

EARTH SCIENCE LAB GRADING RUBRIC

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, students should develop their own questions and perform investigations. Students will:

Rubric Score 4 - EXEMPLARY

Performance Indicators

- select and use appropriate tools and technology to perform tests, collect data, analyze relationships, display data, identify and communicate explanations using logic and evidence.
- solve problems using appropriate mathematical formulas
- predict outcomes using models and theories as scientific representations of reality
- create and interpret topographic and geologic maps
- predict the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time)
- create an experiment that illustrates the need for controlled tests, and assess the statistical variability in the investigation.
- create an investigation/project that demonstrates the cumulative nature of science
- create a project or solve a problem that requires combining and applying concepts from more than one area of science.
- make an informed decision about a societal issue by researching the literature and analyzing the data, then effectively communicate their findings.
- assess a situation in which an observation does not agree with an accepted scientific theory, because the observation is mistaken or fraudulent (e.g., Piltdown Man fossil or unidentified flying objects), and/or because the theory is wrong (e.g., Ptolemaic model of the movement of the sun, moon and planets).

Rubric Score 3 - ACCOMPLISHED

Performance Indicators

- select and use tools and technology to perform tests, collect and display data, analyze relationships, but do not effectively communicate explanations using logic and evidence.
- solve problems using appropriate mathematical formulas
- distinguish between hypothesis and theory, and recognize the use and limitations of models and theories as representations of reality.
- read and interpret topographic and geologic maps
- analyze the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time).
- create an experiment that illustrates the need for controlled tests, and recognize the statistical variability in the investigation.
- analyze the components of an investigation/project that demonstrate the cumulative nature of science
- analyze a situation that requires combining and applying concepts from more than one area of science.
- investigate a societal issue by researching the literature and analyzing the data, then effectively communicate their findings.
- identify a situation that demonstrates the idea that when an observation does not agree with an accepted scientific theory, sometimes the observation is mistaken or fraudulent (e.g., Piltdown Man fossil or unidentified flying objects), and sometimes the theory is wrong (e.g., Ptolemaic model of the movement of the sun, moon and planets).

Rubric Score 2 - DEVELOPING

Performance Indicators

- select and use tools and technology to perform tests, collect and display data, but are unable to analyze relationships.
- solve problems given the appropriate formulas and equations
- compare and contrast hypothesis and theory
- be able to read topographic and geologic maps, but are unable to interpret.
- recognize the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time).
- identify the need for controlled tests in investigations and recognize the existence of statistical variability in investigations.
- explain the cumulative nature of science
- describe a situation that requires combining and/or applying concepts from more than one area of science.
- research a societal issue using the literature and available data.
- explain that when an observation does not agree with an accepted scientific theory, sometimes the observation is mistaken or fraudulent (e.g., Piltdown Man fossil or unidentified flying objects), and sometimes the theory is wrong (e.g., Ptolemaic model of the movement of the sun, moon and planets).

Rubric Score 1 - BASIC

Performance Indicators

- be able to use tools and technology to perform tests, collect data and display data, given specific instructions.
- know that scientific problems can be solved using mathematical formulas and equations
- be able to recognize that hypothesis and theory are different
- be able to recognize topographic and geologic maps
- identify the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time).
- define controls and variables in an investigation
- know that science has a cumulative nature
- know that there is interaction between different areas of science
- identify a societal issue using the literature.
- recognize that an observation may be mistaken or fraudulent, and that sometimes theories are wrong.

Rubric Score 0 - MISSING

Performance Indicators

- not be able to select and use appropriate tools and technology to perform tests, collect data, analyze relationships and display data.
- not be able to recognize the use of mathematical formulas and equations in solving scientific problems.
- are unable to distinguish between hypothesis and theory, and recognize the use and limitations of models and theories as representations of reality.
- not be able to read and interpret topographic and geologic maps
- be unable to identify the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time).
- not recognize the issues of statistical variability and the need for controlled tests.
- not recognize the cumulative nature of science
- not recognize that there is interaction between different areas of science
- not be able to investigate a societal issue by researching the literature and analyzing the data.
- not know that when an observation does not agree with an accepted scientific theory, sometimes the observation is mistaken or fraudulent (e.g., Piltdown Man fossil or unidentified flying objects), and sometimes the theory is wrong (e.g., Ptolemaic model of the movement of the sun, moon and planets).

