

ODYSSEY Molecular Explorer

— Release 6.2 —

Correlation with the

Wyoming Science Content and Performance Standards

Grade Span 9-12

Adopted July 7, 2003

1. CONCEPTS AND PROCESSES

In the context of unifying concepts and processes, students develop an understanding of scientific content through inquiry. Science is a dynamic process; concepts and content are best learned through inquiry and investigation.

EARTH, SPACE, AND PHYSICAL SYSTEMS:

10. Structure and Properties of Matter:

Students describe the atomic structure of matter including subatomic particles, their properties, and interactions. They recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. They explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Students describe physical states of matter and phase changes. Students differentiate between chemical and physical properties, and chemical and physical changes.

- **LAB Chemical Matter** "Side-by-Side Comparison of Solids, Liquids, and Gases"
- **LAB Chemical Matter** "Comparing the States of Matter"
- **LAB Chemical Matter** "Chemical and Physical Properties"
- **LAB Atoms** "Nuclei and Electrons"
- **LAB Chemical Bonding** "Exploring Ionic Interactions"
- **LAB Chemical Bonding** "Electron Sharing in Molecules"
- **LAB Chemical Bonding** "Energetics of Covalent Bonding"
- **LAB Chemical Bonding** "Polar Bonds and Molecules"
- **LAB Chemical Bonding** "Classifying by Bond Polarity"
- **LAB Liquids & Solids** "The Melting Transition"
- **DEMONSTRATION Chemical Matter** "Do physical changes affect the amount of matter?"
- **MISCELLANEOUS Main Groups** "Alkali Metals"

- **MISCELLANEOUS** *Main Groups* "Alkaline Earth Metals"
- **MISCELLANEOUS** *Main Groups* "Boron Group"
- **MISCELLANEOUS** *Main Groups* "Carbon Group"
- **MISCELLANEOUS** *Main Groups* "Nitrogen Group"
- **MISCELLANEOUS** *Main Groups* "Oxygen Group"
- **MISCELLANEOUS** *Main Groups* "Halogens"
- **MISCELLANEOUS** *Main Groups* "Noble Gases"
- **MISCELLANEOUS** *Transition Metals* "Elements of the d- and f-Blocks"

11. Chemical Reactions:

Students recognize that chemical reactions take place all around us. They realize that chemical reactions may release or consume energy, occur at different rates, and result in the formation of different substances. They identify the factors that affect reaction rates.

- **DEMONSTRATION** *Kinetics* "What does a chemical reaction look like at the molecular level?"
- **LAB** *Kinetics* "Reactive Collisions Between Molecules"
- **LAB** *Kinetics* "Examining a Reaction Mechanism"

12. Conservation of Energy and Increase in Disorder:

Students demonstrate an understanding of the laws of conservation of mass and energy within the context of physical and chemical changes. They realize the tendency for systems to increase in disorder.

- **DEMONSTRATION** *Thermochemistry* "What is the energy of a vibrating diatomic molecule?"
- **DEMONSTRATION** *Kinetics* "What does a chemical reaction look like at the molecular level?"
- **LAB** *Kinetics* "Examining a Reaction Mechanism"
- **DEMONSTRATION** *Chem. Thermodyn.* "Do all spontaneous processes involve a visible increase of disorder?"
- **DEMONSTRATION** *Chemical Thermodynamics* "Are gas expansions irreversible?"

13. Energy and Matter:

Students demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between energy and matter.

- **DEMONSTRATION** *Thermochemistry* "What is the energy of a vibrating diatomic molecule?"
- **LAB** *Thermochemistry* "Thermal Energy"

→ **DEMONSTRATION** *Chem. Thermodyn.* "Do all spontaneous processes involve a visible increase of disorder?"