



INVESTIGATING MATERIALS AND MINERALS



Inquiry

Models

Scientists and engineers use models to help them understand ideas and relationships. In the last investigation, you used a model to help you understand some of the difficulties of exploring for minerals. In this investigation, you will be working to design a model that will help to demonstrate some of the key issues in mining and separating minerals from the rock in ore.

Keep in mind that few models are perfect. They are both alike and unlike what they represent, in a number of ways.

- b) How was the egg model unlike the Earth and the mining process?
- c) What do mining companies need to think about when they are deciding whether to mine in a particular area or for a particular mineral?
- d) What suggestions can your group provide to improve the egg model or make it more realistic? Can you think of an alternative?

Part B: Separating Minerals from Gangue

1. Now you will focus on how minerals are separated from gangue. (Gangue is a term used to refer to all of the undesired parts of an ore.) For an example, think about hematite, one of the minerals from which metallic iron is extracted.

Iron is a much-desired element for the manufacture of many products (steel, in particular).

- a) Make a list of objects that are made from iron and steel.

Discuss with your group what you think are the properties of iron that would help you to separate it from a mixture.

- b) Make a list of these properties.

In your group, decide which property of iron you think would be most useful in separating it from a mixture.

- c) Support your reasoning with evidence and logic.

2. You will now be given samples of cereals in sealed plastic bags. Some cereals have iron added to them as a mineral supplement. Using your knowledge of the properties of iron, come up with a plan for how you could find out which cereals have had iron added and how you could get the iron out of the cereals.

- a) Write down your plan and check it with other groups.

3. When you think that your plan makes good sense, assemble your materials and carry out the plan.

It will probably take more than one try for you to find out which cereals contain iron, and how to get it out.

- a) Be sure to record your results for each trial, whether or not each is successful.