APPLY TECHNOLOGICAL DESIGN AND SCIENTIFIC HABITS OF MIND

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

Students will apply the concepts, principles and processes of technological design within classroom investigations accordingly:

- *Knowledge*: Understand the concepts, principles and processes of technological design.
- *Application*: Apply the appropriate scientific habits of mind when investigating science concepts.
- *Communication*: Incorporate the scientific technologies and processes of technological design into classroom investigations and reports.
  Note to teacher: These concepts could be embedded into technological design investigations. Suggested activities for standards 12C and D at stage D, incorporate many of the performance descriptions for Standard 11B.

Procedures

1. ***In order to know and apply the concepts, principles and processes of technological design (11A) and the accepted practices of science (13A) and apply scientific technologies (13B),*** students should experience sufficient learning experiences to develop the following:
   - Brainstorm the design dilemma associated with classroom curricular concepts in terms of testing the science principles.
   - Research sources of scientific information related to posed questions for testing.
   - Determine procedural sequence, success criteria and design options to safely test the choices of variables associated with the dilemma.
   - Sketch design plan and select appropriate graphic display of data according to success criteria variables.
   - Construct design prototype, following classroom rules for preparation, procedures and clean-up.
   - Collect and display data from prototype testing accurately and honestly.
   - Use scientific technologies and incorporate appropriate safety precaution.
   - Recognize the necessity of controlled variables and carefully recorded observations.
   - Identify faulty procedural steps which could cause different results.
   - Communicate the findings to explain the observations and explanations of tested principle.
   - Generate future design modifications and alternative applications for design.
2. Separated assessment of 11B may not be practical. Significant research has demonstrated the value of inquiry-based, hands-on life-long learning for students. The emphasis of technological design 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 technological design investigations in order to build mastery of each concept or process of technological design.
3. See suggested procedures for 12C and 12D at stage D for specific assessment features.

Examples of Student Work not available **Resources N/A**

Time Requirements

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