

## Rocks, Rocks, Rocks Worksheet

What if your proposed locations are in “bad” rock formations? What if the caverns collapse? What if the rock is too hard to dig through? What if water flows right through the rock? These are important questions. Civil and mining engineers deal with these sorts of issues all the time. Civil engineers design auto and train tunnels under cities, rivers, mountains and even oceans. Mining engineers design deep caverns—miles below the surface—for mining precious metals and diamonds. It is critical to investigate and understand rock properties when designing caverns and tunnels in solid rock. Some rocks are like chalk—they crumble and snap. Other rocks are extremely hard. So, the strength of the cavern depends on the *rock properties*.

It is time for your engineering team to begin to test the rocks in Alabraska to determine their properties. Knowing these rock properties will help you determine the best cavern locations.

Follow the rock testing procedure below and fill in the “**Rock Test Data Table**.” Also refer to the “**Rock Identification Flow Chart**” to complete the table. After correctly identifying each rock, answer all the worksheet questions.

### Rock Testing Procedure

1. After receiving rock samples from the teacher, record the sample ID number in the ID# column of the table.
2. Using the **Mohs Hardness Scale** (to the right →), conduct the hardness tests and record the hardness value in the hardness column.
3. Record the brightness of each rock.
4. Observe the particles of the rock sample. Can you see grains, like beach sand? Record your answer in the granular column of the table.
5. Observe the surface of the rock sample. Does it appear to have holes in it where water could penetrate, or is the surface more solid? Record your observations in the data table.
6. Record the luster. Is the rock dull or shiny?
7. Put a drop of vinegar on each rock. Record whether it fizzes or not. Then use a paper towel to dry it off.
8. Put each rock in a glass of water. Does it float or sink? Dry off each rock after testing it.
9. Follow the **flow chart** to identify each rock type. What is its name?
10. Use your **textbook** to classify the rock as igneous, sedimentary or metamorphic.

### Mohs Hardness Scale

Hardness	Meaning
1	Softest known mineral. It flakes easily when scratched by a fingernail.
2	A fingernail can easily scratch it.
3	A fingernail cannot scratch it, but a copper penny can.
4	A steel nail can easily scratch it.
5	A steel nail can scratch it.
6	Cannot be scratched by a steel nail, but it can scratch glass.
7	Can scratch steel and glass easily.
8	Can scratch quartz.
9	Can scratch topaz.
10	Hardest known mineral. A diamond can scratch all other substances.

Name:

Date:

Class:

1. If you hammered a nail into pumice, what would happen? Into granite? Explain.

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2. How important is rock hardness to designing and constructing caverns? What if the rock is too hard? What if the rock is too soft?

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3. Look at your rock test results and determine which rock is the hardest (not including diamond) and which is the softest.

The hardest rock is \_\_\_\_\_ and the softest rock is \_\_\_\_\_.

Look on your Geology Map to see where these rocks are found in Alabraska. Identify them by the grid (nearest letter and number).

The hardest rock is found in these areas:

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The softest rock is found in these areas:

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How might the presence of pores or holes affect your cavern design? Which of the rocks are solid? (Refer to the **Rock ID Flow Chart**.)

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4. Is rock color an important property for underground caverns? Explain.

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5. Is the luster of the rock an important property for underground caverns? Explain.

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