INTERACTIONS OF SCIENCE AND TECHNOLOGIES

Performance Standard 13B/11B/12A-F.G

Students will explore the interactions of science and technology in multicultural, societal and economic settings from an historical context in multiple curricular units accordingly:

- *Knowledge*: Correlate the interactions of pure science concepts in historic technological innovations and their societal implications.
- *Application*: Research the historical context for a technological innovation and trace its impact through current examples.
- *Communication*: Present research to analyze how the introduction of a new technology has affected human activities worldwide.

Procedures

1. ***In order to know and apply concepts that describe the interaction of science, technology and society (13B) and the concepts, principles and processes of technological design (11B) and the understand the fundamental concepts, principles and interconnections of the life physical and earth and space sciences goal 12,*** students should experience sufficient learning opportunities to develop the following:
   - Identify an important historic innovation which was driven by science or engineering principles associated within curricular contextual units (life, environmental, physical, chemical, earth or space sciences).
   - Research original setting for the original invention or entrepreneurial situation,.
   - Research the progression of the innovation.
   - Generate possible alternative scenarios which could or should have been considered historically.
   - Research the continuing impact of the original innovation on human activities worldwide.
   - Present report on historical significance of technology and its impact.

   Note to teacher: This activity relates to the expectation of knowledge associated with standard 13B, which may culminate from the context of curricular activities for any/all of the standards in Goal 12, with the foundations in the processes of technological design from standard 11A.
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. In the context of a curricular unit, determine significant inventions, discoveries or technologies that were integral in the progress of that scientific concept by teacher or student selection processes. For example, from 12A relating to genetics, the significant technology and societal impact could be associated with agricultural biotechnology and food production globally. They could trace the progression of hybridization processes to an overview of genetic recombination technologies which have led to new hybrids that can produce more and better food supplies. They could find that there are societal hesitations about how these food products could affect human health in untested or unproven circumstances. From environmental or physical or earth sciences, they could consider any number of technologies associated with industries such as steel, mining or transportation and address the societal impact from the original beginning of the industry to its present-day challenges. In the space sciences, they could investigate the beginnings of rocketry and progress through the kinds of spin-off technologies that have been developed with positive and negative impacts. Students should emphasize a world-wide impact and consider discoveries or inventions from around the world. This kind of activity could be integrated into many of the curricular units in order to integrate the pure science concepts into real-world situations. They should be given ample time for initial presentation for expectations and individual or group research, as well as class presentation and discussion. All students could investigate the same innovation or subdivisions of the same innovation; they could alternatively research different technologies or inventions associated with the same curricular focus. Assign 8-10 minute presentations which include:
   - An explanation about the original setting for the innovation.
   - The economics, demographics and geographic parameters from that time period.
   - Trace the innovation from early stages of development and testing.
   - Focus on the societal acceptance and hesitations.
   - Consider predicted and unanticipated risks and benefits.
   - Current impact of this innovation.
   - Future possibilities of this innovation.
   - Graphic display of past and present connections, diagrams, and/or pictures.

4. Evaluate each student's work using the Science Rubric as follows and add the scores to determine the performance level:
   - *Knowledge*: The interactions of science and technology and society were identified and described correctly.
   - *Application*: The research was well-detailed and well-organized, the man.
   - *Communication*: the presentation and display were well-organized and well-detailed and provided a thorough explanation of the impacts of the contributions.

Examples of Student Work not available

Resources
- Copies of the STS Starter Page
- Science Rubric

Time Requirements
- 3-5 class periods if completed in class (20 minutes for introduction and expectations; 2-4 days for research; 1-2 days for presentations)

SCIENCE, TECHNOLOGY AND SOCIETY
STARTER PAGE

1. **Identify the innovation.**

2. **When and where did it happen?**

3. **What was its original purpose?**

4. **What was happening at this time?**

    - **What was the need?**
    - **Who was involved?**

5. **Describe the early stages of the innovation. How was it tested?**

6. **How much did it cost? Was there any special financing?**

7. **How did people respond to the innovation? Did they accept it immediately or were there hesitations at first? Why?**

8. **What were the original risks and benefits?**

9. **What were the unanticipated risks and benefits?**

10. **What is the current impact of this innovation?**

11. **What is the future for this innovation?**

12. **Find pictures or graphs or diagrams which help explain this innovation.**