

APPLY TECHNOLOGICAL DESIGN AND SCIENTIFIC HABITS OF MIND

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

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 12 A, C, D and F at stage E, 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 common design dilemmas associated with ordinary surrounding or circumstances, in terms of testing the science principles.
 - Research sources of scientific information related to common designs for testing.
 - Suggest appropriate materials, equipment and data-collection strategies, procedural sequence, success criteria and design options to safely test the associated technological design dilemma.
 - Sketch design plan and select appropriate graphic display of data according to success criteria variables.
 - Complete assembly of innovation, following classroom rules for preparation, procedures and clean-up.
 - Collect and display data from investigation accurately and honestly.
 - Test prototype of design by conducting multiple trials and record observations.
 - Use scientific technologies to collect, store, retrieve, and communicate data, and incorporate appropriate safety precautions,
 - Recognize the necessity of controlled variables and compare carefully recorded observations and summaries.
 - Identify faulty procedural steps which could cause different results, errors, or distort how variables interact.
 - Communicate an evaluation report to explain the observations and explanations of tested principle for peer review.
 - 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 12 A, C, D and 12F at stage E for specific assessment features.

Examples of Student Work not available

Time Requirements

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