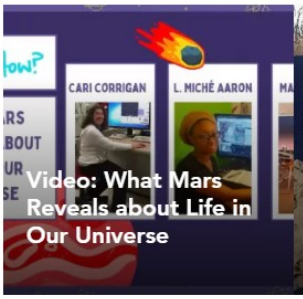
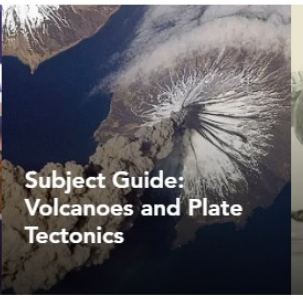
Earth Science Resources

Our Earth Science teaching resources include short articles (literacy resources) written by Smithsonian museum educators, hands-on activities, worksheets, subject guides, and videos featuring Smithsonian scientists and experts.

Featured Resources



Video: What Mars Reveals about Life in Our Universe



Subject Guide: Volcanoes and Plate Tectonics

Smithsonian Libraries: Geosciences Subject Guide

Science Literacy Resources +

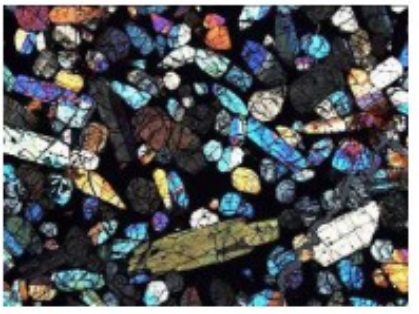
Featured Collections +

Subject Guides −

- Antarctic Meteorites and Mars
- Asteroids and Meteorites
- Cellphone Science
- Fossil Preparation from Field to Museum
- Fossilization – How Fossils Form
- Geology of Gems and Minerals
- Island Biodiversity Past to Future
- Mass Extinction of Large Dinosaurs and More
- Minerals and Microbes
- Modeling and Measuring Volcanic Eruptions
- Reading Climate Change from Fossil Leaves
- Tracking Global Change Through Ocean Fossils
- Volcanoes and Plate Tectonics

NATIONAL MUSEUM of NATURAL HISTORY

Antarctic Meteorites and Mars



An Antarctic meteorite slice, thinner than a human hair, is lit up by polarized light for analysis. Smithsonian image.

Introduction

National Middle School Science Standards

Earth Science, Physical Science

Key Terms

geology, meteorites, minerals, Mars, solar system history, melt clasts

Key Concepts

- Characteristics of meteorites
- Evidence of solar system collisions
- Antarctica as a source of meteorites
- What meteorites reveal about Mars
- Technology used by meteoriticists

NATIONAL MUSEUM of NATURAL HISTORY

Asteroids and Meteorites

The most studied meteorite in the world, the Allende, contains evidence of our early solar system. Photo by Chip Clark, Smithsonian.

Introduction

National Middle School Science Standards

Earth Science, Physical Science

Key Terms

geology, meteorites, asteroids, minerals, space missions, orbit, solar system history

Key Concepts

- Evidence from meteorites about Earth's formation
- Characteristics of meteorites, meteors, asteroids
- Mineral origins of the universe
- Importance of space missions for astronomy
- Technology used by meteoriticists

NATIONAL MUSEUM of NATURAL HISTORY

Cellphone Science

The contents of your cell phone have global reach. Smithsonian photo by Joshua A. Bell.

Introduction

National Middle School Science Standards

Earth Science

National Curriculum Standards for Social Studies

Key Terms

cultural anthropology, mobile technology, minerals, supply chain, recycling, materials engineering

Key Concepts

- How mobile technology affects human culture
- History and future of mobile technology
- Minerals as nonrenewable resources
- Global distribution of minerals for technology
- Technology used by cultural anthropologists

NATIONAL MUSEUM of NATURAL HISTORY

Fossil Preparation from Field to Museum

Smithsonian Collections Manager Matthew Miller uses an air scribe to clean off vertebrae from the tail of a Ceratosaurus dinosaur. Photo by Michelle Pinsdorf, Smithsonian.

Introduction

National Middle School Science Standards

Earth Science, Life Science

Key Terms

fossil, paleontology, collection, curation, preparator

Key Concepts

- Finding fossils in the field
- Securing fossils for transport
- Cleaning and preparing fossils
- Interpreting data contained in fossils
- Technology used by fossil preparators

NATIONAL MUSEUM of NATURAL HISTORY

Fossilization - How Fossils Form

How does the fossil bone (black and grey) on the left differ from the modern, weathered bone on the right? Smithsonian image by Juliana Olson.

Introduction

National Middle School Science Standards

Life Science, Earth Science

Key Terms

fossil, fossilization, preservation, taphonomy, paleontology

Key Concepts

- Defining fossilization
- Conditions causing fossilization
- Frequency of fossilization
- Hard vs. soft tissue preservation
- Technology used by taphonomists

NATIONAL MUSEUM of NATURAL HISTORY

Geology of Gems and Minerals

Crystals of garnet on muscovite. Photo by Chip Clark, Smithsonian.

Introduction

National Middle School Science Standards

Earth Science

Key Terms

geology, rock, mineral, pegmatite, crystal, gem

Key Concepts

- Processes of mineralization and crystallization
- Differences between gems and minerals
- Human impacts on gems and minerals
- Geographic distribution of gems and minerals
- Technology used by geologists

NATIONAL MUSEUM of NATURAL HISTORY

Island Biodiversity Past to Future

Scientists are fascinated by evidence that Channel Island people have been interacting with island foxes for more than 7,000 years. Photo by Rene Vellanoweth, California State University Los Angeles.

Introduction

National Middle School Science Standards

Earth Science, Life Science

National Curriculum Standards for Social Studies

Key Terms

archaeology, biodiversity, coastal ecosystem, Native American, climate change, Holocene period

Key Concepts

- Human impacts on island and coastal biodiversity
- Changes in ecosystems over time
- Shifting baselines of biodiversity
- Impacts of human activities on ecology
- Technology used by archaeologists

NATIONAL MUSEUM of NATURAL HISTORY

Mass Extinction of Large Dinosaurs and More

Asteroid headed towards Earth at the end of the Cretaceous. Depiction by Mary Parrish, Smithsonian.

Introduction

National Middle School Science Standards

Earth Science, Life Science

Key Terms

paleontology, dinosaur, fossil record, mass extinction, asteroid, Cretaceous period, K-T boundary

Key Concepts

- Extinctions at the end of the Cretaceous
- Causes of mass extinction events
- Interpreting ecosystem changes through fossils
- Reconstructing ancient environments
- Technology used by paleontologists

NATIONAL MUSEUM of NATURAL HISTORY

Minerals and Microbes

A handful of soil contains millions of microbes that process minerals. Photo by Scott Bauer, Natural Resources Conservation Service, USDA

Introduction

National Middle School Science Standards

Life Science, Earth Science

Key Terms

geology, microbiology, microbes, minerals, chemical elements, ecosystem services, remediation

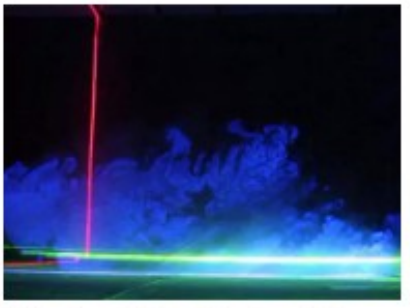
Key Concepts

- Ecology of microbes such as fungi and bacteria
- Flow of energy between minerals and microbes
- Microbes and their value for ecosystem services
- Definition and composition of a mineral
- Technology used by geologists and microbiologists

Resource Types

NATIONAL MUSEUM of NATURAL HISTORY

Modeling and Measuring Volcanic Eruptions



Laser beams lighting up the flow of materials from a model volcanic eruption in the Smithsonian's Experimental Volcanology Laboratory. Photo by Ben Andrews, Smithsonian.

Introduction

National Middle School Science Standards

Earth Science, Physical Science

Key Terms

volcanology, explosive eruption, pyroclastic flow, density, entrainment, plume

Key Concepts

- Types of volcanic eruption
- Behavior of an explosive eruption
- Differing densities of volcanic materials
- Modeling pyroclastic flows
- Technology used by volcanologists

NATIONAL MUSEUM of NATURAL HISTORY

Reading Climate Change from Fossil Leaves

Fossil leaf from warming period 55 million years ago. Smithsonian image.

Introduction

National Middle School Science Standards

Earth Science, Life Science

Key Terms

paleobotany, climate change, fossil leaves, fossil record, PETM, Cretaceous period

Key Concepts

- Global climate change over time
- Interpreting ecosystem changes through fossils
- Plants as climate indicators
- Paleocene-Eocene Thermal Maximum
- Technology used by paleobotanists

NATIONAL MUSEUM of NATURAL HISTORY

Tracking Global Change Through Ocean Fossils

These microscopic ocean organisms called foraminifera are great indicators of global climate changes.

Introduction

National Middle School Science Standards

Earth Science, Life Science

Key Terms

paleobiology, foraminifera, plankton, ocean fossils, indicator species, extinction, climate change

Key Concepts

- Studying the fossil record of small ocean animals
- What foraminifera reveal about Earth's history
- Earth's deep history of climate change
- Causes and consequences of climate change
- Technology used by paleobiologists

NATIONAL MUSEUM of NATURAL HISTORY

Volcanoes and Plate Tectonics

An ash plume rises from Mount Cleveland volcano in Alaska, May 23, 2006. Photo by J. N. Williams, International Space Station 13 Crew, NASA.

Introduction

National Middle School Science Standards

Earth Science

Key Terms

igneous petrology, plate tectonics, magma, core, mantle, subduction, spreading seafloor

Key Concepts

- Dynamics of plate tectonics
- Distribution of submarine volcanoes
- Formation of igneous materials
- Technology used by petrologists

Resource Types

Videos and Webcasts +