

**Lesson Title** "Observing Crystals," FOSS Earth Materials, Inv. 1, Part 3

**Grade level:** 4-5

**Unit Learning Target:** Earth materials change over time. People use Earth materials for various purposes. 4-5 ES2A

**Lesson Learning Target:** *What are the students expected to be able to do? (Compose in student language.)*

I can identify unknown materials by observing their properties. I can explain how a mock rock is like a real rock.

**Previous Learning to Target:** Rocks are made of ingredients called minerals; minerals are made of only one ingredient.

**Learning Task:** Students use water to dissolve and separate minerals from mock rocks. After the water has evaporated, they identify the remaining mineral crystals of salt (and maybe alum) by their physical properties. The students then identify all ingredients in the mock rocks, providing evidence for each ingredient.

**Key Vocabulary Terms for Lesson:**

Evaporate  
Observe  
Physical Properties  
Evidence

## Do the Math/Science

*Use lenses of both learner and teacher. Examine your thinking. What concepts/ skills/reasoning did you use to solve the task? Identify those that represent prior knowledge.*

- Students have observed that many rocks appear to be made of more than one ingredient.
- Students have observed that some rocks have crystals in them.
- Students have observed that crystals can be separate from rocks (as a diamond in a ring).
- To avoid getting oils and dirt on the magnifying lenses, students know how to hold the hand lenses properly.

## Identify Success Criteria

*What success criteria will determine if learning has occurred?*

- Identify and provide evidence, with words and pictures, that the crystal minerals in the evaporation dishes are salt crystals (there may also be some alum crystals).
- List the ingredients in a mock rock with evidence for each ingredient.
- Describe how a mock rock is like a real rock.

# Do the Science

Time	Draft the lesson flow	Anticipated responses	Remember	Formative Assessments
~ 40 minutes	<p>How should the lesson progress? [Share the target both visually and verbally at the beginning and the end of the lesson. Remind students of the target throughout the lesson.]</p> <p>Identify the target for the students. By the end of the lesson, this is what they will all know: <b>“I can identify crystal minerals by observing their properties. I can explain how a mock rock is like a real rock.”</b></p> <p><b>7. As per FOSS Manual</b> In addition, introduce the terms: <b><i>observe, observation, physical properties.</i></b></p> <p><b>8. As per FOSS Manual</b> In addition, introduce the term: <b><i>evidence</i></b></p> <p><b>9. as per FOSS Manual</b></p> <p><b>10.</b> Opportunity for <b>Think, Pair, Share:</b> Instead of having a volunteer describe his or her ideas, pose the question: <i>How do you think the crystals got from the mock rocks to the evaporation dishes?</i> Have the students, without talking,</p> <ul style="list-style-type: none"> <li>• <b>Think:</b> jot their thoughts in their notebook</li> <li>• <b>Pair:</b> discuss their idea with a partner and write their partner’s idea in their notebook</li> <li>• <b>Share:</b> then have a class discussion and written summary as per FOSS Manual</li> </ul>	<p>What correct/incorrect student responses can we anticipate? What is our reasoning?</p> <p>Some students may want to tell you what they know about this right now. Tell them they will have a chance later.</p> <p>Little square crystals with Xs in them are salt crystals.</p>	<p>Is there anything specific the teacher should remember to do? Not to do?</p> <p>Post the lesson learning target. Refer to it at the beginning of the lesson, throughout the lesson, and again at the end of the lesson.</p> <p><b>7.</b></p> <ul style="list-style-type: none"> <li>• Evaporation dishes</li> <li>• Hand lenses</li> <li>• FOSS Earth Materials Notebook p. 6</li> </ul> <p><b>9.</b></p> <ul style="list-style-type: none"> <li>• FOSS Student Sheet #12</li> </ul> <p><b>10.</b></p> <ul style="list-style-type: none"> <li>• Blank notebook page</li> <li>• Demo, or have students, dissolve salt in water.</li> </ul>	<p>What do we want the learners to know? How will we know learning expectations are met? What will be our evidence?</p> <p><b>9.</b> Use this activity as the formative assessment for <i>“I can identify unknown materials by observing their properties.”</i></p>

