TITLE: **Introduction to Caves & Karst and How They Form, Lesson 1**

TOPIC: Cave & Karst Formation

GRADE LEVEL: Middle

CONTENT OBJECTIVE & SHORT DESCRIPTION:

TIME REQUIRED: 45 minutes (Combine Lessons 1 & 2 for a 90 minute block if needed)

MATERIALS NEEDED:
Images on Explore Caves & Karst CD
Model on Explore Caves & Karst CD
Internet access either for students or to display site for all.

DIRECTIONS FOR INSTRUCTION:
Your preparation involves reading the teacher text on the CD-ROM Explore Caves & Karst either to increase your knowledge or as a review. This lesson refers to pages 4-6, and 9-14 of the teacher text.

1. In the interest of inquiry learning, it is important to start your caves & karst unit with a discussion about caves. Ask students for their knowledge of caves, what they think caves are, and how they form. Try it with karst too, although fewer will know what a karst topography is. Great definitions may come out of this, and you may also get a feel for any misconceptions there may be concerning caves that can be addressed during the unit.
2. Steer students toward addressing how caves and karst are made. Discuss the types presented in the Explore Caves & Karst CD. If you have a sample of limestone rock, you may want to pass that around. Show a Power Point presentation of the Karst Features images and the Caving images on the CD.
3. Demo – take hydrochloric acid and drop some on your limestone; students marvel at the fizzing. Then take a container of vinegar and drop a piece of real chalk into it. It should fizz like crazy and the chalk should change shape. Baking soda is fun too, to see all of the bubbles produced when CO_2 forms. Discuss how rain is not neutral but is usually acidic when it falls, and can eat away at carbonate materials. In old cemeteries, compare limestone or marble (which is metamorphosed limestone) headstones to granite ones. See links to example activity below* and the bottom section at http://www.huddersfieldgeology.supanet.com/pages/p20wea.htm.
4. In groups of 2 or 3, have students work together to construct the 3-D cave model on the Explore CD. May need to finish as homework.

Carbonate Rocks - group of rock types that are predominately made up of carbonate minerals, such as calcite and aragonite (calcium carbonate) and dolomite (calcium-magnesium carbonate). This group of rocks includes limestone, marble, and dolostone. Carbonates are more easily dissolved by slightly acidic water than most other rock types.

Deposition - The act or process by which an agent of erosion (such as wind or water) leaves behind sediment.

Erosion - The act or process of being worn away by the action of wind, water, or glacial ice.

Speleothem - A calcite deposit created when the calcium carbonate dissolved in water seeping through limestone cave walls is redeposited within the cave environment.

Stalactite - A deposit of calcium carbonate resembling an icicle hanging from the roof or sides of a cavern.

Stalagmite - A deposit of calcium carbonate formed on the floor of a cave by the drip of calcareous water.

Weathering - To undergo or endure the action of the elements. If rain water is acidic, weathering may include the dissolution of carbonate rocks.

* Headstone weathering – activity from England - http://www.chemsoc.org/networks/learnnet/jesei/graves/home.htm