Activity 1: Resource Scavenger Hunt

Maine Geological Survey

Objectives:

To make students aware of the vital link between materials obtained from rocks and minerals and the levels of comfort, technological achievement, and materials usage that exist in their daily lives. This activity also reinforces the understanding of the definitions of element, mixture, and compound. Some students may still not have clear mental distinctions for these terms.

Time:

To start the hunt will take about 25 minutes of in-class time to establish the ground rules, and 45 minutes at the end of the hunt for class discussion and scoring. Allow enough out-of-class time so that the students have an adequate chance of finding many items, but don't let the activity get "old". Normally 1 week of hunting time is adequate with most groups.

Background:

Our entire civilization and way of life is now based almost totally on our ability to use materials - elements, mixtures, and compounds - that we have mined or extracted in some fashion from the earth. The clothing we wear, the food we eat, the tools we use (cars, computers, combines, concrete mixer trucks, and caulking compounds) and the items we use to entertain ourselves, all come from, or are produced by tools that came from earth materials. If we took all of the earth products out of our life, we would be hungry, naked, and shivering in the dark. And yet, when you ask students, "Where do

these things come from?" the answer, as often as not, is "the store.". You may also want to ask students to bring in something that they have made totally by hand from all-living materials; this is more difficult than at first appears. Discuss the objects that are brought in with the class. If an object meets the criteria, compare this object to commercial models of the same item if possible. Baskets woven of natural reeds and vines as opposed to the commercial models are always good for comparison purposes.

Materials:

Score sheet (attached), items found in hunt supplied by students. Many students will take their materials home after the hunt, a few will tell you that you can keep them, and some will be left behind.

Procedure:

Students, individually or in pairs/teams, have a set amount of time to collect as many specific elements, mixtures, and compounds as possible that are used in our lives that come from earth materials. They must be specific in describing the composition and use of the substance; holding up a twisted, broken widget and saying "I know there is some metal in here because it is heavy" does NOT count. Bringing in a piece of entrance cable labeled copper or aluminum DOES count. Points are awarded for each item (no duplicates - one copper item is all that is needed) and high scorers get a reward (liter of soda, 3 bonus points in grade book, candy bar, extra library pass and so on). You may decide to award different amounts of points for each of the three categories. If resources permit, you may wish to have levels of reward so that a large number or even ALL students win something. After the allotted time, have the students bring in their scavengings and have a class tally session. This session can be a good introduction to more serious activities/discussions on recycling, strategic resources, landfills, and the whole issue of solid waste.

Special Safety Procedures:

On the next page is a list of many of the more commonly found items that students often bring to class. Most of these present no special problems. Some however are toxic or present environmental threats if disposed of improperly. If any of these items are brought in, you will want to discuss their proper disposal with the students (if in doubt check with the chemistry teacher). This is also a GOOD place to start discussions about responsible usage of these items and related responsible disposal/recycling. The "loot, pillage, and burn" philosophy that characterized much of the 19th and early 20th century resource development activities is no longer an acceptable or viable approach.

Follow-Up:

If there is a local mine, quarry, gravel pit, or similar operation available, arrange for a class field trip to this site. In the question and answer session students can find out all of the different uses of the material and their markets.

Have your class take a serious look at recycling on the local level. Dwindling resources, higher extraction costs, and the whole solid waste issue will eventually force man to recycle virtually everything. Students which start this in school will be more apt to continue the practice in adult life. An additional incentive is that the recycling of metals can be a very lucrative, money raising activity. In 1990 one class of 30 students raised over $300 for the Children's Rain Forest Project by collecting and recycling aluminum over a five month period.

References:

Activity developed by Duane Leavitt.

COMMONLY ENCOUNTERED SCAVENGER HUNT ITEMS

ELEMENTS

Item	Source(s)
Gold	computer contact points, teeth, jewelry
Silver	coins, jewelry
Copper	wire, pennies, flashing, jewelry
Lead*	bullets, pipe, flashing
Zinc*[1]	galvanized nails, pails, tubs
Mercury*	ballast switches in thermostats, thermometers
Platinum	pellet coating in catalytic converters, test wires, electrodes
Carbon	diamond, graphite in pencils, spark plug wires, electrodes
Aluminum	wire, foil, cans, cookware etc.
Iron	barbecue units, cookware, nails
Tungsten	filament in incandescent light bulbs
Magnesium	lawn mower frames, flashbulbs
Tantalum	suture wires for reconstructive bone surgery
Chromium	plating on car bumpers, stove parts
Nickel	coins, rechargeable batteries
Sulfur	matches, signal flares (railroad)
Thorium*	mantles in gas lanterns
Silicon	computer chips, body implants
Iodine*	tincture of iodine
Beryllium*	coating on inside of fluorescent lights

*Items marked with this asterisk are toxic or pose other environmental hazards if disposed of improperly. Mercury especially should not be allowed to escape into the environment under ANY circumstances. Flinn Scientific has an ongoing mercury collection program for schools; the only cost the school incurs is shipping the material to Flinn. See resources section for Flinn address.

1 - Zinc, in and of itself, is not harmful; most zinc contains certain amounts of cadmium which are NOT removed in the refining process; cadmium is similar to mercury in its biochemical behavior.

COMPOUNDS

Item	Source(s)
Stannous fluoride	toothpaste
Calcium sulfate	white powder in sheetrock
Hydrocarbons	coal, oil
Silica	sand, glass (not fiberglass)
Feldspar	porcelain – sinks, tubs, spark plugs
Titanium dioxide	paint
Clays	kitty litter, oil absorbent
Limestone, soda ash	fiberglass
Fluorine	toothpaste

MIXTURES

Item	Source(s)
Any water solution	soft drinks, coffee, tea
Pre-mixed concrete	sand, calcium oxide, aggregate
Alloy metals	Wood's metal, Onion's alloy

Name_____

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Student Sheet

Purpose:

This activity will help you realize the significance of the mined and quarried materials that are an IMPORTANT part of our everyday lives.

Materials:

Score sheet, pens and notebooks, masking tape, and whatever you can scavenge from the real world (with permission).

Procedure:

1. Scavenge examples of as many different substances as you can find. As you collect your sample think about what life would be like without that particular type of item. You only need one example of each type of substance; for example, a copper penny, copper wire, and a copper bracelet all count only as copper. High scorers will win some kind of prize (ask teacher). In addition there may be a grade associated with completing this exercise. You may ask your parents, teachers, and neighbors for help, but YOU must be able to tell the class what each item you scavenge is used for and what material(s) it contains. You must be specific. If the samples are liquids or powders make certain you place them in containers so they won't spill.
2. Label your samples by using a small piece of masking tape and numbering each one.

3. Record the item, and its number, on your score sheet in the appropriate category. If you need more score sheets, ask your teacher or just copy the format onto a blank sheet of paper. If you are UNSURE of what is meant by the terms element, mixture, and compound, be certain to have your teacher explain this to you before you start the hunt.
4. Your teacher will assign a number of points for items within each category. The total number of points determines who wins.
5. The first item on the score sheet has been filled in as an example to follow; you already have at least one point.

GOOD LUCK!!!

ELEMENTS (points per item:_____)		
Number	**Name**	**Source**
1	copper	pennies, copper wire

COMPOUNDS (points per item:_____)		
Number	**Name**	**Source**
1	hydrocarbons	coal, oil

MIXTURES and ALLOYS (points per item:_____)		
Number	**Name**	**Source**
1	water solution	soft drinks