

POWERHOUSE SCIENCE CENTER

3615 Auburn Blvd., Sacramento 95821 (916) 674-5000

Topics

Earth and Space Sciences

Grades

4-6

Duration

60 minutes

Vocabulary

rock, mineral, geology, sedimentary rock, metamorphic rock, igneous rock, extrusive rock, intrusive rock, lithosphere, tectonic plate, asthenosphere, mid-ocean ridge, mantle, core, fault, epicenter, crust

Next Generation Science Standards

Practices

Planning & Carrying Out Investigations
Developing and Using Models
Analyzing and Interpreting Data

Core Ideas

ESS1C: The History of Planet Earth
ESS2.A: Earth Materials and Systems

Dynamic Earth

Overview

This program delivers a basic understanding about the structure and origin of the Planet Earth. Starting with the crust, students explore the formation and properties of the rock types with Powerhouse's collection of specimens. The theories of Continental Drift and Plate Tectonics are discussed to give students an understanding of what lies below the crust and how our planet has changed over millions of years. Students rotate through five (three rock, one crystal and one fossil) hands-on exploration stations.

*Grade 6 includes a cross section of the Earth's interior to explain location of tectonic plates

Objectives

- Students review the definitions of rocks and the different types.
- Students identify rocks based on the way they form and their features.
- Students are introduced to the theories of Continental Drift and Plate Tectonics.
- Students learn that all minerals have a crystalline structure and observe the different types.
- Students use fossils to learn how the earth has changed over millions of years.

Teacher Preparation

- Programs are presented either in the classroom or a single room (library, science room, extra classroom) to set up in for all presentations is appreciated but not required.
- Set-up usually takes about 5-10 minutes.
- Student seating can be at your discretion (chairs or floor), as you know your classroom's personality and preferences best.
- The teacher is required to remain in the class at all times.
- Educators will need 4-5 stations to set up, student desks may be joined or large tables will work as stations.

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Next Generation Science Standards

Core Ideas

ESS2.B: Plate Tectonics
and Large-Scale System
Interactions

ESS2.E: Biogeology

Crosscutting Concepts

Cause and Effect

Systems and System
Models

Stability and Change

Scale and Proportions and
Quantity

Patterns

Vocabulary

Geology: the study of the
origin, history and
structure of the earth

Rock: a naturally formed
solid material that is
usually made of minerals

Mineral: a single, solid ele-
ment or compound oc-
curring naturally in the
Earth's crust

Igneous rock: rock formed
when magma or lava
cools and hardens

Core: the innermost region
of the Earth

Dynamic Earth

Teacher Preparation:

- Educators are able to break down and set-up after each program
- Educators greatly appreciate access to your room before the program, especially if the program starts immediately following a recess or lunch

Extended Learning Activity

One of the techniques scientist use to study what lies below the earth's surface is called core sampling. Core sampling techniques are used in underground or undersea exploration and prospecting. A core sample is a roughly cylindrical piece of subsurface material removed by a special drill and brought to the surface for examination.

Here are 2 options for students to take core samples:

Option 1 Edible core sampling using cupcakes:

https://d32ogoqmya1dw8.cloudfront.net/files/ANGLE/educational_materials/activities/cupcake_geology_interpreting_core.pdf

Option 2 Core sampling using sand:

<http://www.earthsciweek.org/classroom-activities/core-sampling>

Example of Core Samples



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Dynamic Earth

Vocabulary Continued:

Metamorphic rock: rock formed when existing rock is changed by extreme heat and pressure

Sedimentary rock: rock formed from sediment like pebbles or sand

Extrusive rock: rock formed when lava gets cool and hard

Intrusive rock: rock formed when magma gets cool and hard

Lithosphere: the outer part of the Earth, consisting of the crust and the upper mantle

Tectonic plate: a huge moving piece of the lithosphere

Mid-ocean ridge: a long, underwater mountain range

Mantle: a thick layer of rock between the Earth's crust and the core

Fault: a crack in the Earth's crust along which movement has occurred

Epicenter: the point on the Earth's surface directly above the focus of an earthquake

Asthenosphere: a soft layer of almost-liquid rock in the Earth's mantle

Resources

-United States Geological Survey: This Dynamic Planet: A Teaching Companion

<https://pubs.usgs.gov/gip/dynamic/dynamic.html>

-TED Ed: The Pangaea Pop-up

<https://www.youtube.com/watch?v=p-vNSqUy0I4>