

**Grade: 3-5**

**How Do We Use Minerals?**

**Lesson #3A: Mineral Paths**

**Time: 1 class period**

**Overview:**

Students play a game to trace the minerals used in every day products back to their mined origin.

**Essential Questions:**

How do we use minerals?

How do we classify the objects that we use every day?

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**Source: Previous AMEREF curriculum.**

# Mineral Paths

Grades 3-5  
1 class period

## Overview:

Students play a game to trace the minerals used in every day products back to their mined origin.

## Essential Questions:

How do we use minerals?

How do we classify the objects that we use every day?

## Assessment

Can students:

- List the minerals used in every day products.
- Trace the path of a mineral from the mine to the market.

## Vocabulary

- **Manufacture:** Making things using raw materials.
- **Consumer:** A person who uses things.
- **Wholesaler:** A business who buys things from a place that makes them and sells them to a store.
- **Retailer:** A business who sells things to you or me in a store.

## Alaska

### Standards

Addressed:

#### Science GLEs

The student demonstrates an understanding

-that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by:

[3] SC3.1 identifying and sorting examples of living and non-living things in the local environment. (L)

-that solving problems involves different ways of thinking, perspectives, and

curiosity by: [3] SE2.1 identifying local tools and materials used in everyday life. (L)

#### Geography

A student who meets the content standard should: E1) understand how resources have been developed and used;

#### Government and Citizenship

F 2) be aware that economic systems determine how resources are used to produce and distribute goods and services;

## Teacher information and Procedure

***Prior knowledge for students: none***

***Materials needed:***

- Path Finder (Primary) sheet
- game cards
- blank transparencies
- transparency pens
- damp cloth or sponge

***What to do in advance:***

Tape or paper clip a transparency onto each Path Finder sheet. Students will trace the mineral product back to its origin by writing on the transparency with a transparency pen. After each player's turn, students wipe off the ink using a damp cloth.

Copy a Path Finder sheet onto a transparency to use on an overhead for a class demonstration.

***What to do during the lesson:***

- ***Gear up:***

Divide students into teams and give them five minutes to list everything in the room that contains things that have been mined. They will get 1 point for each correct item on the list and 2 points for each incorrect item. Trade lists and have the teams check and score each others' lists. As a class, discuss any items that may be incorrectly listed.

- ***Explore:***

Introduction is best done as a whole class, demonstrating how to play the game. The activity can be done as a center.

Review the steps from mine to market using the example of a tin lunch box.

The box is traced back to the retailer (store) where it was sold to you. From the store it is traced back to the wholesaler (the place where they sell

things to the store). That person bought it from the manufacturer (place where the thing was made). The manufacturer bought the tin to make the box from a refiner. A refiner bought tin-ore concentrate from a mine and produced tin metal or tin plate. Go over the terms manufacturer, wholesaler, retailer. Ask the student where they think the locks, hinges, and decorations came from.

Draw a card from the game cards and demonstrate how the product on the card can be traced all the way to the mine using the Path Finder sheet on the overhead. Some cards require students to distinguish between metal and non-metal objects.

Students use the Path Finder sheet and take turns drawing cards and tracing the path of the item shown on the card. Students get a score based on the number of steps an item takes to get from the mine to the manufacturer. (Items that are not mined get 0 points). Students keep score.

- **Generalize:**

Ask students these questions:

- Were you surprised about the number of things that are mined?
- Besides the minerals used, what other kinds of resources are used to process, manufacture, and transport items to you?
- Is there an unlimited supply of minerals to use in providing these items?
- What if minerals were not available to make the items we use everyday?

- **Assess:**

Name three common mineral-based items and ask students to name a mineral used in each and trace its path from the mine to the classroom.

**Related Resources in the AMEREF Kit:**

- From the Mine to My Home Poster: National Energy Foundation
- From Mountains to Metals: The Story of Rocks, Minerals, and the Mining Industry Poster: National Energy Foundation
- Rocks and Minerals and How We Use Them Poster: National Energy Foundation

***Extensions, adaptations, and more resources:***

- For older or more advanced students you may want to use the advanced cards as used in the 6-8 grade "Path Finder"
- Have a class store and sell things made out of rocks, minerals, and metals.
- Make commercials for things made of rocks and minerals.
- Find all the things in a house made of rocks and minerals

**Background:**

Many of the products we use in our everyday lives contain mined resources.

They may be made of minerals, metals, coal, or petrochemicals. For instance a pencil has lead, wood casing, a rubber eraser, and metal eraser holder.

The lead is made from graphite and the eraser holder from aluminum. The casing is made from wood, but the yellow paint is a petrochemical. In the past, erasers were made from coal. (Note the list of things made of minerals, metals, petrochemicals, coal, and oil.)

After a resource is mined, it is then refined to its purest form. From refining, the manufacturer turns it into a usable product. For iron, this may mean making the metal into steel and then into different strengths of steel, It may also mean rolling it into sheets to be sent to yet another manufacturer who may shape it into a fender, steel beam, or ball bearing. Another manufacture will take the bearings and fenders and put them on cars, while another company will take the beams and prepare them for buildings. The manufacturing process continues until a final product is delivered to the wholesale store. The wholesaler sells to the retail store, who sells the product to the customer.

Most of the resources mined or produced in Alaska are refined overseas with the exception of oil, coal and some gold, zinc, silver, and jade. Most of Alaska's oil is refined in Washington and California. Some of the placer gold nuggets are fabricated and made into jewelry within the state, as are some of our state's jade and silver.

From mining to production, a mineral evolves from a portion of a rock into a useful tool or supply. Each time it changes form, an opportunity in manufacturing is created with economic implications every step of the way.

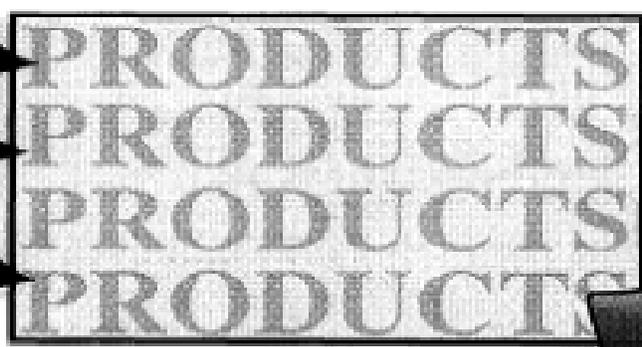
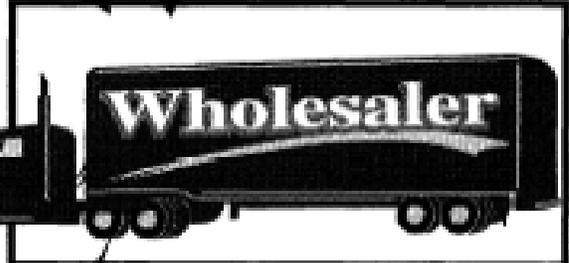
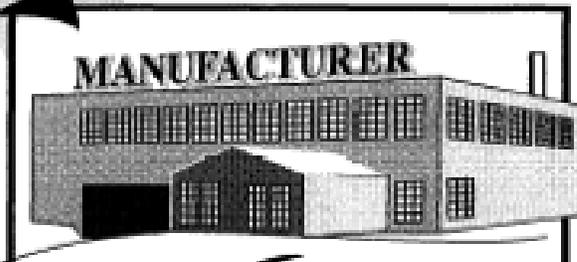
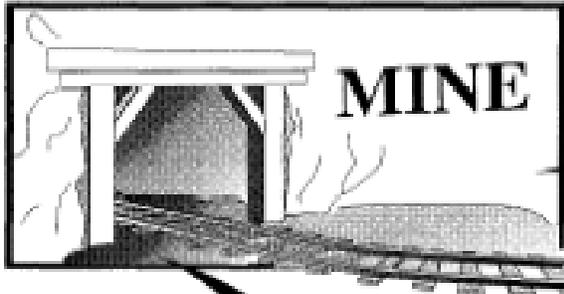
Mining and manufacturing are two of the few ways to actually create wealth. Not only was money made by selling a product, but money was paid to employees and contractors working to recover and refine the mineral.

From this exchange of work and money, the mineral gains value as it goes from its raw form to that of a manufactured product. You may have noticed this if you have ever bought copper wire. Copper costs about \$2.50 a pound in its refined form. However, if you buy a pound spool of copper wire it costs about \$4.00. The process to transform copper mineralization in a rock of a mine to the spool of wire at the store is reflected in the price which the consumer must pay for the product.

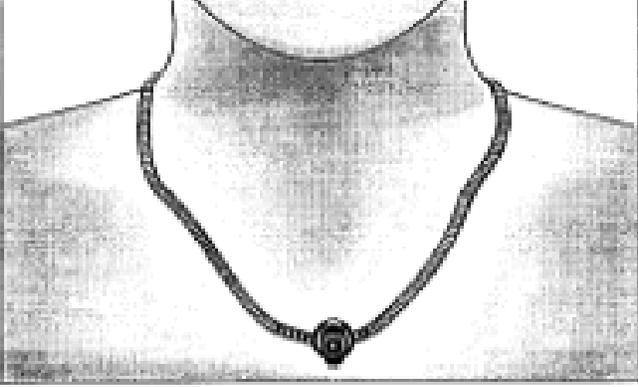
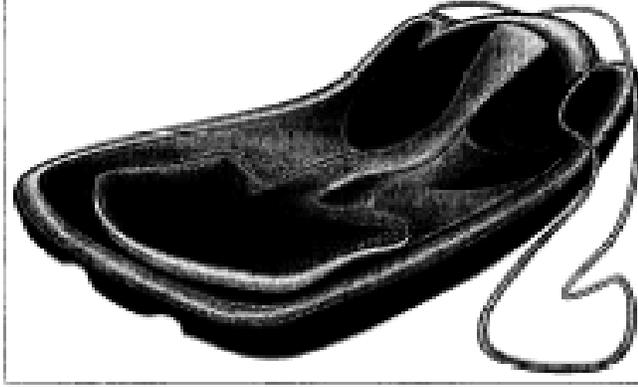
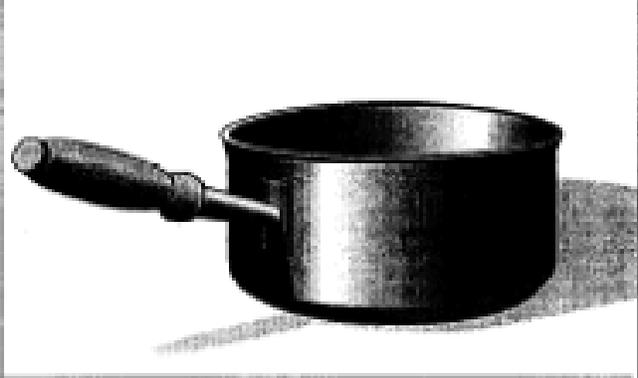
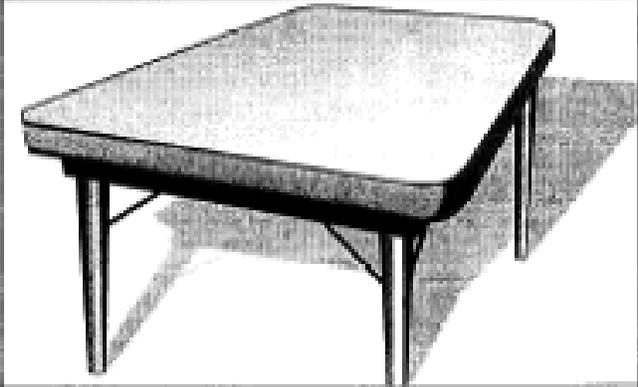
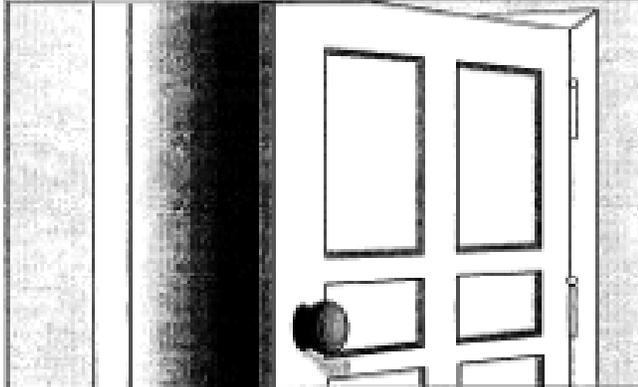
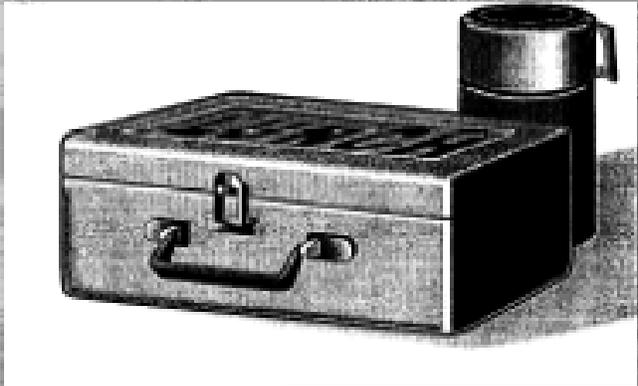
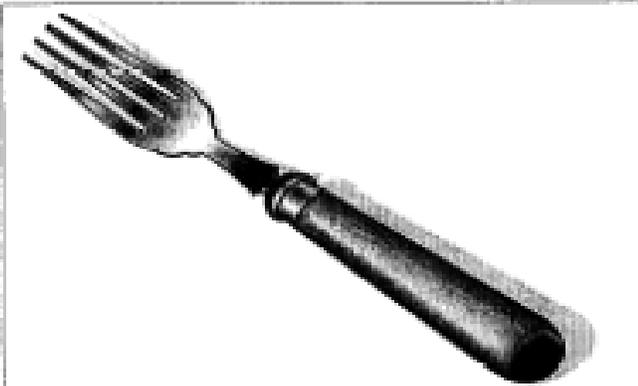
Alaska Resources Kit: Minerals and Energy, Module D-Ecology/Economy Rev 1996

# Minerals Path

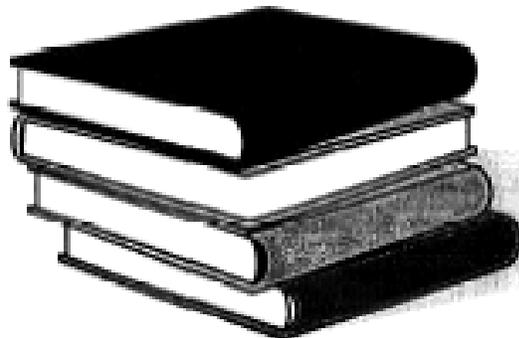
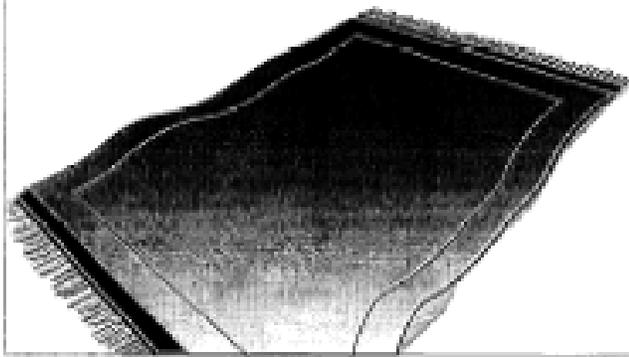
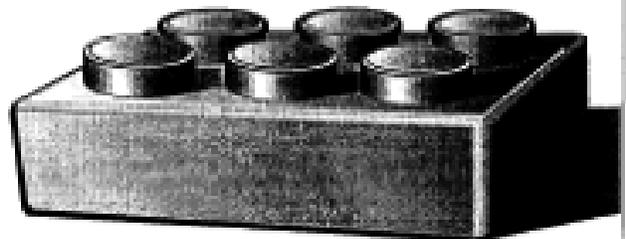
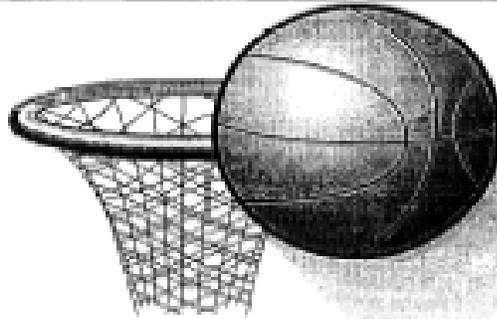
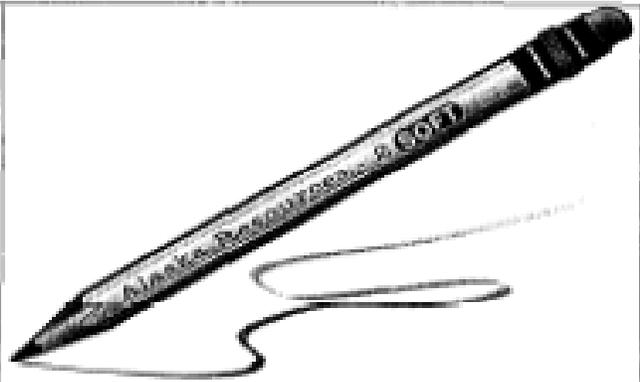
## Primary Path Finder



# Minerals Path Cards



# Minerals Path Cards



## MANUFACTURED PRODUCTS MADE OF MINED RESOURCES

<u>Petrochemicals</u>	<u>Gold</u>	<u>pewter</u>	<u>nuts/bolts</u>
computer disk	jewelry	bronze	nails
basketball	money		hammers
comb	lab equipment	<u>Graphite</u>	tools
toothbrush	glasses	pencil lead	appliances
plastic bag	optics		
skateboard wheels	electronics	<u>Zinc</u>	
polyester shirt	computer chips	galvanized steel	
fake fleece jacket	spaceships	buckets	
	tooth fillings	garbage cans	
<u>Coal</u>	<u>Lead (toxic)</u>	steel pipe	
shoe polish	electric batteries	chain link fence	
nylon jacket	fishing weights	brass	
rubber band	buck shot	paint	
rubber boots	X-ray shielding	car parts	
moth balls	sound proofing	pennies	
rubber cement	ammunition	roof gutters	
fertilizers	electronic	dry cell batteries	
dye	appliances	nutrition	
roofing	TV tubes	fertilizer	
	TV glass	photocopying	
<u>Copper</u>	<u>Platinum</u>	<u>Aluminum</u>	
wires	jewelry	cans	
pennies	car exhaust	foil	
to make bronze	systems	fixtures	
to make brass	missiles	parts of	
motors	dental crowns and	appliances	
telephones	bridges	airplanes	
televisions		skiffs	
computers	<u>Silver</u>	barrels	
stove	jewelry	aluminum siding	
coffee pot	coins		
iron	photography film	<u>Iron/Steel</u>	
toaster	bearing metal	construction	
electrical cable	solder	beams	
plumbing	table cutlery	bridges	
switches	dental, medical,	cars	
appliances	and scientific	trains	
roofing	equipment	railroad tracks	
building/construct		knives	
ion	<u>TIN</u>	utensils	
	coating under cars	surgical	
	tin cans	equipment	
		dental instruments	