

## TEACHER RESOURCE PAGE

### Lesson Plan

#### Section: Structure of Atoms

#### Pacing

<b>Regular Schedule</b>	<b>with lab(s):</b> NA	<b>without lab(s):</b> 2 days
<b>Block Schedule</b>	<b>with lab(s):</b> NA	<b>without lab(s):</b> 1 day

#### Objectives

1. Describe the evidence for the existence of electrons, protons, and neutrons, and describe the properties of these subatomic particles.
2. Discuss atoms of different elements in terms of their numbers of electrons, protons, and neutrons, and define the terms atomic number and mass number.
3. Define isotope, and determine the number of particles in the nucleus of an isotope.

#### National Science Education Standards Covered

##### UNIFYING CONCEPTS AND PROCESSES

UCP 1 Systems, order, and organization

UCP 2 Evidence, models, and explanation

UCP 5 Form and function

##### PHYSICAL SCIENCE—STRUCTURE OF ATOMS

PS 1a Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as mass and electrical charge. Each atom has a positively charged nucleus surrounded by negatively charged electrons. The electric force between the nucleus and electrons holds the atom together.

PS 1b The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.

## PHYSICAL SCIENCE—STRUCTURE AND PROPERTIES OF MATTER

PS 2b An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties. This “Periodic Table” is a consequence of the repeating pattern of outermost electrons and their permitted energies.

### KEY

SE = Student Edition

ATE = Annotated Teacher Edition

## Block 2 45 minutes

### FOCUS 5 minutes

- \_ **Bellringer** ATE (GENERAL). This activity has students write down the words that they do not know from the key terms.

### MOTIVATE 10 minutes

- \_ **Identifying Preconceptions**, ATE (BASIC). This activity shows students that unexpected results can occur during experiments and can lead to new inquiry.

### TEACH 30 minutes

- \_ **Demonstration**, ATE (GENERAL). This demonstration uses a television set and a magnet to demonstrate how a magnet held near a cathode ray tube causes the beam to be deflected. This phenomenon indicates that the particles in the beam have a negative charge. Compare this demonstration to Figure 6.
- \_ **Transparency, Gold-Foil Experiment (GENERAL)**. This transparency master shows the set up for the gold-foil experiment. (Figure 8)
- \_ **Transparency, Gold-Foil Experiment on the Atomic Level (GENERAL)**. This transparency master relates the results of the gold-foil experiment to the underlying atomic events. (Figure 8)
- \_ **Using the Figure**, ATE (GENERAL). This activity has students examine the information in Table 3 and compare protons with neutrons.

## HOMEWORK

- \_ **Reading Skill Builder**, ATE (BASIC). Have students use Figure 6 and the information in their textbook to draw and label a diagram of a cathode ray tube.
- \_ **Homework**, ATE (BASIC). This assignment has students create a graphic organizer using a question, discovery, and inference format.

## OTHER RESOURCES

- \_ [go.hrw.com](http://go.hrw.com)
- \_ [www.scilinks.org](http://www.scilinks.org)

## KEY

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## Block 3 45 minutes

TEACH 35 minutes

- \_ **Transparency, Properties of Subatomic Particles (GENERAL)**. This transparency master summarizes the properties of electrons, neutrons, and protons. (Table 2 and Table 3)
- \_ **Teaching Tip**, ATE (GENERAL). Show students a periodic table and point out the atomic numbers. This activity helps students realize that the numbers on a periodic table relate to the number of protons in each element's nucleus.
- \_ **Sample Problem A: Determining the Number of Particles in an Atom**, SE (GENERAL). This problem demonstrates how to determine the number of particles in an atom.
- \_ **Sample Problem B: Determining the Number of Particles of Isotopes**, SE (GENERAL). This problem demonstrates how to determine the number of particles in the isotopes of an element.

CLOSE 10 minutes

- \_ **Interactive Tutor for ChemFile**, Module 2: Models of the Atom; Topic: Atomic Structure

- \_ **Quiz**, ATE (GENERAL). This assignment has students answer questions about the concepts in this lesson.
- \_ **Reteaching**, ATE (BASIC). Students draw and label models of the nuclei of two isotopes.
- \_ **Assessment Worksheet: Section Quiz** (GENERAL)

#### HOMEWORK

- \_ **Practice Sample Problems A: Determining the Number of Particles in an Atom**, SE (GENERAL). Assign items 1–4.
- \_ **Homework**, ATE (BASIC). Students complete a table to help them master the concepts of atomic number and mass number. (Sample Problem A)
- \_ **Practice Sample Problems B: Determining the Number of Particles of Isotopes**, SE (GENERAL). Assign items 1–2.
- \_ **Homework**, ATE (BASIC). This assignment provides students with additional practice in determining the number of particles in the isotopes of an element. (Sample Problem B)
- \_ **Section Review**, SE (GENERAL). Assign items 1–8.
- \_ **Skills Worksheet: Concept Review** (GENERAL)

#### OTHER RESOURCES

- \_ **Skill Builder**, ATE (ADVANCED). Ask students to research the work going on in particle physics. Then, have them write a short paper about their findings.
- \_ **Group Activity**, ATE (GENERAL). Small groups of students use 30 3 50 index cards to practice writing and reading nuclear symbols.
- \_ **go.hrw.com**
- \_ **www.scilinks.org**