Science Objectives

- Students will observe weathering and erosion due to wave action and gravity.

Vocabulary

- weathering
- deposition
- erosion
- gravity
- abrasion
- geoscience processes

About the Lesson

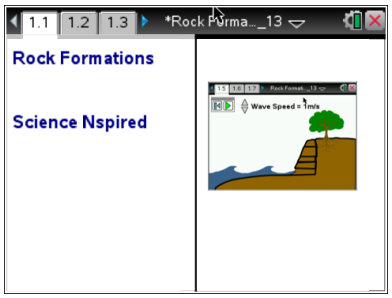
- In this lesson students make observations of weathering and erosion by waves and gravity. Students will use their observations to match the actions of the waves to the processes that shape the earth.
- As a result, students will understand that:
  - Weathering is the physical or chemical breakdown of rock.
  - Erosion is the process of carrying rock away.
  - Geoscience processes can change the Earth's surface at varying time and spatial scales.

TI-Nspire™ Navigator™

- Send out the *Rock_Formations.tns* file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.

Activity Materials

- Compatible TI Technologies: TI- Nspire™ CX Handhelds, TI-Nspire™ Apps for iPad®, TI-Nspire™ Software



Tech Tips:

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials

Lesson Files:

Student Activity

- Rock_Formations_Student.doc
- Rock_Formations_Student.pdf

TI-Nspire document

- Rock_Formations.tns

Discussion Points and Possible Answers

Have students read the background information on the student activity sheet or on page 1.2

Move to page 1.3.

Have students answer questions 1 and 2 in the .tns file, activity sheet, or both.

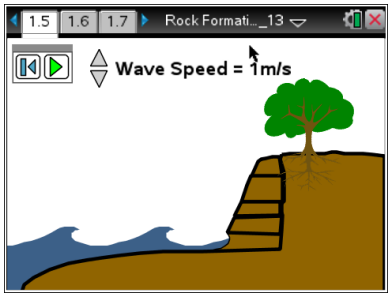
Q1. When water waves pound on the face of a rock cliff. Which of the following processes can occur over time?

Answer: D. all three can occur

Q2. Geoscience processes can change the earth's surface:

Answer: C. all of the above

Move to page 1.5



1. After selecting the Play button to start simulation, students will observe what is happening to the rocks at the base of the cliff.

2. Students can use the up and down arrows to change the speed of the waves.

3. Have students run the simulation until the bottom layer of the cliff has eroded completely.

Tech Tip: To access the Directions again, select menu or **Document Tools ( ) > Rock Formations > Directions.**

Tech Tip: To access the Directions again, select > **Rock Formations > Directions.**

Move to pages 1.6 - 1.12. Have students answer questions 3 - 9 in the .tns file, activity sheet, or both.

Q3. What happens to the size of the bottom layer of rock during the simulation?

Answer: B. It decreases.

Q4. The waves smash into the rock, knocking off small particles from the rock cliff. Which process or processes does this demonstrate?

Answer: A. weathering

Q5. After the small particles of the rock cliff are knocked off, the waves carry them away. Which of the following process or processes does this demonstrate

Answer: B. erosion

Q6. What force caused the upper rock layers to fall into the ocean?

Answer: B. gravity

Q7. Which of the following process or processes best categorizes the action of the upper rock layers on the cliff falling into the ocean and settling onto the ocean floor?

Answer: B and C. erosion and deposition

Q8. Which action best demonstrates erosion and weathering over a long period of time?

Answer: A. wave action dissolving and abrading the lowest rock layer

Q9. What would eventually happen to the upper rock layers that fell into the ocean?

Sample Answer: Student answers will vary; The rocks will continue to be weathered by abrasion and dissolving of minerals. Wave action will erode the rocks over time.

TI-Nspire Navigator Opportunities

Make a student a Live Presenter to show how to vary the speed of the waves in the simulation. Throughout the activity, monitor student progress. At the end of the activity, collect the .tns file and save to Portfolio.

Wrap Up

When students are finished with the activity, retrieve the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using Slide Show.

Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.
- Summative assessment could consist of questions/problems on the chapter test or a performance assessment involving students identifying the processes of weathering, erosion, and deposition around the school, community, or at home. Have students emphasize geoscience processes that shape local geographic features.