Lesson Preparation – Geode Gems (<1 hour active time)

Materials:

Geode (1 per student)

Goggles (~1 per 4 students, although you can do with as little as 1)

Hammer (~1 per 4 students, although you can do with as little as 1)

Socks (~1 per 4 students, although you can do with as little as 1)

Plastic Bag (1 per student)

Geode Gems Worksheet, with Earth Science Crossword on Reverse (1 per student)

Lesson Plan – Geode Gems (50 min)

Opening (5 Min)

Have a student read the title and intro paragraph on the worksheet aloud.

Briefly discuss the process of geode formation (mineral rich water seeps into a gap over time) and have the students remind you what they know about minerals and what they look like.

Ask students if they have seen something called a crystal before, and what it looked like. Discuss how we use the same word to describe how the mineral forms over time, with all the mineral particles holding hands in a specific pattern.

Explain to the students that they will be using the scientific method to answer a question about geodes. The scientific method is used by scientists to answer all kinds of questions.

Directions (10 min)

Have a student read the first box on the worksheet. Hold up a geode in front of the class and have the students describe it to you. Have them record what they have said.

Have a student read the second box on the worksheet. Encourage students to propose questions that they may be able to answer by breaking the geode open. *What color is inside? Is it hollow? Is it a ball or dirt?*

Ask students if they know what a hypothesis is, and describe the process of making a best guess based on the information we already have. Have them propose an answer to their question.

Explain that once they have filled out the three top boxes on the worksheet, they will be taken a few at a time outside to break open their geode. In the meantime, they can work on the crossword while they wait. Do a sample on the crossword.

Breaking Geode / Crossword (25 min)

Have students come outside in groups based on the number of hammers/goggles/sock you have. Place each geode in a sock, and have a student with googles hit it with a hammer until it breaks open. Pieces can be places in a plastic bag and the student can return to the classroom.

Worksheet Completion (5 minutes)

Once the student has broken open their geode, they can complete the remainder of their worksheet. You may want to have them complete the very last box (what was the answer to your question) as a group so that you can provide guidance as to what would be an appropriate answer for specific questions.

Closing (5 min)

Gather students and have them respond to some questions.

Was it easy for you to guess what was inside your geode? What sorts of clues did you use? What would have made it easier?

Why do we pick a question and create a hypothesis? *We do this for several reasons. One reason is that we may not know what we want to do until we have picked a question. It wouldn't be useful for us to break open a geode if we wanted to know about volcanos. One reason we pick a hypothesis before we perform the experiment is to help us focus on how what we already know relates to what we find out.*

Discuss the idea of observational science in contrast to experimental science. When we observe, we look at things as they are. When we do an experiment, we change something a little to see how it changes the outcome. Ask the students what we did today. *Observational Science.*

Finish by allowing students to ask any remaining questions, and encourage discussion about what other kinds of things they would like to learn about the earth, rocks and minerals.