

ARIZONA MINERALS LAB PRE-PROGRAM ACTIVITIES

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



ARIZONA ACADEMIC STANDARDS

SC07-S6C1-01
SC07-S4C3-02
SCHS-S4C3-02
SCHS-S4C5-02
SC07-S3C1-01&02
SCHS-S3C2-01

VOCABULARY

Rock
Mineral
Resource
Mining

ANTICIPATORY

Grades 6-8

Basic Minerals – Macro and Trace

From Utah Education Network
<http://www.uen.org/Lessonplan/preview.cgi?LPid=1260>

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

Grades 6-HS

What Materials are in My Car?

From Geological Society of America
http://www.geosociety.org/educate/LessonPlans/i_rocks.htm

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

Grades 7-HS

Chile Mining Accident

From ASU School of Earth and Space Exploration
<http://sese.asu.edu/teacher-resources>

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

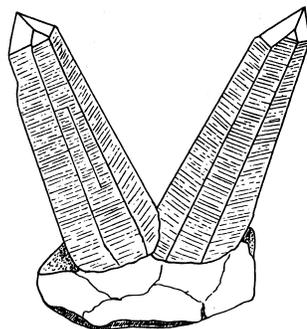


IMAGE DATABASES

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>

POWERPOINTS

Mining 101 Slideshow

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

Rocks on Your Face Slideshow

From Mineral Information Institute
<http://www.mii.org/pdfs/RocksOnYourFace.pdf>

Gr 7-9

Rock Solid Introduction

From Teach Engineering – Resources for K-12
http://www.teachengineering.org/view_lesson.php?url=collection/cub_/lessons/cub_rock/cub_rock_lesson01.xml

ARIZONA MINERALS LAB PRE-PROGRAM ACTIVITIES

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

ARIZONA ACADEMIC STANDARDS

SC07-S6C1-01,02&03
SCHS-S6C1-01,02&03
SC07-S6C2-01,02&03
SC07-S4C3-02
SCHS-S4C3-02
SCHS-S4C5-02
SCHS-S3C2-01&04

VOCABULARY

Rock
Mineral
Plate Tectonics
Crust
Igneous
Sedimentary
Metamorphic
Magma
Lava
Pressure
Weathering
Erosion
Deposition
Texture
Grains

EXPLORATION ACTIVITIES

Grades 6-8

Land Mass Formation Demonstration

From the Franklin Institute – Resources for Science Learning
<http://sln.fi.edu/tfi/activity/earth/earth-7.html>

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

Grades 6-8

NHMU: Rock Cycle

From Utah Education Network
<http://www.uen.org/Lessonplan/preview?LPid=11513>

Board and dice game simulating the rock cycle.

Grades 6-9

Rock Cycle Lab

From Geological Society of America
http://www.geosociety.org/educate/LessonPlans/i_rocks.htm

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

From Glencoe Earth Science
http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit1/chapter3/virtual_lab.html

Virtually perform mineral identification tests using their properties.



Grades 6-9

Mining in Texas (cookie mining)

From Science-class.net –resources for elementary and middle school science teachers

http://science-class.net/Geology/rocks_minerals.htm

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

Grades 6-8

Minerals in Your Body

From USGS Life Cycle of a Mineral Deposit

<http://pubs.usgs.gov/gip/2005/17/gip-17.pdf> or <http://pubs.usgs.gov/gip/2005/17/>

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



ARIZONA MINERALS LAB POST-PROGRAM 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.

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SC07-S6C1-01,02&03
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SC07-S6C2-01,02&03
SC07-S4C3-02
SCHS-S4C3-02
SCHS-S4C5-02
SC07-S3C1-01&02
SCHS-S3C2-01&04

VOCABULARY

Rocks
Minerals
Resource
Renewable
Nonrenewable
Metal
Mining
Ore
Vein
Core-Drilling
Extraction
Leaching
Consumption
Reduce
Reuse
Recycle

APPLICATION /ELABORATION

Grades 6-8

Recycling Includes E-cycling

From EPA- The Quest for Less Packet
http://www.epa.gov/osw/education/quest/pdfs/qfl_complete.pdf

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

Grades 6-8

Personal Mineral Consumption

From USGS Life Cycle of a Mineral Deposit

<http://pubs.usgs.gov/gip/2005/17/gip-17.pdf> or <http://pubs.usgs.gov/gip/2005/17/>

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

From EPA- The Quest for Less Packet
http://www.epa.gov/osw/education/quest/pdfs/qfl_complete.pdf

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

Grades 6-8

Activity 5: Extracting Metal (Copper) from a Rock

From USGS Life Cycle of a Mineral Deposit

<http://pubs.usgs.gov/gip/2005/17/gip-17.pdf> or <http://pubs.usgs.gov/gip/2005/17/>

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

Lesson Plans—Geology, Mining, Mining Processes, Ore Processing, Minerals for Everyday Life for Ages 11-13, 13-15 and 15-18

From Ground Rules: Mining Right for a Sustainable Future, Caterpillar
<https://mining.cat.com/groundrules>

Suggestions:

Electroplating Pennies

From Ore Processing Lesson Plans, Ages 11-13

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

Leaching to Separate Metals from Ore

From Ore Processing Lesson Plans, Ages 15-18

Students conduct leaching experiment to extract copper from copper ore.

Orebody Mystery From Mining Processes Lesson Plans, Ages 15-18

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



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SCHS-S3C2-01&04

VOCABULARY

Mining
Ore
Resource
Renewable
Nonrenewable
Metals
Reduce
Reuse
Recycle

APPLICATION /ELABORATION

Grades 8-HS

Clean up This Mess

From Teach Engineering – Resources for K-12

http://www.teachengineering.org/view_curricularunit.php?url=collection/van_/curricular_units/van_cleanupmess_unit/van_cleanupmess_unit.xml

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.

Recycle all that you can in a school

Instructions for implementing an effective school recycling program

The Cost of the Toss

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

From Cornell Waste Management Institute

<http://cwmi.css.cornell.edu/TrashGoesToSchool/Activities9-12.html>

Grades 9-10

The Fragile Western Biome

From PBS: New Perspectives on The West http://www.pbs.org/weta/thewest/lesson_plans/lesson07.htm

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

FURTHER RESOURCES

Find more curriculum resources.

American Geosciences Institute

<http://www.agiweb.org/geoeducation.html>

Digital Library for Earth Science Education

<http://www.dlese.org/library/index.jsp>

Mineral Information Institute

Lesson Plans related to the importance of mining for humans

<http://www.mii.org/teacherhelpers.html>

