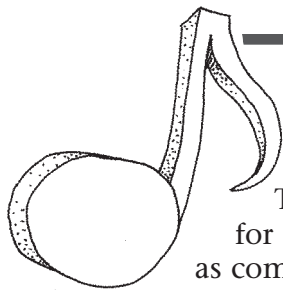


SONGBOOK & TEACHER'S GUIDE



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It is also recognized that some text and graphics for this guide have been adapted from *Out of the Rock: Integrated Learning Activities for Students* developed and distributed by NEF.

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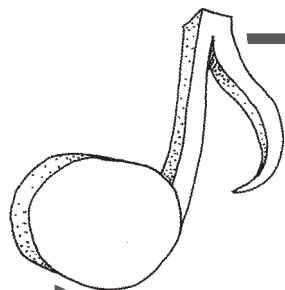
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145 South 400 East
SALT LAKE CITY, UTAH 84111
(801) 908-5800 • FAX (801) 908-5400
e-mail: info@nef1.org
<http://www.nef1.org>





Rock Music

INTRODUCTION

This teacher's guide presents eleven songs and learning activities dealing with basic concepts in earth science and minerals education. Each lesson includes a song and an activity as well as additional information for the teacher. The lessons focus on integrating the arts as a means of enhancing science content. The activities have recommended grade levels, but may be adapted for use in other grades.

Music has been found to increase a young person's ability to learn. This happens in two ways: first, it can be used as background music to enhance the atmosphere in the learning environment, stimulate the student's learning capacity, and help them focus on what they are learning; second, music can provide a way for students to remember material presented to them.

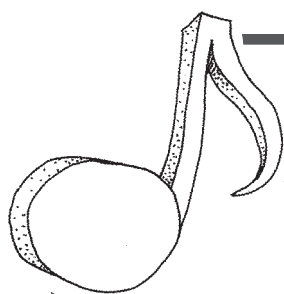
The music in this guide is designed to help students learn specific content material. It is presented in the form of fun, upbeat songs that help students learn more about earth science, focusing on rocks and minerals and related information. The songs can be used to enhance the lessons as presented, to stand alone, to be included in music or singing time, or as a review of material.

The songs may also act as a springboard for other activities or as an assessment tool. The teacher could assign students well-known melodies and have them come up with lyrics that review material being studied. Students could compose their own songs or raps that reflect a knowledge of the subject material. The songs in this guide could be used as part of a play or skit demonstrating student knowledge of this subject. This could be presented to another class, at a science fair, at a school-wide assembly, or as a part of parent night activities.

The activities also invite participation and learning in curricular areas other than science and music. Language arts, technology, social studies, performing arts and visual arts activities are included either in the lessons themselves or suggested in the extensions.

Music is a great addition to any curriculum. It provides a fun, dynamic method to enhance student learning. We hope you will find these songs and activities beneficial to your earth science study.





LEARNING ACTIVITY CORRELATION

ACTIVITY	SCIENCE	SOCIAL STUDIES	TECHNOLOGY	READING	WRITING	DRAMA	MUSIC	DANCE	ART	CONCEPTUAL FRAMEWORK	GRADE LEVEL
Out of the Rock	x				x	x	x		x	2	any grade
Rocky Minero	x	x					x			1	intermed.
The Rock Cycle	x				x		x			1	intermed.
Steer Clear	x		x		x		x		x	3,5	any grade
Old Mr. Mohs	x		x	x	x		x		x	1	intermed.
The Four Kinds of Coal	x	x			x	x	x		x	1	any grade
The Mountain of Stone	x						x			2	any grade
Using Electricity	x	x		x	x		x	x	x	4	any grade
Modernized Miner	x			x	x		x		x	3	intermed.
The Geologic Time Scale	x		x	x			x			1	intermed.
The Miners are Reclaiming	x	x		x			x			5	intermed.

**Most of these lessons would be adaptable to any grade level concerned with the science content.*

CONCEPTUAL FRAMEWORK

This conceptual framework, developed by NEF, has several important uses. Its most important purpose is to provide educators and materials developers with a thoughtful and organized presentation of fundamental mineral resources and mining goals and concepts.

Content Domain 1: Origin and distribution of mineral resources

Content Domain 2: Uses of mineral resources

Content Domain 3: Mining the industry

Content Domain 4: Economic impact of mineral resource extraction and use

Content Domain 5: Environmental impacts of mineral resource extraction and use

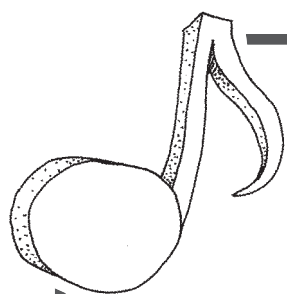
Content Domain 6: Limits of mineral resources

Content Domain 7: Mineral resources conservation and recycling

Content Domain 8: Future of mining and mineral resource use

A more detailed version of NEF's conceptual framework is available in *Out of the Rock: Integrated Learning Activities for Students*. For more information, contact NEF.





Rock Music

USES OF ROCKS, MINERALS, AND MATERIALS

Aluminum — used in packaging, power lines, building and construction, cars, washing machines, pots and pans

Asphalt — used for pavement and roofing shingles

Barium — used as a heavy additive in oil well drilling mud, in the paper and rubber industries, as a filler or extender in cloth, ink, and plastics products, in radiography, spark-plugs, and in white pigment

Beryllium — when mixed with copper it makes a hard and elastic alloy used in the aerospace industry; used in the windows of x-ray tubes, and in the nuclear industry

Brass — used for doorknobs and fixtures

Calcite — used in optical instruments, chalk, cement, and lime

Cobalt — used in superalloys for jet engines, chemicals (paint driers, catalysts), permanent magnets, and in cutting tools

Copper — used for plumbing, electrical wiring, in light bulbs, TVs, and telephones

Corundum — best known as the gems ruby and sapphire; good for grinding and polishing, used in sandpaper and nail files

Feldspar — used in glass, ceramics, soaps, abrasives, cements, concrete, fertilizer, tarred roofing materials, paper, and insulation

Fluorite — main source of fluorine used for fluoride in toothpaste and drinking water; used as a paint pigment

Galena — most important lead mineral; used for weapons, ceramics, glassware, and metal alloys

Gypsum — used in wallboard, plaster, and cement

Iron — used in pipes, brass, steel, stainless steel, screws, and nails, and as pigment in paint

Limestone — used in building and cement

Lithium — used in ceramics and glass, in primary aluminum production, in the manufacture of lubricants and greases, rocket propellants, vitamin A synthesis, silver solders, and batteries

Mercury — used in the manufacture of drugs, pigments, insecticides, and scientific instruments, as well as in dentistry

Molybdenum — used in alloy steels to make automotive parts, construction equipment, gas transmission pipes, and stainless steel

Platinum — used in jewelry, oil refining, and in reducing pollution from car exhausts

Quartz — used in watches and radios

Silica — used in insulation, light bulbs, and TVs

Silver — used in jewelry, ornaments, silverware, and the photographic industry

Slate — used as a building stone and in blackboards

Sulfur — used in the manufacture of sulfuric acid, fertilizers, chemicals, explosives, dyestuffs, petroleum refining, vulcanization of rubber, and fungicides

Talc — main ingredient in talcum powder; used for insulation in electrical equipment and as a lubricant

Vermiculite — used in insulation

Zinc — used in paint and in many alloys including brass, bronze, and stainless steel