

APPLY SCIENTIFIC INQUIRY and SCIENTIFIC HABITS OF MIND

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

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.

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

Procedures

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:
 - Formulate inquiry questions associated with the classroom curricular concepts in terms of hypotheses.
 - Research sources of scientific information related to posed questions for analysis.
 - Propose and conduct inquiry investigation which finds answers to posed hypotheses/questions with limited variable choices.
 - Use scientific technologies and incorporate appropriate safety precautions.
 - Follow classroom rules for preparation, procedures and clean-up.
 - Recognize the necessity of controlled variables and carefully recorded observations.
 - Prepare data tables, charts and visualizations.
 - Collect data for analysis to resolve proposed hypothesis statements.
 - Identify faulty procedural steps which could cause different results and record observations accurately and honestly.
 - Analyze and synthesize data trends using inferences and deductions.
 - Communicate the investigation's hypothesis, procedure and explanations orally and in written format.
 - Generate further questions to consider for future investigations.
2. Separated assessment of 11A 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.
3. See suggested procedures for 12A, 12B, 12E and 12F at stage D for specific assessment features.

Examples of Student Work not available

Time Requirements

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