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
- American Geosciences Institute http://www.agiweb.org/geoeducation.html
- Digital Library for Earth Science Education http://www.dlese.org/library/index.jsp

Literature:

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


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](http://www.mii.org/teacherhelpers.html)
Lesson Plans related to the importance of mining for humans