## Lesson Plan: Dichotomous Key to Minerals

**Grade Level: 4-Essential Curriculum: Standard #1: R 4.1.4, Standard #2: ST 4.2.2, 4.2.1, A 4.2.3**

**Objective:**

Students will:

* Learn how dichotomous keys can be used to identify minerals
* Learn how to use various tests to identify minerals
* Be able to compare and contrast rocks using scientific procedures

**Materials-** Mineral samplesof:

* hematite
* calcite
* pyrite
* galena
* sulfur
* graphite
* biotite mica
* quartz
* And scratch plates, empty glass baby food jars, eye droppers, vials of vinegar, station markers with letter identification and worksheets

**Prior Learning:** Teacher will define terms such as luster, metallic, cleavage, fracture, dense, acidic reactions and discuss how to use the graphite on scratch plate, scratching the baby food jar with quartz and using vinegar on calcite. Also demonstrate how to use the dichotomous key.

**Procedure:** Teacher will place minerals, scratch plates, and vials of vinegar around a table in stations with identified letter markers that match the answer key. Students will start at any letter and travel around the table until they have completed their worksheet.

**Follow-up Learning:** Teacher can demonstrate:

* how sulfur smells bad
* graphite can be used to write with
* pyrite is fool’s gold
* galena is heavy because it contains lead

**Dichotomous Key to Minerals**

Test the mineral at each station by starting at question #1 and stay at the station until you have identified the rock, and then move to the next station. Follow the directions of each number until you discover the name of the mineral. Write the name of the mineral next to the number of its station on the back of this sheet. Turn the sheet in to your instructor to be checked.

1. Test hardness:

 a) scratches glass go to #2.

 b) does not scratch glass go to #3.

2. Look for luster:

 a) It has a metallic luster. The mineral is pyrite.

 b) It has a nonmetallic luster. The mineral is quartz.

3. Look for luster:

 a) It has a metallic luster. Go to #4

 b) It has a nonmetallic luster. Go to #5

4. Test texture/weight:

 a) Has a greasy feel. The mineral is graphite.

 b) It is very dense (heavy). The mineral is galena.

5. Test cleavage:

 a) It shows cleavage (breaks in flat smooth surfaces). Go to #6.

 b) It shows fracture (breaks in irregular surface). Go to #7.

6. Test acid reaction: (Drop a couple of drops of vinegar on the mineral):

 a) It bubbles in acidic vinegar. The mineral is calcite.

 b) It does not bubble in acidic vinegar. The mineral is biotite mica.

7. Test streak:

 a) It leaves a yellow streak. The mineral is sulfur.

 b) It leaves a red-brown streak. The mineral is hematite.

**Dichotomous Key to Minerals Worksheet**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the name of the mineral next to the name of its station:

A)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

F)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

G)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

H)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Instructor Answer Key

A) Hematite

B) Calcite

C) Pyrite

D) Galena

E) Sulfur

F) Graphite

G) Biotite Mica

H) Quartz