

Applied Sciences/Technology 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 “Training and Testing” activity would serve as a good information-gathering activity, with a discussion as the final product rather than a full report. Students record their activities and discuss the lessons they learned as they worked on this training mission. This activity can be used as a benchmark for the “Mission Simulation” activity.

Developing an hypothesis: Before the “Mission Simulation” activity, students detail a plan of action to complete their mission. They could accomplish this by generating a list of initial commands and describing how they will communicate with the rover. They should also describe what potential pitfalls might occur and how they might handle them. Assign points according to following schedule:

- 10 points: The student has made a complete command list, commands are well-chosen, commands are clear, explanation of commands are clear, possible pitfalls seem complete and well thought out.
- 8 points: The student has made a complete list, but commands are not well-chosen or clear, possible pitfalls are not well thought out or described effectively.
- 6 points: The student’s command list is incomplete or very unclear, choice of commands is poor, explanations are missing, incomplete or unclear.

Recording data: Each student must complete a record of each mission trial. An analysis of the success or lack of success for each mission is generated, including a description of what could be done to improve the outcome the next time. Assign points accordingly:

- 10 points: All data is recorded, analysis of outcome is clear and well thought out.
- 8 points: Some data missing, analysis of outcome is unclear or incomplete.
- 6 points: Big gaps in data, analysis of outcome is missing.

Reaching a conclusion: How well did the students analyze their data in relation to their hypotheses? Did students improve their success from one round to the next? Were there disagreements about how to communicate with the rover? How were they resolved? What surprised them the most? What did this exercise tell them about how a rover might help scientists determine whether life exists or may have existed on another planet? Are there other things would they want to try or explore further? Assign points:

- 10 points: Student makes a good evaluations 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.