



ARIZONA-SONORA
DESERT
MUSEUM

Arizona Rocks and Minerals

A forty-five minute Desert Discovery Class program

To the Teacher:

Thank you for making the *Arizona Rocks and Minerals* Desert Discovery Class a part of your curriculum. During this exciting educational program, students will handle rock and mineral samples and see live desert animals. The *Arizona Rocks and Minerals* program explores such topics as: characteristics and properties of rocks and minerals, importance of rocks and minerals to humans and animals, and uses in every-day products. This Teacher Information Packet provides resources to help you integrate these themes and concepts into your classroom curriculum.

This packet contains resources for pre- and post- program information and activities along with a vocabulary list and suggested further resources. These materials were developed to help you extend this class topic with both introductory and follow-up lessons. The pre-program information will introduce students to some of the basic concepts presented in *Arizona Rocks and Minerals*, and help prepare them for the class. We hope you'll find this information useful and easy to incorporate into your science curriculum. For more information about the Desert Museum and the Sonoran Desert, visit our website at www.desertmuseum.org.

Sincerely,
ASDM Conservation Education and Science Department

ARIZONA ROCKS AND MINERALS

Have you ever wondered ... What's the difference between a rock and a mineral? Who needs minerals anyway? How rocks "travel" through the rock cycle? If so, then this is the program for you!

PROGRAM OBJECTIVES

Through the examination and analysis of rock and mineral specimens, common household materials and live animals, students will be able to:

- Distinguish between a rock and a mineral and describe characteristics of each.
- Identify the three main categories of rocks and describe the conditions by which they travel through the rock cycle.
- Explain how minerals are formed.
- Identify different minerals from the Sonoran Desert Region using physical property tests.
- Understand that minerals are important nutrients necessary for a variety of function within the body of humans, other animals and plants.
- Recognize how minerals are used in everyday life.
- Become familiar with some minerals that provide raw materials for specific man-made items.

ARIZONA ACADEMIC STANDARDS IN SCIENCE CORRELATION

The *Arizona Rocks and Minerals* program and supplemental activities correlate to these Arizona Academic Science Standards. See each activity for specific standards and performance objectives.

SC01-S6C1-01,02,03&05	SC03-S4C1-01	SC07-S4C3-02
SC03-S6C1-01,02,03&06	SC04-S4C1-02	SCHS-S4C3-02
SC07-S6C1-01,02&03	SC05-S4C1-01	SC04-S4C3-02,03&04
SCHS-S6C1-01,02&03	SC06-S4C1-06	SC07-S3C1-01&02
SC04-S6C2-03	SC01-S4C3-03	SCHS-S3C2-01&04
SC07-S6C2-01,02&03	SC03-S4C3-01&05	
SC02-S4C1-01	SC04-S4C3-01	

Arizona State Science Standards

Strand 3: Science in Personal and Social Perspectives

Concept 1: Changes in Environments

Strand 4: Life Science

Concept 1: Characteristics of Organisms

Structure and Function in Living Systems

Concept 3: Organisms and Environments

Populations of Organisms in an Ecosystem

Interdependence of Organisms

Strand 6: Earth and Space Science

Concept 1: Properties of Earth Materials

Structure of the Earth

Concept 2: Earth's Processes and Systems

Energy in the Earth System

RESOURCES

Websites/Organizations

- Arizona-Sonora Desert Museum: 2021 N. Kinney Rd., Tucson, AZ 85743. Phone: (520)883-3025. www.desertmuseum.org
- American Geosciences Institute <http://www.agiweb.org/geoeducation.html>
- Digital Library for Earth Science Education <http://www.dlese.org/library/index.jsp>
- Tucson Gem and Mineral Show <http://www.tgms.org/>

Literature:

- Arizona-Sonora Desert Museum. *A Natural History of the Sonoran Desert*. Tucson: ASDM Press, 1999.
- Braus, Judy, ed. *Ranger Rick's NatureScope, Geology: the Active Earth*. National Wildlife Federation. (1-800-722-4726)
- Symes, Dr. R. F. *Eyewitness Books, Rocks and Minerals*. Alfred A. Knopf, Inc., 1988

Mineral Sources:

- Kino Rocks and Minerals Retail Showroom: 6756 South Nogales Hwy, 520-294-0143

VOCABULARY

Rock	Magma	Core-drilling
Mineral	Lava	Extraction
Streak	Pressure	Leaching
Luster	Weathering	Resource
Hardness	Erosion	Renewable
Soil	Deposition	Nonrenewable
Crust	Texture	Reduce
Plate Tectonics	Grains	Reuse
Igneous	Mining	Recycle
Sedimentary	Ore	
Metamorphic	Vein	

PRE-PROGRAM INFORMATION & ACTIVITIES

ANTICIPATORY ACTIVITIES:

A variety of activities to hook student interest in rocks and minerals and human uses of resources.

Grades 3-5 (adaptable for Gr 1-2) **Minerals in Your Home**

In this internet-based activity, students explore a virtual house room by room to investigate household items that contain minerals. Teachers can pair this activity with a digital library of minerals where students need to find pictures of the minerals and match them to the items in the house.

Grades 3-8 **Basic Minerals – Macro and Trace**

In option 2, students research minerals to solve a nutrition mystery.

Grades 5-HS **What Materials are in My Car?**

Students investigate minerals and relate them to uses for car parts.

Grades 7-HS **Chile Mining Accident**

Students explore the importance of minerals in their own lives as well as risks of mining.

IMAGE DATABASES

Arizona-Sonora Desert Museum Digital Library

www.desertmuseumdigitallibrary.org/public/mBrowse.php

Geology and Earth Science Images <http://www.marlimillerphoto.com/images.html>

Earth Science World Image Bank <http://www.earthscienceworld.org/images/>

Images of Rocks and Minerals <http://geology.com/teacher/rocks.shtml>

Mineralogy Database <http://webmineral.com/>

Mineral photos by type <http://mii.org/mineral-photos-type>

The Mineral and Gemstone Kingdom <http://www.minerals.net/MineralMain.aspx>

POWERPOINT PRESENTATIONS

Mining 101 Slideshow

Rocks on Your Face Slideshow

Gr 7-9 Rock Solid Introduction

EXPLORATION ACTIVITIES

A variety of activities for students to explore characteristics, properties and uses of rocks and minerals.

Grades 1-2 First Rocks

Students investigate rocks by rubbing, washing, sorting and describing rocks.

or

Grades 1-2 Rocks, Rocks Everywhere

Students sort rocks based upon color, hardness, texture, layering and particle size.

Grades 3-6 Land Mass Formation Demonstration

Teacher demonstration using wax and water to model formation of Earth crust.

Grades 1-5 Rock Cycle Activity

Students use crayon shavings and aluminum foil to demonstrate the changes that rocks undergo in the rock cycle.

Grades 3-8 NHMU: Rock Cycle

Board and dice game simulating the rock cycle.

Grades 5-9 Rock Cycle Lab

A fun, hands-on rock cycle lab using everyday materials to help students understand the processes that form rocks.

Grades 8-HS Minerals Virtual Lab

Virtually perform mineral identification tests using their properties.

Grades 5-9 Mining in Texas (cookie mining)

Students simulate the extraction of nonrenewable minerals by mining chocolate chips from cookies and calculate cost and value of ore.

Grades 5-8 Minerals in Your Body

Students investigate distribution and importance of elements in the human body.

POST-PROGRAM INFORMATION & ACTIVITIES

APPLICATION/ELABORATION ACTIVITIES

A variety of activities for students to apply program concepts, and elaborate on the importance of rocks and minerals to humans, and efforts for conservation of resources.

Grades 3-5 (adaptable for Grades 1-2) Engineering for the Three Little Pigs

Students build three different sand castles and test them for strength and resistance to weathering. Then, they discuss how the buildings are different and what engineers need to think about when using rocks, soils and minerals for construction.

Grades 1-3 Materials2: Recycled Materials

Students investigate the types of materials that can be reused, as well as potential uses for each type of recyclable material.

Grades 3-5 Straight Scoop on Soils, You Dig?

Student lab investigation comparing soil samples based on properties of color, texture, water capacity and composition in order to solve a problem in a farming scenario.

Grades 4-8 Recycling Includes E-cycling

Assess different types of household electronics, their lifespan, and opportunities for recycling them.

Grades 5-8 Personal Mineral Consumption

Students calculate total amounts of specific minerals they consume in a lifetime, and apply critical thinking to the effects of resource availability to their own lives.

Grades 7-8 A Product's Life

Students research steps involved in a product's life cycle and present their findings to the class.

Grades 5-8 Activity 5: Extracting Metal (Copper) from a Rock

Student lab activity demonstrating how copper is mined from rock using "solvent extraction" method.

Ages 11-13 Electroplating Pennies

Lab activity where students electroplate zinc onto a copper penny to simulate the purification stage of ore processing.

Ages 15-18 Leaching to Separate Metals from Ore

Students conduct leaching experiment to extract copper from copper ore.

Ages 15-18 Orebody Mystery

Using playdoh and straws, students explore the techniques of core-drilling and geological testing.

Grades 8-HS Clean up This Mess

Students are challenged to design a method for separating steel from aluminum based on magnetic properties as is frequently done in recycling operations.

Grades 9-12 How Does Waste Affect Our Natural Resources

Students will compare estimated life expectancies of some nonrenewable natural resources and will understand the role recycling and careful use play in extending the availability of these resources.

Grades 9-12 Recycle all that you can in a school

Instructions for implementing an effective school recycling program

Grades 9-12 The Cost of the Toss

Student role-play activity to discuss cost and benefits to various methods of waste management.

Grades 9-10 The Fragile Western Biome

Students will discover the impact of American westward expansion, in particular the mining industry, on the ecosystems of the West.

FURTHER RESOURCES

Mineral Information Institute <http://www.mii.org/teacherhelpers.html>

Lesson Plans related to the importance of mining for humans

