CURRICULUM SUGGESTIONS

TOPICS

Structure of the Atom	Structure of Matter	Shapes of Molecules
Nature of Light	Solids	Electrical Interactions
Atomic Theory	Crystals	VSEPR Theory
Quantum Mechanics	Crystal Structure	

OVERVIEW

This unit could stand by itself with a scope limited to the theory behind diffraction of electromagnetic radiation, in general, and the use of X-ray diffraction, specifically, to determine the structure of materials. The same could be said for scanning probe microscopy. The unit could, however, also be used to supplement an existing chemistry curriculum and to provide a way to introduce or reinforce the above topics. In the suggestions that follow, when a specific investigation or activity is used as an example, it refers not only to the activity referenced, but also to the background information that is included in the Introduction to the unit and the Teacher Notes for that activity. These suggestions are illustrative not exhaustive.

SUGGESTIONS

Investigation 1 -----This investigation can be used to introduce the nature of light. Examples would include: velocity, frequency, and wavelength relationships; electromagnetic spectrum; properties of light, such as reflection, refraction, diffraction, and interference; dimensional analysis.

Investigation 2 ----- This investigation can be used to teach crystal structures, which are often included in a unit on the phases of matter. It could also be used in conjunction with the VSEPR theory of bonding to reinforce the concepts of molecular shapes as a consequence of electrical interactions between bonded and lone pairs of electrons. The investigation should provide the students with an understanding of how we know the shapes of molecules.

Investigation 3 ----- This investigation can be used to make the inherently abstract nature of topics related to quantum mechanics more concrete. By seeing that the theory of quantum mechanics can be used to create a real instrument that can, in turn, be used to image atoms, students should be able to see the practical consequences of this topic.

Activity 1 ----------This activity is intended to weave Investigations 1-3 into the fabric of everyday life. By having students research the current literature and other information sources, it is hoped that they will see that these concepts are not just something that is studied in a chemistry class, but have applications that make a difference to our quality of life.