

## MINERAL UNKNOWNNS

### STANDARDS

See summary of National Science Education Standards.  
 Original: <http://books.nap.edu/readingroom/books/nses/>

Standard Concept	General standard	Specific standard	General standard	Specific standard	General standard	Specific standard
Grade Level		K-4		5-8		9-12
Science as inquiry (A)	Abilities ... to do ... inquiry	A.1.4.1	Abilities ... to do ... inquiry	A.1.8.1	Abilities ... to do ... inquiry	A.1.12.1
		A.1.4.2		A.1.8.2		A.1.12.2
		A.1.4.3		A.1.8.3		A.1.12.4
		A.1.4.5		A.1.8.4		A.1.12.5
				A.1.8.5		A.1.12.6
				A.1.8.6		
				A.1.8.7		
	Understandings about ... inquiry	A.2.4.1	Understandings about ... inquiry	A.2.8.1	Understandings about ... inquiry	A.2.12.2
		A.2.4.2		A.2.8.2		A.2.12.5
		A.2.4.3		A.2.8.5		
		A.2.4.4		A.2.8.6		
		A.2.4.5				
		A.2.4.6				
Physical Science (B)	Properties of ... materials	B.1.4.1	Properties and changes of properties in matter	B.1.8.2		
		B.1.4.2				
Earth Science (D)	Properties of Earth materials	D.1.4.1	Structure of Earth system	D.1.8.4		



## MINERAL UNKNOWNNS

### INTRODUCTION

Rocks are made of minerals. Minerals can be identified by their properties. When minerals are used, these properties, or the components of the minerals, are applied.

### OBJECTIVE

Students will identify basic properties of minerals and to gain practice in using tools to determine mineral properties.

### MATERIALS:

- Mineral Specimens
- Mineral Identification Procedures:
  - GeoMan's Mineral ID Tests:  
<http://jersey.uoregon.edu/~mstrick/MinRockID/MinTests.html>
- Mineral Identification Tables, e.g., GeoMan's Mineral Identification Tables:
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MinRockGloss.html>
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MineralID/Metallic.html>
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MineralID/NonMetallic1.html>
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MineralID/NonMetallic2.html>
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MineralID/NonMetallic3.html>
  - <http://jersey.uoregon.edu/~mstrick/MinRockID/MineralID/NonMetallic4.html>
- Mineral Identification Tools:
  - Magnifying Glass
  - Penny
  - Nail or Steel Blade
  - Glass Plate
  - Streak Plate
  - Dropper Bottle
  - Magnet

### PROCEDURE (Teacher instructions)

- 1) Number mineral specimens.
- 2) Spread specimens out on a table or counter on top of a sign labeled with the numbers of the specimens.
- 3) Divide class into groups.
- 4) Each group works with each specimen to determine its properties and to try to identify it.
- 5) The group should write down the properties that led to their identification.
- 6) Each group reports the results of their work to the rest of the class.
- 7) The class discusses the identifications.
- 8) The class should develop a mineral identification work sheet, listing the properties to use, and possibly, a mineral identification flow chart.

### EVALUATION

- Students identify one or more minerals, write the properties they used to make the



- identification, and record the procedure.
- Confirm the mineral identification with a key to the unknown minerals.
    - Identify any errors in identification, specifically identifying the results of the mineral test and the error.
  - Devise a general procedure (flow chart) according to the various schemes used by the groups.

#### NOTE TO TEACHERS:

The mineral identification charts should suggest procedures to the students. A basic mineral identification procedure order follows.

- 1) Geologists normally sort minerals first by luster.
- 2) Minerals with a metallic luster are often sorted with a streak plate, unless the color or crystal form suggests an immediate identification, e.g., pyrite, or another test indicates identification, e.g., a magnet to test for magnetite.
- 3) Minerals with a non-metallic luster are sorted by hardness.
  - a. After preliminary sorting, other properties suggest identifications or further tests, e.g., the yellow color of sulfur suggests an immediate identification of sulfur.
  - b. However, the luster of calcite might not be sufficient to identify it without looking for its distinctive cleavage, or whether it effervesces when combined with cold, dilute hydrochloric acid.

