

Earth Sciences Activities: Guiding and Evaluating Student Work

For the students to get the most out of these activities, it helps to have clear expectations from the start. The “Mineral Identification” activity would serve as a good information-gathering activity, with a discussion as the final product rather than a full report. Before beginning, students should generate ideas for what environmental conditions might indicate the presence of life and why.

Developing an hypothesis: Students explain how their group decided which minerals may indicate whether life may have existed in the past. They can show this using a table with criteria for life across the top of the table and the minerals listed on the side of the table. In each box in the table, students indicate whether the formation of the mineral indicates a possible condition for life and include at least a sentence to explain how the site meets the criteria. Assign points according to following schedule:

- 10 points: The student has made a complete table, factors are well-chosen, explanations are clear.
- 8 points: The student has made a complete table, but it is not well laid out, not all factors are chosen well, explanations are fuzzy.
- 6 points: The student’s table is incomplete or very unclear, choice of factors is poor, explanations are missing, incomplete or unclear.

Recording data: Each student must complete the identification booklet using the worksheets. Assign points accordingly:

- 10 points: All data is recorded, mineral properties are described completely, explanation of conclusion about the possible existence of past life is clear and well thought out.
- 8 points: Some data missing, some properties not complete, explanation of conclusion about the possible existence of past life is there, but not effective.
- 6 points: Big gaps in data, minerals are missing from booklet, explanation of conclusion about the possible existence of past life is clear missing.

Reaching a conclusion: How well did the students support their hypotheses? Were there disagreements about the identification of any of the minerals? How were they resolved? Were there disagreements about whether a mineral might indicate past conditions that could support life? How were they resolved? What surprised them the most? What did this exercise tell them about how the geological evidence on other planets might help scientists determine whether life may have existed there in the past? Are there other things would they want to try or explore further? Assign points:

- 10 points: Student makes a good evaluation of hypothesis -- results match up with the conclusion. There are thoughtful, original responses to each question.
- 8 points: The student’s evaluation of hypothesis is a little suspect. Good responses to most questions.
- 6 points: Student’s conclusion statement is poor/missing. Responses are brief.