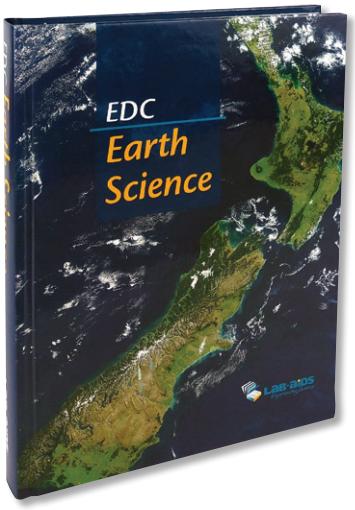
EDC EARTH SCIENCE

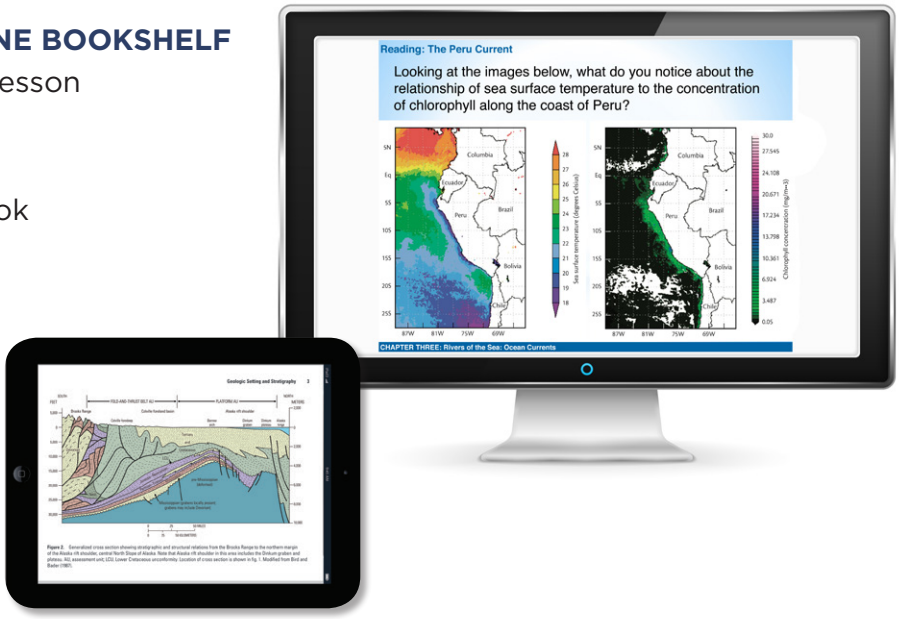


EDC EARTH SCIENCE involves students by challenging them with thought-provoking investigations and questions they hear about in the news or at their family dining table. Students are introduced to this course with an exciting excerpt from the novel *Red Mars*. Their performance assessment in The Mid-Year Challenge—where students prepare a news story (live, video, blog, written) and make predictions about what Earth will be like in the year 2100. In the End-of-Year Challenge students apply the knowledge they have gained during this course to prepare an essay or presentation predicting what Earth will be like when its interior cools completely.

EDC Earth Science may be purchased as a full-year discipline-based program in one hard bound book OR as units to create a customized scope and sequence (on the following pages).

ACCESS TO MY LAB-AIDS ONLINE BOOKSHELF

- Editable PowerPoints for each lesson
- ExamView
- Printable student sheets
- Online Student and Teacher book with Teacher Resources
- Supplemental Resources



STEM LITERACY
REFILLABLE HALF KIT

EDC EARTH SCIENCE FULL-YEAR PROGRAM	ITEM NO.
COMPLETE EQUIPMENT PACKAGE (materials for up to 5 classes of 32 students, mobile storage cart, TE/TR DVD, My Lab-Aids bookshelf access for one teacher for 7 years which includes ExamView, PowerPoints, online Teacher's Edition and Resources, online Student Book, and supplemental resources)	EDCE-1000
MY LAB-AIDS BOOKSHELF FOR STUDENTS (access to online book, student sheets, resource supplements; 7 years)	EDCE-1OLSP-7
STUDENT BOOK (hardcover)	EDCE-1SB
TEACHER'S EDITION (hardcover)	EDCE-1TE
SCIENCE LAB NOTEBOOK (bulk pricing up to 55% off)	SLN-1
Small class sizes for 5 sections of 16 students might consider our **COMPLETE EQUIPMENT PACKAGE FOR 16 STUDENTS PER CLASS**	EDCE-1H-1000NC

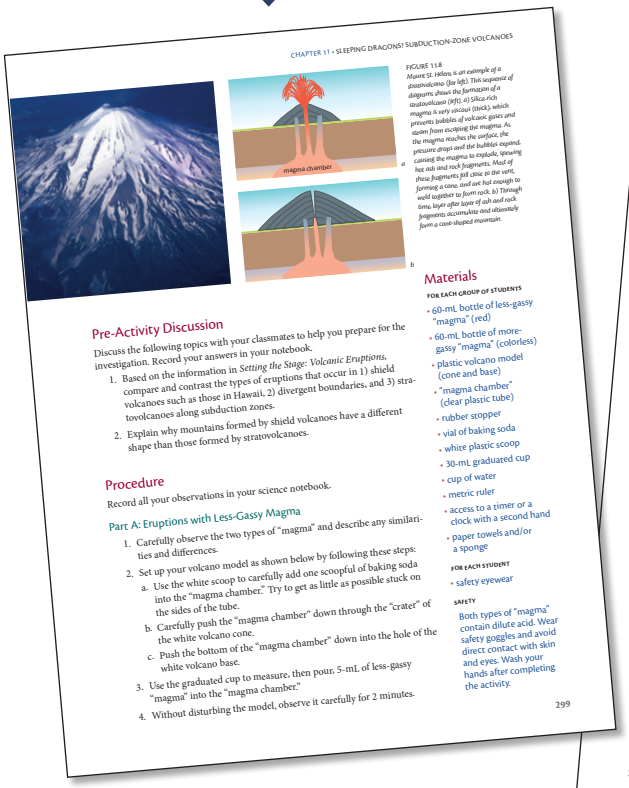
For custom orders and standards correlations by state please see the "Your State" page on **lab-aids.com** to contact your state's Science Curriculum Sales Consultant.

PROGRAM COMPONENTS

Individual components combine to form a complete learning system.

- Student book that seamlessly integrates investigations, labs, and readings into the context of the issue's storyline
- Equipment to carry out each embedded activity for 5 classes of 32 students (in groups of four, pairs or individuals)
- *My Lab-Aids* online student and teacher bookshelf portals
- Student Science Lab notebook

Materials needed for embedded labs and activities are part of the Complete Equipment Package



CHAPTER 11 • SLEEPING DRAGONS? SUBDUCTION-ZONE VOLCANOES

FIGURE 11.8
Mount St. Helens is an example of a stratovolcano. (far left). This sequence of diagrams shows the formation of a stratovolcano (left). a) Silica-rich magma is very viscous (thick), which prevents bubbles of volcanic gases and steam from escaping the magma. As the magma reaches the surface, the pressure drops and the bubbles expand, causing the magma to explode, spewing hot ash and rock fragments. Most of these fragments fall close to the vent, forming a cone, and are hot enough to weld together to form rock. b) Through time, layer after layer of ash and rock fragments accumulate and ultimately form a cone-shaped mountain.

magma chamber

a

b

Pre-Activity Discussion

Discuss the following topics with your classmates to help you prepare for the investigation. Record your answers in your notebook.

1. Based on the information in *Setting the Stage: Volcanic Eruptions*, compare and contrast the types of eruptions that occur in 1) shield volcanoes such as those in Hawaii, 2) divergent boundaries, and 3) stratovolcanoes along subduction zones.
2. Explain why mountains formed by shield volcanoes have a different shape than those formed by stratovolcanoes.

Procedure

Record all your observations in your science notebook.

Part A: Eruptions with Less-Gassy Magma

1. Carefully observe the two types of "magma" and describe any similarities and differences.
2. Set up your volcano model as shown below by following these steps:
   a. Use the white scoop to carefully add one scoopful of baking soda into the "magma chamber." Try to get as little as possible stuck on the sides of the tube.
   b. Carefully push the "magma chamber" down through the "crater" of the white volcano cone.
   c. Push the bottom of the "magma chamber" down into the hole of the white volcano base.
3. Use the graduated cup to measure, then pour, 5-mL of less-gassy "magma" into the "magma chamber."
4. Without disturbing the model, observe it carefully for 2 minutes.

Materials

FOR EACH GROUP OF STUDENTS

- 60-mL bottle of less-gassy "magma" (red)
- 60-mL bottle of more-gassy "magma" (colorless)
- plastic volcano model (cone and base)
- "magma chamber" (clear plastic tube)
- rubber stopper
- vial of baking soda
- white plastic scoop
- 30-mL graduated cup
- cup of water
- metric ruler
- access to a timer or a clock with a second hand
- paper towels and/or a sponge

FOR EACH STUDENT

- safety eyewear

SAFETY

Both types of "magma" contain dilute acid. Wear safety goggles and avoid direct contact with skin and eyes. Wash your hands after completing the activity.

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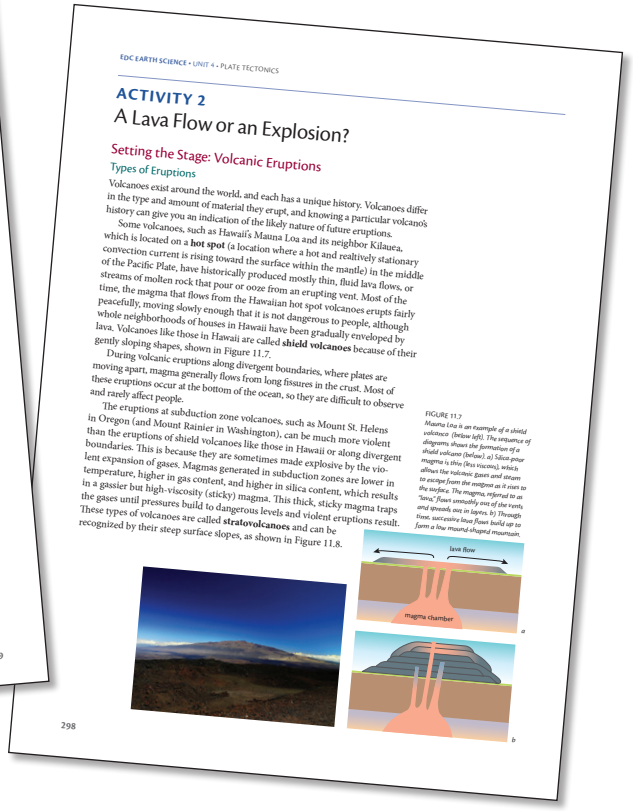

EDC EARTH SCIENCE • UNIT 4 • PLATE TECTONICS

ACTIVITY 2
A Lava Flow or an Explosion?

Setting the Stage: Volcanic Eruptions

Types of Eruptions

Volcanoes exist around the world, and each has a unique history. Volcanoes differ in the type and amount of material they erupt, and knowing a particular volcano's history can give you an indication of the likely nature of future eruptions.

Some volcanoes, such as Hawaii's Mauna Loa and its neighbor Kilauea, which is located on a **hot spot** (a location where a hot and realtively stationary convection current is rising toward the surface within the mantle) in the middle of the Pacific Plate, have historically produced mostly thin, fluid lava flows, or streams of molten rock that pour or ooze from an erupting vent. Most of the time, the magma that flows from the Hawaiian hot spot volcanoes erupts fairly peacefully, moving slowly enough that it is not dangerous to people, although whole neighborhoods or houses in Hawaii have been gradually enveloped by lava. Volcanoes like those in Hawaii are called **shield volcanoes** because of their gently sloping shapes, shown in Figure 11.7.

During volcanic eruptions along divergent boundaries, where plates are moving apart, magma generally flows from long fissures in the crust. Most of these eruptions occur at the bottom of the ocean, so they are difficult to observe and rarely affect people.

The eruptions at subduction zone volcanoes, such as Mount St. Helens in Oregon (and Mount Rainier in Washington), can be much more violent than the eruptions of shield volcanoes like those in Hawaii or along divergent boundaries. This is because they are sometimes made explosive by the violent expansion of gases. Magmas generated in subduction zones are lower in temperature, higher in gas content, and higher in silica content, which results in a gassier but high-viscosity (sticky) magma. This thick, sticky magma traps the gases until pressures build to dangerous levels and violent eruptions result. These types of volcanoes are called **stratovolcanoes** and can be recognized by their steep surface slopes, as shown in Figure 11.8.

FIGURE 11.7
Mauna Loa is an example of a shield volcano. (below left). The sequence of diagrams shown the formation of a shield volcano (below). a) Silica-poor magma is thin (less viscous), which allows the volcanic gases and steam to escape from the magma as it rises to the surface. The magma, referred to as "lava," flows unusually out of the vents and spreads, out in layers. b) Through time, successive lava flows build up to form a low mound-shaped mountain.

lava flow

magma chamber

a

b

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