

## SCIENCE AND TECHNOLOGY IN SOCIETY

### Performance Standard 13B (12A, B, C, D, E, F).F

Students will research the interactions of scientific technology in societal situations accordingly:

- *Knowledge*: Identify scientific and/or technological advances in life, physical, environmental, earth and space sciences.
- *Application*: Analyze how scientific and/or technological advances have affected many different aspects of daily life for individuals and in broad societal examples in historic time periods.
- *Communication*: Explain the impact of scientific technological innovations and discoveries in communities and countries.

### Procedures

1. ***In order to know and apply concepts that describe the interaction between science, technology, and society (13B), understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences (12A)***, students should experience sufficient learning opportunities to develop the following:
  - Research scientific discoveries and technological innovations in specific historic time periods.
  - Organize discoveries and innovations in life, environmental, physical, earth and space science categories.
  - Analyze impact of selected discoveries and innovations in terms of personal, community, national or global perspectives.
  - Correlate interrelatedness of pure science research and applied science solutions and their interface with real-world applications.

Note to teacher: This activity should be associated with each of the standards in Goal 12, in order to provide students experience with the perspective of the societal impact of the scientific discoveries and technological innovations in each of the disciplines of science.
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Provide each student a copy of the “Science Impact Matrix” concept map template. Modifications to this concept map should be made depending on the matrix of research that is preferable. This project may have an on-going impact by referring to it continually throughout the school year as additional concepts are presented. This matrix may be oriented initially by the discipline of science (e.g., life, physical, etc.) or the intra-disciplinary categories (for earth sciences: meteorology, geology, etc.) or by time periods (e.g., by decades of the 20<sup>th</sup> century, or centuries since the Dark Ages, future projections, etc.) or geographic categories (e.g., Asian, European, African, Western Hemisphere, etc.) or ethnic groupings (e.g., Native American, Oriental, etc.) or impact possibilities (e.g., changes in the environment, quality of life, birth/death rates, disease cure or elimination, economics, governmental policies, societal understanding, etc.) Additional questions may easily be added, as students make correlations from the societal needs, and the responses by scientists and the kinds of technologies or tools that emerge to resolve the original need. Students should present their findings with creative additions to the class Science Impact Matrix. They should create and present individual concept maps for their individual (or group) research. These concept maps may be added to the class Matrix on color-coded note cards placed strategically to show correlations among and between the sciences, the timeline and discoveries or innovations. Encourage students to continually focus attention to the matrix throughout the year and add concept maps and research findings (note cards) from future curricular units.
4. Evaluate each student’s work using the Science Rubric as follows and add the scores to determine the performance level:
  - *Knowledge*: Research on the scientific and technological advances in the context of the individual concept maps was thorough and complete,
  - *Application*: Analysis of the impact on daily life and society for the context of the Science Impact Matrix was complete and accurate.
  - *Communication*: Explanation of societal impact and correlations to other aspects of the matrix were thorough and well-detailed.

**Examples of Student Work not available****Time Requirements**

- One class period for initial introduction to assignment; 2 class periods for research; 1-2 class periods for presentations; on-going continuation of Matrix contributions within curricular units with shortened time requirements.

**Resources**

- Copies of the “Science Impact Matrix” task sheets
- Colored note cards
- Wall for display of timeline and research findings
- Access to research resources
- Science Rubric

## SCIENCE IMPACT CONCEPT MAP

Questions to consider:

What is the discovery or innovation?

Why did it happen? Why did they need it or want it?

To which science is it related? What is the main science foundation or concept?

Who did it? Who helped?

How much did it cost, in terms of money and time? Who paid for it?

When did it happen? What else was happening?

What was the impact? What were the positive and negative changes?

How was the daily life of people or a community affected at first?

How long did it take for people to accept or reject it?

Where did it happen? Why did it happen there?

How did it affect a region or country at first?

How did it change the population?

How did it change the economics of the people or the area?

How did it affect the environment?

Was it transferred to another place and work better or worse?

What other discoveries or innovations happened as a result?

Create and arrange a concept map about your scientific discovery or technological innovation. Add the appropriate links and facts from your research. You may need to change the shapes or perhaps ask different or additional questions.

