Atom Models Through The Ages

Purpose

Students will recognize and describe how scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.

Materials

For each student: paper, pencil
For each group of students: research materials, materials to build a 3-dimensional model of the atom, materials for a class presentation

Activity

A. Pre-Activity Discussion

1. Ask students to draw a model of an atom without looking in a book. Direct students to include labels in their drawings.
2. Ask students how the idea for their model originated.
3. Discuss their answers and ask: "Do you think scientists have always thought that the atom looks like this?"

B. Activity

1. Briefly discuss the following researchers: Democritus, Ernest Rutherford, John Dalton, Niels Bohr, Joseph John Thompson, Erwin Shrodinger, and Wolfgang Pauli.
2. Divide students into groups and assign each group to research a scientist and his contribution to the atomic model.
3. Direct students to include the following in their research:
   - Dates of birth and death
   - Place of birth, residence, research, and death
   - Picture of the researcher
   - Dates of significant research/findings related to the atomic model
   - Names of research assistants involved
   - Nobel Prize information
   - Any other related information
4. Inform students they will also build a three-dimensional model of the atom based on their researcher's findings.

(continued)

EXTENDING THE ACTIVITY

Direct students to read *The Ever Changing Atom*, by Roy A. Gallant.

INCORPORATING TECHNOLOGY

Discuss other theories that have been modified, such as how different dinosaurs lived and how they became extinct. Direct students to a Web site such as library.thinkquest.org/C005824/extinction.html to find out more about varying theories on dinosaur extinction.

Standards Links
8.1.4, 8.3.8

Activity (continued)

C. Presentations

1. Instruct each group to present its findings and models to the class in the form of a poster or multimedia presentation.
2. Have groups present in the order in which the discoveries they researched were made.
3. Tell students to be prepared to explain why their models seemed accurate at the time in which their researchers made their discoveries.
4. Tell students to also discuss the shortcomings of the models, provided any exist.

Classroom Assessment

Basic Concepts and Processes

At the end of the activity ask questions such as the following:

- Explain how theories can be modified or refuted over time, in terms of the atomic theory.
- Do you think the model of the atom will look the same as it does now in 100 years?
- Explain your reasoning.