Discussion Guide for

ATOMIC STRUCTURE: MAPPING AN INVISIBLE WORLD

OBJECTIVES

After viewing this program students will be able to:

- Diagram a typical atom and label the protons, neutrons, and electrons.
- Design a timeline showing the gradual, evolutionary history in the understanding of the structure of the atom.
- Calculate the number of protons, neutrons and electrons in an atom when given an element's atomic mass and atomic number.
- Determine the value of using industrial and medical radioactive elements and isotopes.
- Describe the formation of an isotope.
- Analyze the movement of electrons from one energy level to another as energy is added and given off.

This program is part of the AIMS Interactive Science Essentials Series. This twenty-four part series covers four subject areas- Earth Science, Biology, Physics, and Chemistry. There are six programs in each subject area. The individual programs are divided into randomly accessible sections. A glossary provides written definitions of terms used in the program, and in most cases will run a section of the video where the word is used in context. A script of the narration is accessible, as well as a bulletin board containing a general introduction to the subject. A quiz allows the student to test their knowledge and the results are recorded for you. In the teacher's section you can view each student's test responses and edit or create your own quiz and test questions.

OVERVIEW

Atomic Structure: Mapping an Innijible World is part three of the Chemistry Essentials series which examines modern day chemistry. The program uses dynamic animation to bring to life the invisible world of the atom and to explain how models of the atom have changed over time. The program introduces students to the atomic models of Dalton, Rutherford, Bohr, and contemporary physicists. Also outlined are important concepts such as subatomic particles, anti-particles, isotopes, atomic number, mass, and radioactive particles. The program concludes by showing how radioactive isotopes are used to detect and fight disease, monitor the flow of pesticides through the environment, and to date fossil remains.

TEACHER'S PREPARATION

- Before the student uses the program set up the computer so that they can easily reach the mouse and the keyboard.
- Load the CD-ROM into the computer so that it is ready for the student to begin using.
- While students are able to work at their own pace, some students may benefit from using the program more than once.

SUGGESTED DISCUSSION QUESTIONS

1. Diagram an atom of carbon and label the protons, neutrons, and electrons.

2. Design a timeline showing the gradual, evolutionary history of understanding the structure of the atom.

3. In five words or less, explain what keeps the negatively charged electrons from colliding with the positively charged protons in the nucleus of an atom.

4. Which element has an atomic number of 2?

5. If an element's atomic mass is approximately 16 and its atomic number is 8, how many neutrons are in the nucleus of the atom?

6. When Thorium-232/90 decays to 228/88, what changes occur in the number of particles in the nucleus? What element does the radioactive Thorium become?

7. Describe the formation of an isotope.

8. Debate the value of using industrial and medical radioactive elements and isotopes.

9. Describe the movement of electrons from one energy level to another as energy is added and given off.

10. Illustrate three types of radiation given off by radioactive elements.

11. Make a mind-map that discusses radioactive decay and the transmutation of radioactive elements and isotopes.

12. Give an example showing how the half-life of carbon- 14 can be used to calculate the age of a fossil.

VOCABULARY

AMU	Atom
Bohr	Carbon
Crookes	Dalton
Democritus	Electron
Elements	Energy
Heat	Isotopes
Mass	Model
Neutron	Orbits
Particle	Proton
Radioactive	Rutherford

ADDITIONAL BENEFITS

Students will be able to:

- Illustrate three types of radiation given off by radioactive elements.
- Demonstrate radioactive decay and transmutation of radioactive elements and isotopes.
- Explain how the half-life of carbon-14 can be used to calculate the age of a fossil.

LENGTH:
21 minutes

SUBJECT AREAS:
Chemistry

AUDIENCE LEVELS:
Junior-Senior High

ORDER NUMBER:
1-9089SG

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