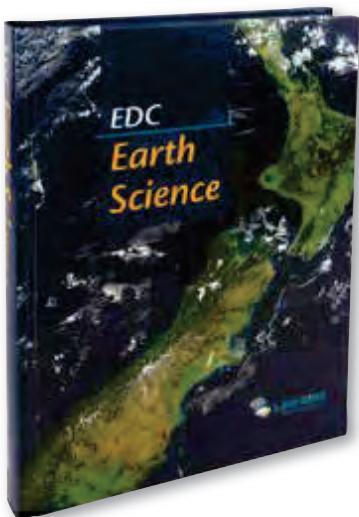


EDC EARTH SCIENCE

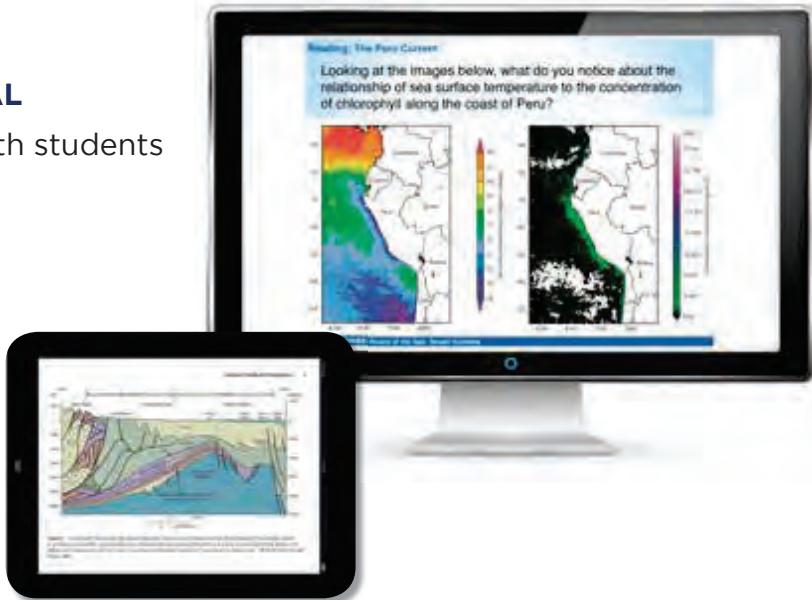


Designed using *A Framework for Science Education*, **EDC EARTH SCIENCE** involves students by challenging them with thought-provoking investigations and questions they hear in the news or at their family dining table. The course opens with an exciting excerpt from the novel *Red Mars* and mid-way through the year students prepare a news story 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 TEACHER'S ONLINE PORTAL

- Assign homework and communicate with students
- Note taking & highlighting for students
- Online Student and Teacher books
- Integrated, online assessment system
- Editable PowerPoints for each lesson
- Single Sign-On (SSO) available



STEM **LITERACY**
REFILLABLE **ADD A GROUP**

EDC EARTH SCIENCE FULL-YEAR PROGRAM	ITEM NO.
COMPLETE EQUIPMENT PACKAGE (materials for up to 5 classes of 32 students, mobile storage cart, Online Portal access for one teacher which includes assessments, PowerPoints, online Teacher Edition, online Student Book, and supplemental resources)	EDCE-1000
ONLINE PORTAL FOR STUDENTS (online subscription to student book, student sheets, resource supplements)	EDCE-1OLSP-1
STUDENT BOOK (hardcover)	EDCE-1SB
TEACHER EDITION (printed)	EDCE-1TE
SCIENCE LAB NOTEBOOK (bulk pricing available)	SLN-1

Individual group packages available for small or large class sizes - refer to lab-aids.com

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.



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

CHAPTER 11 • SLEEPING DRAGONS? SUBDUCTION-ZONE VOLCANOES

FIGURE 11.6
Mount St. Helens is an example of a stratovolcano (far left). This sequence of diagrams shows the formation of a stratovolcano (left) and a shield volcano (right). The magma is thick, which prevents bubbles of volcanic gases and atoms from escaping the magma. As the magma rises toward the surface, the pressure drops and the bubbles expand, causing the magma to become less dense than the surrounding material. Most of these fragments fall close to the vent, forming a cone, and are hot enough to melt talus material (right) through their layer of ash and rock fragments accumulate and ultimately form a cone-shaped mountain.

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
- 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.

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.

299

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)
- Online student and teacher bookshelf portals
- Student Science Lab notebook

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 relatively 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 peacefully, moving slowly enough that it is not dangerous to people, although whole neighborhoods of people 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 sometimes make explosive by the violent expansion of gases. Magmas generated in subduction zones are lower in a greater but high-viscosity (sticky) magma. The thick, sticky magma traps these gases until pressure 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 the example of a shield volcano (far left). The sequence of diagrams shows the formation of a shield volcano (left) and a stratovolcano (right). Magmas are thin (less viscous), which allows them to move and spread to the surface. The magma referred to as "magma" is actually not magma at all, but a mixture of the vent and spread out lava. Through time, successive lava flows build up a low rounded-shaped mountain.

FIGURE 11.8
Mount St. Helens is the example of a stratovolcano (far left). The sequence of diagrams shows the formation of a stratovolcano (left) and a shield volcano (right). Magmas are thick (less viscous), which prevents bubbles of volcanic gases and atoms from escaping the magma. As the magma rises toward the surface, the pressure drops and the bubbles expand, causing the magma to become less dense than the surrounding material. Most of these fragments fall close to the vent, forming a cone, and are hot enough to melt talus material (right) through their layer of ash and rock fragments accumulate and ultimately form a cone-shaped mountain.

298