

APPLY SCIENTIFIC INQUIRY and SCIENTIFIC HABITS OF MIND

Performance Standard 11A/13A/13 B.A

Students will apply the concepts, principles and processes of scientific inquiry within classroom investigations accordingly:

- *Knowledge*: Understand the concepts, principles and processes of scientific inquiry.
- *Application*: Apply the appropriate scientific habits of mind when investigating science concepts.
- *Communication*: Incorporate scientific technologies and the processes of scientific inquiry into classroom investigations and reports.

Procedures:

Note to teacher: These concepts could be embedded into scientific inquiry investigations in varying combinations. Suggested activities and assessments for standards 12A, B, D, E, and F at stage A, incorporate many of the performance descriptions for Standard 11A.

1. *In order to know and apply the concepts, principles and processes of scientific inquiry (11A) and the accepted practices of science (13A) and apply scientific technologies (13B)*, students should experience sufficient learning experiences to develop the following:
 - Describe observed science concept using appropriate senses.
 - Make applicable estimations and measurements about the observed concept.
 - Predict steps or sequences applicable to the observed concept.
 - Describe observed changes in terms of starting and ending conditions, using words, diagrams or graphs.
 - Begin guided inquiry by asking questions using prior knowledge and observations.
 - Infer from observations to generate new questions.
 - Develop strategies to investigate questions.
 - Conduct guided inquiry, following appropriate procedural and clean-up steps and safety precautions as directed by the teacher.
 - Collect data from guided inquiry investigation.
 - Identify and use measuring instruments for gathering data about length, temperature, time, etc.
 - Make estimates and measurements.
 - Record observations (across timed intervals, if applicable)
 - Read data from data-collection instruments.
 - Record and store data accurately and honestly
 - Assemble pictures to illustrate data.
 - Organize data on charts and pictographs, tables, journals or computers.
 - Analyze and display results.
 - Recognize and describe patterns or trends observed in investigation.
 - Propose reasons for differences in observations.
 - Note similarities and differences in observed patterns.
 - Communicate individual and group results of investigation.
 - Identify similar data from others.
 - Generalize data from group investigations.
 - Draw conclusions from data analysis.
 - Suggest more questions to consider about the science concept.

Separated assessment of 11 A may not be practical. Significant research has demonstrated the value of inquiry-based life-long learning for students. The emphasis of scientific inquiry is incorporated into the wording of all performance descriptions for Goal 12, in stages A-J. A spiraling inquiry-based curriculum is encouraged for all classrooms. Specific performance descriptions may be emphasized in different inquiry investigations in order to build mastery of each concept or process of scientific inquiry.

Examples of Student Work not available

Time Requirements

- Initial introduction of processes may require additional time as needed by students.

Resources

- Science Rubric