Rocks, Minerals, Crystals, Oh My!

FRAMEWORK
I. Scientific and Engineering Practices 1,3
II. Cross-Cutting Concepts 3
III. Physical Sciences PS1,

SKILLS/OBJECTIVES

- To teach students about rocks, minerals, and crystals
- To let them learn about the process of investigating these materials

MATERIALS

- Worksheets
- Coloring Supplies
- Limestone, quartz, some magnetic rock
- Vinegar
- Magnifying glasses
- Sand
- Magnet
- Sandpaper
- Paperclip
- Glass slides
- Test tubes
- Droppers
- Bottles of mucilage glue
- Magnesium sulfate

BACKGROUND

- Today we will investigate different types of rocks, minerals and crystals. The differences between these are subtle.
- **Minerals** are naturally occurring solid chemicals formed through geological processes. They can be mined or grown.
- **Rocks** are many minerals together in what is called an "aggregate" or a combination.
- **Crystals** are solids that are comprised of ions, atoms, and molecules arranged in a *repeating pattern*. They start as liquids! But soon solidify. Like rocks, they are made up of various natural materials.
- Ask the kids what kind of words we can use to describe rocks, minerals, and crystals. Heavy, round, dark, rough etc. are all great examples.

Activity #	**Investigating Rocks, Minerals, and Crystals**
Materials	o Worksheets o Coloring Supplies o Limestone, quartz, some magnetic rock o Vinegar o Magnifying glasses o Sand o Magnet o Sandpaper o Paperclip o Glass slides o Test tubes o Droppers o Bottles of mucilage glue Magnesium sulfate
Worksheet	Y

1. Optional: Go outside and have kids find rocks, let each child bring one inside.
2. Have large containers of sand with rocks buried available. Let the children sieve through the sand to discover the rocks.
3. Have the children brush off their rocks (carefully) and hand out the worksheets to investigate them.
4. Which of your rocks is the heaviest? Which one do you think would break more easily? Are your rocks made of one substance or more than one substance? Draw one of your rocks in the place that you found it.
5. Have students do a streak test. Does your rock make a mark on sandpaper? Hematite does. Quartz doesn't. Does your rock make a mark on paper? Graphite does. Quartz doesn't.
6. Can you scratch your rock with a paperclip? Can you scratch it with a penny? If the penny scratches it, your rock is softer than copper. If the paperclip does not scratch it, your rock is harder than steel.
7. Does light shine through your rock? It does through quartz. It doesn't through graphite. Your rock might be glassy, metallic, or dull.
8. Let the children put a drop of vinegar on a piece of limestone and watch it bubble. Ask, does your rock bubble in vinegar? Limestone does because it is made of materials that were once alive.
9. Explain that crystals and minerals are made out of one material, but a rock can be made out of more than one material. Ask the children to find the minerals in the following items. Graphite in a pencil, hematite in a hinge, copper in a penny.

10. What is sand made out of? Are the two kinds of sand different? Look at some of the particles and compare them against your rock.
11. What do crystals look like? Put 3 mL of water into the test tubes and add enough magnesium sulfate to make a saturated solution. Add a drop of glue and stir until the drop is dissolved. Using the dropper, put enough of this solution on the glass slide to cover it completely. Wait a few minutes to let it dry and let crystals form. You made crystals!

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CONCLUSIONS

Rocks, crystals, and minerals come in all sorts of different shapes, sizes, and colors and can have very different characteristics. Look closely at the rocks you find next time you are outside to see how they compare to your rock today!