

Unit 1 overview

Learning objectives

In this unit, students will

- interpret patterns of seafloor topography, earthquakes, and volcanoes to predict the locations and types of plate boundaries;
- compare predicted plate boundaries to currently accepted boundaries and evaluate the differences; and
- use relative plate motion data to classify types of plate boundaries.

In this unit, students will look for patterns in earthquakes, volcanoes, and seafloor topography to locate plate boundaries and describe their characteristics. Using plate motion vectors, they will determine plate boundary types and associated features.

Activity 1.1 – Testing plate tectonics (*Engage*)

Students brainstorm evidence for or against the idea that Earth's surface is changing, and estimate the time scale of any changes they cite. This activity helps students recall what they already know about plate tectonics and related processes. Not all students will know about plate tectonics but they should still be able to contribute to the discussion.

During the classroom discussion, record students' ideas on an overhead projector or large sheet of paper. Save the list of questions and ideas for later exploration.

Activity 1.2 – Investigating Earth's clues (*Explore*)

In this activity, students examine world patterns of earthquakes, volcanoes, and topography to establish spatial relationships. As they explore the data, they learn that these are all signs of a deforming Earth. Students who complete this activity early should be encouraged to explore some of the questions raised in the Engage discussion.

Activity 1.3 – Discovering plate tectonics (*Explain*)

In the readings, students learn that heat is a major driving force of plate tectonics and they come to understand how heat also affects the patterns of earthquake depth and magnitude, volcano locations, and topography. Students learn about the three types of plate boundaries and the processes that occur at each. Discuss these concepts with students to ensure they have a firm understanding before going on.

Activity 1.4 – Analyzing plate boundaries (*Elaborate*)

Students use their understanding of plate tectonics to map the major plate boundaries. These are compared to the accepted boundaries and students are encouraged to look for differences. Using relative plate motion vectors as well as all previous data, they also determine and label the type of each boundary (convergent, divergent or transform).

Evaluating student comprehension

To provide students with feedback on their understanding of the science concepts they have explored, a simple concept map and unit assessment are provided on the following pages.

In addition to the sample assessments provided, you may wish to develop other, more authentic assessments that are more closely aligned with students' interests. For example, you might have students investi-

gate geographically-significant plate boundaries and discuss how they affect nearby populated areas. Another common type of assessment is to revisit the first (Engage) activity and have students reflect on how their understanding of the key science concepts has changed.