TO TEACHER:*** *Give groups about two minutes to talk. Then ask them to share one idea from their group. Try to get a variety of responses that contradict each other or that are different ideas for why. Record these ideas as they are shared with the class. Also look for opportunities to draw out questions that they have. If they have questions, ask them to record each one on a separate sticky note. Try to keep the controversy going so students don't just accept any one idea. It is good scientific practice to be skeptical—to look for evidence for claims made even by scientists. An example dialogue is on the right.* *Once several ideas have been shared, ask the groups to talk again and record some questions on sticky notes that they are wondering about. Give students each a fine-point marker and some sticky notes to record their questions, one per note. Tell them to write big enough so everyone can read their questions.* *Encourage students to collaborate on their questions by saying something like,* Discuss the	Maybe it is sand washed up by waves? **So how would waves make the land? Tell me more.** I think it is dirt from the river. **How does that happen? Can you say more?** Is it like what happened when volcanoes make islands? Like, is it lava from the ocean that turns to rock? **So, what kind of evidence would we need to find that out?**

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			questions and make sure your group agrees on the wording. Use the Communicating in Scientific Ways chart to help you with this. Write each question on a separate sticky note and make sure everyone's questions are on sticky notes. Make sure you have enough questions so that each person on your team has at least one question to ask. ***NOTE TO TEACHER:*** *To build the Driving Question Board (DQB) gather students in a circle around the place you will post questions. The DQB should remain up during all the lessons. The process will involve these steps: Ask for a volunteer to come to the board, face the class, and read their question aloud to the class. Then have them post the question on the board. Ask if anyone has a similar question and have them come to the front and do the same, posting their question near the first one (or on top of the first one if it is identical). Once similar questions have been shared, move to an unrelated question. Continue until all students have shared a question and all questions are posted.* Let's build a Driving Question Board. These questions will drive our learning for several lessons. We may not answer all of them, but we will answer some. Gather your sticky notes	

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			and look at the questions you have written. Each team will share a question. If one is similar to your team's question, put your sticky note next to the similar one. Can someone share with the class one question you have? ***NOTE TO TEACHER:*** *Sample questions that students may ask are given on the right. The questions shown on the right are similar to the focus questions for the remaining lessons. It would be great if these questions came from students as you conclude this lesson. Take the opportunity to guide them toward these questions but do not negate other questions that they may ask. If a question does not come from students, you can steer them this way:* It seems we have a lot of questions about how the land changes or forms over time. Someone said that water might have something to do with carrying dirt and rock. Can someone put that question on a sticky note? And someone was curious about how a delta forms at the end of a river. Let's get that up there as well. We have a lot of questions about the land and the river. Does anyone have questions about the ocean? *Probe student ideas to know what they are thinking when they give examples or use words that are unfamiliar. If there is a question from*	Where does the new land come from? What causes a delta to form at the end of a river? How long does it take a delta to form? How long do deltas last? Is it rock and dirt from the river? How much rock and dirt does it take to make a delta? What happens when a river meets the ocean? Do ocean waves affect the delta?

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			the class about whether a student's idea is "true", ask the student to pose it as a question and write it on a sticky note. *It will be very helpful for you to have a good idea of the focus questions for the next several lessons. You can lead a discussion that helps students articulate some of their wonderings into questions similar to the upcoming focus questions. Do not expect all focus questions to be on the DQB, but it would be helpful if the focus question for the next lesson appears. Students will return to the DQB several times during the unit and have the opportunity to add additional questions when they learn more.* These are great questions about Earth's surface and how it can change. Let's label our Driving Question Board with our Unit Central Question, *What can cause Earth's surface to look the way it does?* *Add this question as the title of the Driving Question Board.*	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
6 min	**Summarize and Synthesize** Synopsis: Students summarize what they think so far about how land forms and changes and what they still need to know. Main science ideas: Even though land and water features on maps appear stable, they can change over time. Watching Earth's surface change over time leads us to questions that we can investigate.	Summarize key science ideas. Highlight key science ideas and focus question throughout.	Alright, today's lesson focused on the questions: *Has Earth's surface always looked this way? Why or why not?* How would you answer these questions now? Before I ask a few of you to share, turn to a shoulder partner and share your answer using evidence from today's lesson. *After students have a chance to share with their partner, ask a few students to share what they said or what they heard. As students share, return to the Lesson 1 Focus Question chart and add revisions in a different color.* ***NOTE TO TEACHER:** for each Lesson Focus Question Chart in this unit, use the same color for initial ideas at the beginning of the lesson and the same color for their revised ideas at the end of the lesson. For example, "blue" initial ideas and "green" revised ideas on each Lesson Focus Question chart.* *Summarize what students shared by saying something like,* Today we learned that maps from different time periods can show changes in land and water features. We saw that the Mississippi River has changed course several times, and with it new land forms and other land disappears. We have some initial ideas about how land forms and changes and have a lot of questions on our DQB.	Earth's surface has not always looked this way. Land and water features like the Mississippi delta can change. I knew places like the Grand Canyon changed over time, but I didn't know other places like the Mississippi delta can change too. How does that happen? I have questions. Earth's surface has changed over time. The Mississippi delta got bigger and moved around over thousands of years.

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			NOTE TO TEACHER: *Engage the students in a discussion of any trends they see in the groups of questions. Perhaps your class board has several questions related to the time it takes to change the land or where the land comes from. Communicate with students that they will try to answer most of their questions in the next several lessons. Tell them that we will revisit the DQB several times, but they are free to add questions at any time. Also, encourage them to watch for questions they may have answered through the activities that they do. When they answer a question, we can place a big check mark by the question.* We have a lot of questions about our Unit Central Question, *What can cause Earth's surface to look the way it does?* Our questions seem like they are mostly about where the soil came from, how it makes land, and how long it takes. ***NOTE TO TEACHER:*** *Customize this summary statement to capture the themes from the class DQB.*	

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			NOTE TO TEACHER: *While the idea that "wind and water can change the shape of the land" is a K-2 disciplinary core idea (ESS2.A), this unit layers on the 3-5 crosscutting concept of "some systems appear stable, but over long periods of time will eventually change" (Stability and Change) and intersects with the 3-5 disciplinary core idea (ESS2.B) "maps can help locate the different land and water features of Earth."*	
1 min	**Link to Next Lesson** Synopsis: Teacher links to the next lesson and the next focus question.	Link science ideas to other science ideas.	To help us explore our Unit Central Question, *What can cause Earth's surface to look the way it does?*, next time, we will investigate one of the questions on the board: *What causes a delta to form at the end of a river?* ***NOTE TO TEACHER:*** *The focus question for the next lesson is,* What causes deltas to form? *Look at the DQB and call attention to this question if it is on the board. Tell students that in the next lesson, this question of theirs will be our focus question. If it does not appear, there is a suggestion below that will help you navigate to the next focus question.* *If the next lesson's focus question does not appear on the DQB, say something like,* You mentioned that you are wondering where this land came from at the end of the river. This is what we will try to figure out in the next lesson.	

BSCS SCIENCE LEARNING

Transforming Science Education Through Research-Driven Innovation

Earth's Changing Surface

Lesson 1

Has Earth's surface always looked this way? Why or why not?

1

2

What do we know and wonder about Earth's surface?

What we *know*	What we *wonder*

3

Lesson 1 Focus Questions

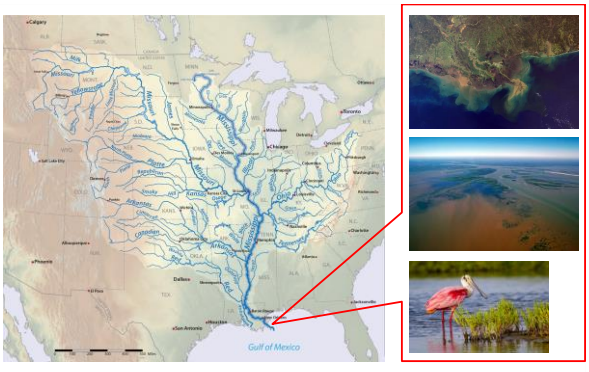
Has Earth's surface always looked this way? Why or why not?

Write your ideas here.

Focus Questions: Has Earth's surface always looked this way? Why or why not?

I think that Earth's surface [has / has not] always looked this way because ...

4



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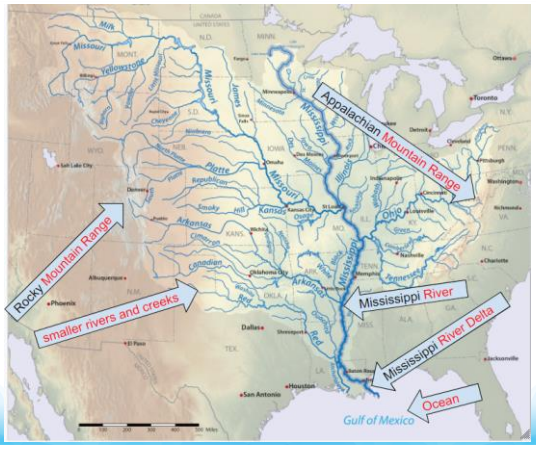

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HO1.3 *How does land change to form a delta?*

PART A: Make observations and jot down wonderings while you watch the satellite-imagery animation from outer space showing the Mississippi delta forming over thousands of years.

View from outer space				
Date	5,000 years ago	3,000 years ago	1,000 years ago	Today
Your noticings and wonderings				

animation link

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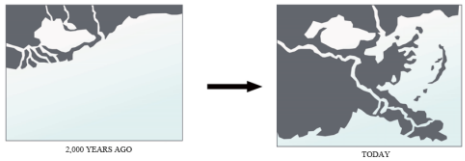
7

HO1.3 *How does land change to form a delta?*

PART B: Look at the map of the delta from 2,000 years ago and today. Consider these questions:

- How did this happen?
- Where did the new land come from?



Using words and pictures, draw your thinking about the questions above.

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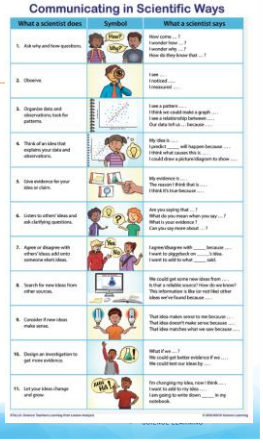
How did this happen? How did the delta form?

What are your ideas? Share with your group.



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Our Driving Question Board

Driving Question Board Protocol

- ➔ The 1st team reads their question aloud to the class and then posts it on the Driving Question Board (DQB).
- ➔ Students who are listening should raise their hand if their team has a question that relates to the question that was just read aloud.
- ➔ The 1st team selects the next team whose hand is raised.
- ➔ The 2nd team reads their question, says why or how it relates, and then posts it near the question it most relates to on the DQB.
- ➔ The student selects the next student. We will continue until every team has at least one question on the DQB.

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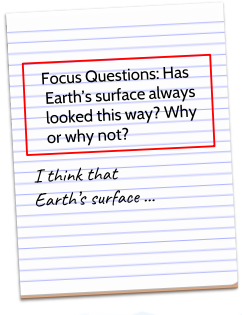
Lesson 1 Focus Questions

Has Earth's surface always looked this way? Why or why not?

How would you answer this question now?

Share your new ideas with a partner.



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What can cause Earth's surface to look the way it does?

What questions on our DQB will help us answer this Unit Central Question?

Lesson 2 Focus Question

What causes deltas to form?

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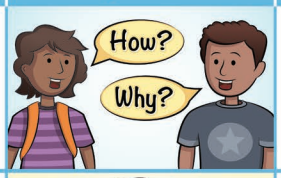
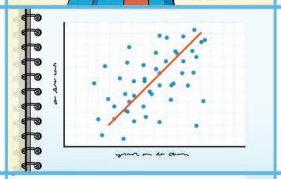
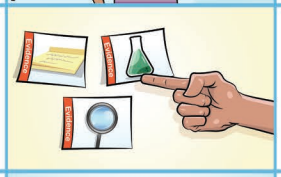
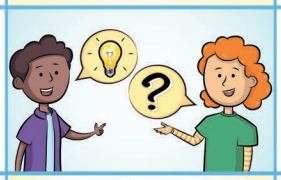
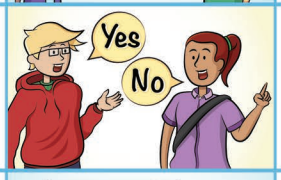
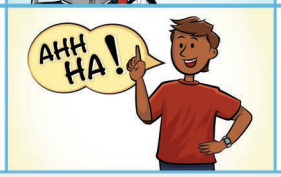
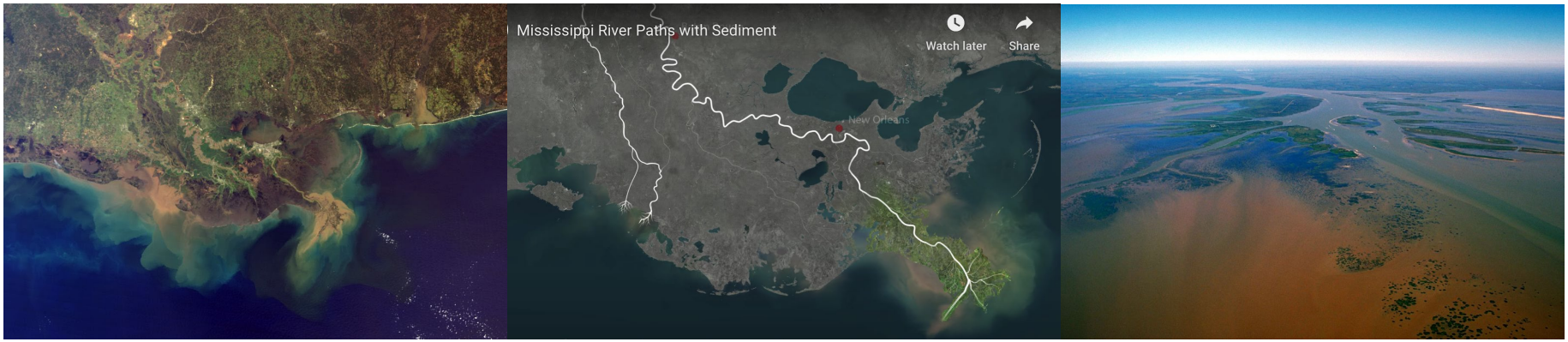
Communicating in Scientific Ways

What a scientist does	Symbol	What a scientist says
1. Ask why and how questions.		How come … ? I wonder how … ? I wonder why … ? How do they know that … ?
2. Observe.		I see … . I noticed … . I measured … .
3. Organize data and observations; look for patterns.		I see a pattern … . I think we could make a graph … . I see a relationship between … . Our data tell us … because … .
4. Think of an idea that explains your data and observations.		My idea is … . I predict _____ will happen because … . I think what causes this is … . I could draw a picture/diagram to show … .
5. Give evidence for your idea or claim.		My evidence is … . The reason I think that is … . I think it's true because … .
6. Listen to others' ideas and ask clarifying questions.		Are you saying that … ? What do you mean when you say … ? What is your evidence? Can you say more about … ?
7. Agree or disagree with others' ideas; add onto someone else's ideas.		I agree/disagree with _____ because … . I want to piggyback on _____'s idea. I want to add to what _____ said.
8. Search for new ideas from other sources.		We could get some new ideas from … . Is that a reliable source? How do we know? This information is like (or not like) other ideas we've found because … .
9. Consider if new ideas make sense.		That idea makes sense to me because … . That idea doesn't make sense because … . That idea matches what we saw because … .
10. Plan an investigation to get more evidence.		What if we … ? We could get better evidence if we … . We could test our ideas by … .
11. Let your ideas change and grow.		I'm changing my idea, now I think … . I want to add to my idea … . I am going to write down _____ in my notebook.

The Mississippi Delta

The Mississippi River is one of the longest rivers in America. Rain and melting snow from 31 states run off the land. This water goes into creeks and rivers. The water ultimately flows into the Mississippi River. Nearly half the land in the United States has creeks and rivers that flow into the Mississippi River. The water flows all the way to the Gulf of Mexico. It takes 3 months for a drop of water to flow from the start of the river to the gulf! The map shows the parts of the United States that have water that flows into the Mississippi River.

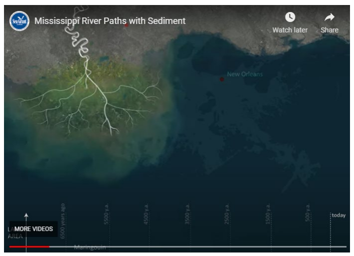
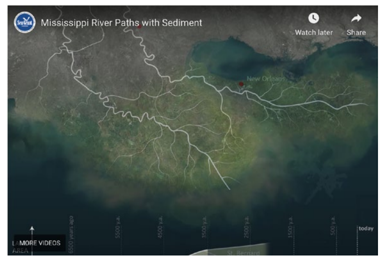
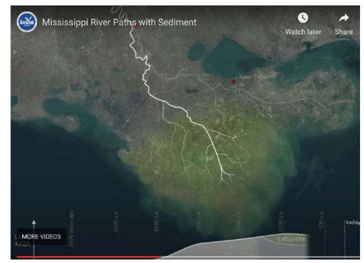
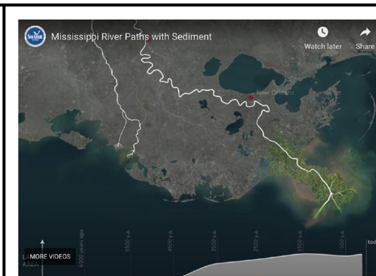
The Mississippi delta is the place where the river meets the ocean. The delta spans almost 3 million acres. It is the largest coastal wetlands in the United States. The delta wetlands are about 10% of the whole state of Louisiana! It is home to hundreds of kinds of birds, reptiles, mammals, and plants.



Images of the Mississippi delta from space and flying over it.

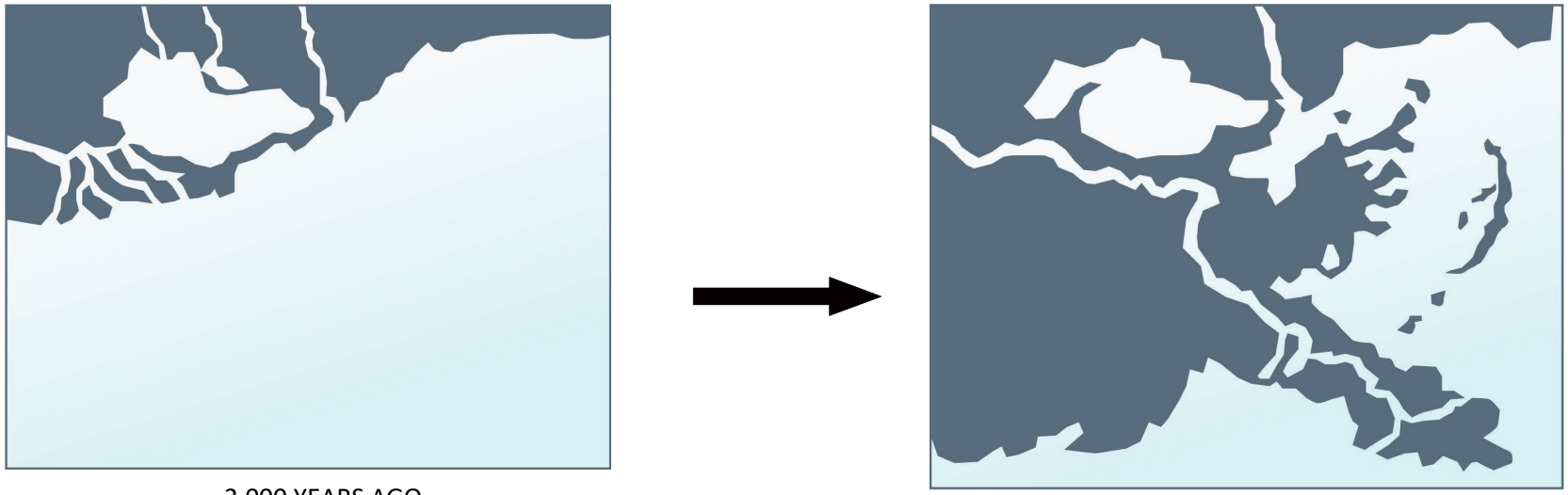
How does land change to form a delta?

PART A: Make observations and jot down wonderings while you watch the satellite-imagery animation from outer space showing the Mississippi delta forming over thousands of years.

View from outer space				
Date	5,000 years ago	3,000 years ago	1,000 years ago	Today
Your noticings and wonderings				

PART B: Look at the map of the delta from 2,000 years ago and today. Consider these questions:

- How did this happen?
- Where did the new land come from?



2,000 YEARS AGO

TODAY

Using words and pictures, draw your thinking about the questions above.