

Lesson 1 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
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— <i>Has Earth's surface always looked this way? Why or why not?</i> —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: <i>Has Earth's surface always looked this way? Why or why not?</i>	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: <i>What can cause Earth's surface to look the way it does?</i>	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.			

Lesson 2 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
3 min	Link to Previous Lesson: Class reviews ideas and questions from the previous lesson on the Mississippi River and delta. They consider how the delta might form.			
5 min	Lesson Focus Question: Teacher introduces Lesson Focus Question: <i>What causes deltas to form?</i> Students write their initial ideas in their notebook and share with the class.			
10 min	Setup for Activity: Teacher introduces the stream model, and students use an analogy chart to discuss what each feature represents in the real world. Students make predictions about what might happen when water is released at the top of the table.	Moving water in rivers and streams shapes and reshapes Earth's surface by moving rocks and soil from higher elevations and depositing them at lower elevations.		
15 min	Activity: Students study erosion and deposition in a stream model and record their observations.			
15 min	Follow-up to Activity: Students use their observations and records from the stream model to interpret and reason about the effects of erosion and deposition on the surface of Earth. Students learn the processes they have observed are erosion and deposition. The class discusses the results of their investigation.	Erosion is the process by which earth materials, such as rock fragments, sand, and soil, are removed from one place on Earth's surface and transported by wind and/or water. As the kinetic energy of the wind or water decreases, the earth materials are deposited (deposition), building up new land.		
10 min	Synthesize and Summarize Today's Lesson: Students synthesize ideas about erosion and deposition as they answer the focus question in their notebooks.	Deltas form at the end of rivers when this new land builds up over time.		
2 min	Link to Next Lesson: Teacher asks questions to link what they have learned to the next lesson's focus question.			

Lesson 3 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
3 min	Link to Previous Lesson: Class recalls ideas from the previous lesson about delta formation and starts to consider what could cause delta formation to happen faster or slower.			
8 min	Lesson Focus Question: Teacher introduces Lesson Focus Question: <i>What can change how fast deltas grow?</i> Students write their initial ideas in their notebook.			
10 min	Setup for Activity: Class brainstorms new conditions to test what might speed up or slow down erosion. Students make predictions.			
12 min	Activity: Students test one condition and record their observations.	Rainfall, the amount of water flowing, vegetation, and the type and slope of the land can affect the rate of erosion and deposition, changing where soil and rock flow and deposit.		
12 min	Follow-up to Activity: Each group shares their observations across different conditions, and students record which ones speed up and which ones slow down erosion and deposition.			
5 min	Synthesize and Summarize Today's Lesson: The class discusses the natural processes that can come together to speed up or slow down delta formation.	The Mississippi River freely deposited soil and rock that flowed from other places, which created the delta originally.		
5 min	Link to Next Lesson: Teacher tells students about all the changes on the Mississippi to protect towns and transportation traffic. Students suggest ideas for how it could change the natural process.			

Lesson 4 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
3 min	Link to Previous Lesson: Students review what they figured out in the previous lesson, revisit the DQB, and make predictions about a disappearing delta.			
15 min	Lesson Focus Question and Setup for Activity: Students rewatch an animation to the end about the Mississippi delta, showing what is currently happening to the delta. The teacher introduces the focus question, and students record it in their notebook. Students find out more about the delta through a short reading and learn that in recent times, people have put dams and levees on the river to control flooding.	Increased flooding and rainfall caused humans to build walls to manage the flow of the river. This causes a steadier flow of water for communities and transportation along the river, but it limits how soil and rock could be deposited in the delta. Over time, the land seems to “disappear,” but really, the soil and rocks are being swept away by the flow of water and wave currents faster than the land is deposited from the river.		
20 min	Activity: The class uses a stream table to investigate how a dam influences delta formation and considers the reasons why those changes occur.			
10 min	Follow-up to Activity: Students turn and talk with a partner and then individually write their ideas for why the delta might be shrinking. Students also consider the positive and negative effects of dams on a river.	Human activity can have both positive and negative effects on natural processes.		
10 min	Synthesize and Summarize Today’s Lesson: Students reconsider their initial models of delta formation and discuss what they have learned and how they might revise their initial ideas. The teacher records students’ ideas for what they have figured out so far.			
2 min	Link to Next Lesson: The teacher links to the next lesson and to unanswered questions on the DQB.			

Lesson 5 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
2 min	Link to Previous Lessons: Teacher builds links to ideas from previous lessons.	Erosion and deposition are ongoing processes. Where Earth's surface has built up can be worn down to build up again elsewhere.		
5 min	Lesson Focus Questions: Teacher introduces the focus questions: <i>Where does the soil and rock in a delta come from, and where does it go? Does the rock and soil ever change?</i> Students share their initial ideas about the sand and soil in a delta.			
10 min	Setup for Activity 1: Teacher guides students in reviewing the directions for each investigation and creating an analogy chart to support understanding of how the materials relate to the focus questions.			
20 min	Activity 1: In small groups, students complete three investigations that challenge them to think about processes that break apart and wear down mountains and other surface landforms.	Smaller rocks were once part of bigger rocks. Rock breaks down all over the land because of rain, ice, vegetation, and wind.		
20 min	Follow-up to Activity 1: Class discusses the investigation questions. Teacher introduces weathering. Students return to the Lesson 1 map to consider where the rock and soil is coming from.	Weathering is a process that causes rock to fragment, crack, and crumble. Weathered materials are carried away by gravity, water, and/or wind (erosion). Rocks that are carried away due to erosion previously came from bigger rocks. Rock and other weathered materials are transported between different land and water features.		
5 min	Setup for Activity 2: Students rewatch the animation of the Mississippi delta growing and shrinking and consider with a shoulder partner how they might use the ideas they figured out to explain why the Mississippi delta looks the way it does.			
10 min	Activity 2: Students answer the Lesson Focus Questions and the Unit Central Question by revising their initial explanation of what is happening on Earth's surface.	Rock breaks down all over the land because of rain, ice, vegetations, and wind. This is the rock and soil carried away by rivers. As rocks continue to be carried away (erosion) by gravity, water and/or wind, the rocks continue to break down into smaller pieces (weathering). These smaller pieces can be deposited in different places building up the surface of the Earth.		
5 min	Follow-up to Activity 2: Students revisit their initial models and explain how their ideas have changed.			
10 min	Summarize Today's Lesson: Students revisit the DQB and check off what they can now answer. Students share how their thinking has changed about the Lesson Focus Questions and the Unit Central Question.	Weathering breaks down rocks to smaller pieces which then can be eroded and deposited elsewhere, changing the surface of Earth.		
1 min	Link to Next Lesson: Teacher links ideas to next lesson.			

Lesson 6 General Outline

Time	Phase of lesson	How the Science Content Storyline Develops	STeLLA Strategies	Notes
5 min	Introduction, Focus Question, and Link to previous lessons: Students recall how they used the processes of weathering, erosion, and deposition to explain how the Mississippi delta grew and shrank over time. Teacher reminds students of the Unit Central Question— <i>What can cause Earth’s surface to look the way it does?</i> —and introduces that it will also be the focus question for today’s lesson.			
3 min	Setup for Activity: Teacher explains and assigns the use-and-apply task.			
20 min	Activity: Students record ideas and wonderings about what is causing land changes in four locations, explaining how the land changes are examples of weathering, erosion, deposition, or some other unknown processes.	Some processes build up Earth’s surface, while other processes wear down Earth’s surface. Weathering, erosion, and deposition are ongoing processes that shape the surface of Earth.		
15 min	Follow-up to Activity: Students come to consensus about what is happening at each location and identify when they could use weathering, erosion, and/or deposition to explain changes in landforms.	Weathering, erosion, and deposition are earth processes that have effects on different types of landforms. However, these three processes cannot explain all land changes, which leads us to wonder about other processes.		
12 min	Summarize and Synthesize: Students return to the Unit Central Question— <i>What can cause Earth’s surface to look the way it does?</i> —to synthesize ideas in a class discussion. Students share new questions they have.	Earth’s surface looks the way it does because different processes shape the land. We are able to use Earth’s processes of weathering, erosion, and deposition to explain some of the land changes, but not all. We are now curious about new questions that we would like to explore in the future.		
3 min	Link to Next Lesson: Students add new questions to the DQB. Teacher shares how students could keep exploring their new questions.			