EXPLORATION 2 **HANDS-ON ACTIVITY**

Glaciers on the Move

Activity Guide, pages 188–189

TIME ESTIMATE

60 min

SHORT ON TIME?

Conduct steps 1 and 2 as a teacher demonstration. Have students individually observe, record what they see, and answer the questions.



POSSIBLE MATERIALS

- ☐ clear plastic cup
- ☐ spoonful of sand
- ☐ spoonful of gravel
- ☐ spoonful of soil
- ☐ water
- ☐ piece of cardboard
- ☐ large ball of clay
- ☐ wooden block

PREPARATION

A day in advance, fill the plastic cups with water and put them in a freezer overnight. Distribute the cups of ice and other materials to students prior to starting the activity.

INVESTIGATIVE PHENOMENON

Frozen water can shape Earth's surface slowly.

Phenomenon Explained Students explore the **investigative phenomenon** by making and observing a model glacier to infer how frozen water affects the rate of change to Earth's surface.

Form a Question After viewing the image of a glacier, students should form a question about glaciers. If students struggle to form a question, ask them to consider different forms of ice with which they are familiar. **Sample questions:** How do glaciers form? How do glaciers move?

STEP 1 Students make a model of a glacier and Earth's surface over which it moves.

STEP 2 Students observe the effect of moving the model glacier over the surface and record their observations. Then they repeat this step twice.

Explain that glaciers typically move downhill over very long periods of time, shaping rock formations over Earth's surface. When glaciers shape rock formations, it's almost like they leave behind clues. Deep grooves in rock and deposits of sediment can show how far a glacier moved and in which direction. Ask students to describe how they might tell the direction that another group's model glacier moved.

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- **Make a Claim** Claims should indicate that a glacier can change Earth's surface slowly by scraping the surface and moving rocks and soil in its path.
- **Evidence** Students should cite as evidence their observations that when the ice was pushed down the slope, a dent was created in the clay and sand was moved.
- **Reasoning** Students should explain their reasoning, such as that, since they used a model of a glacier moving, similar changes to what they observed must occur when a real glacier moves slowly over Earth's surface.





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FORMATIVE ASSESSMENT

MAKING SENSE OF PHENOMENA

Students gain understanding that frozen water can shape Earth's surface slowly as they explore the **investigative phenomenon.** They should connect this to the **anchoring phenomenon** that different factors can cause quick or slow changes on Earth's surface. Students should understand that a slow-moving glacier can cause Earth's surface to change slowly, and thus the rate of change on Earth's surface can happen slowly or quickly.

REMEDIATION If students struggle to connect the **investigative phenomenon** back to the **anchoring phenomenon,** have them go online to observe pictures of landforms changed by glaciers and discuss them with a partner.

MAKING SENSE OF PHENOMENA IDEA ORGANIZER

After completing Exploration 2, students can fill in the **Idea Organizer** to summarize the connection between how frozen water can shape Earth's surface slowly and the anchoring phenomenon that different factors can cause quick or slow changes to Earth's surface.

Activity Outcome

Students should make and observe a model glacier in order to infer how frozen water affects the rate of change to Earth's surface. They use observations to support a claim that glaciers slowly change Earth's surface.

Performance Indicators	
	make and observe a model glacier
	make a claim that glaciers slowly change Earth's surface
	support the claim using observations as evidence

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