APPLY TECHNOLOGICAL DESIGN AND SCIENTIFIC HABITS OF MIND

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

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 12D at stage F, 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:
   - Generate ideas for possible technological designs in terms of testing the science principles.
   - Brainstorm pertinent applicable design variables.
   - Research sources of scientific information related to historical studies about the science principle.
   - Suggest appropriate materials, equipment and data-collection strategies, procedural sequence, success criteria and design options to safely test the associated technological design dilemma.
   - Maximize resource capabilities in design and procedures.
   - Select appropriate graphic display of data to show relation of tested success criteria variables.
   - Complete assembly of innovation, following classroom rules for preparation, procedures and clean-up.
   - Documenting data from collecting instruments accurately and honestly in selected format.
   - Test prototype of design by conducting multiple trials and record observation.
   - Incorporate appropriate safety precautions.
   - Interpret and represent results of analysis to produce findings which may support or refute initial design question or scientific principle.
   - Identify faulty procedural steps which could become sources of error or design flaws.
   - Communicate an evaluation report to explain the tested principle and present anecdotal and quantitative observations.
   - Generate design modifications for future investigations.
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 12D at stage F for specific assessment features.

Examples of Student Work not available

Time Requirements

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