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ODYSSEY Molecular Explorer
— Release 7.0 —

Correlation with the
North Dakota Science Content and Achievement Standards
March 2006

Standard 3

Students understand the basic concepts and principles of physical science.

Grade 8

PROPERTIES OF MATTER

8.3.1.
Identify elements and compounds.

→ **C3** *Chemical Matter* "Examples of Elements"

→ **C4** *Chemical Matter* "Types of Compounds"

8.3.2.
Explain the relationship between phases of matter and temperature.

→ **C6** *Chemical Matter* "States of Matter"

→ **C7** *Chemical Matter* "Comparing States Side-by-Side"

→ **C13** *Chemical Matter* "Physical Changes"

→ **H20** *Liquids & Solids* "Melting Transition"

ENERGY TRANSFER AND TRANSFORMATION

8.3.5.
Identify when heat can be transferred by conduction, convection, or radiation.

→ **O3** *Chemical Thermodynamics* "Heat Conduction"

Grade 9-10

PROPERTIES OF MATTER

9-10.3.1.
Classify elements according to similar properties. (e.g., metal, nonmetal, solids, liquids, gases).

→ **Stockroom** Samples Available for Almost All Elements

9-10.3.2.
Classify changes in matter as physical or chemical.

→ **C12** *Chemical Matter* "Types of Properties"

9-10.3.3.
Identify the Law of Conservation of Matter in physical and chemical changes.

→ **H20** *Liquids & Solids* "Melting Transition"

→ **M1** *Kinetics* "Observing a Reaction"

→ **M3** *Kinetics* "Mechanism of a Reaction"

ATOMS AND MOLECULES

9-10.3.4.
Construct a model of an atom (e.g., protons, neutrons, electrons, nucleus, electron cloud).

→ **D2** *Atoms* "Distribution of Mass in Atoms"

→ **D5** *Atoms* "Electron Cloud of Argon"

CHEMICAL REACTIONS

9-10.3.5.
Identify the reactants and products in a chemical reaction.

→ **M2** *Kinetics* "Reactive Collisions"

→ **M3** *Kinetics* "Mechanism of a Reaction"

ENERGY TRANSFER AND TRANSFORMATION

9-10.3.8.
Describe the relationships between kinetic and potential energy in basic transformations (e.g., physical and chemical changes)

→ **L4** *Thermochemistry* "Vibrating Diatomic Molecule"

Grade 11-12

ATOMIC STRUCTURE AND PROPERTIES

11-12.3.1.
Explain how the structure of an atom, isotope, or ion relates to its properties.

→ **D2** *Atoms* "Distribution of Mass in Atoms"

→ **D3** *Atoms* "Isotopes"

→ **D4** *Atoms* "Hydrogen Atom"

→ **D8** *Atoms* "Atomic Orbitals"

11-12.3.2.
Identify the basic organization of the periodic table (e.g., elements are listed according to the number of protons [atomic number]; repeating patterns of physical and chemical properties.

→ **P1** *Main Groups & Transition Metals* "Alkali Metals"

→ **P2** *Main Groups & Transition Metals* "Alkaline Earth Metals"

→ **P3** *Main Groups & Transition Metals* "Boron Group"

→ **P4** *Main Groups & Transition Metals* "Carbon Group"

→ **P6** *Main Groups & Transition Metals* "Nitrogen Group"

→ **P7** *Main Groups & Transition Metals* "Oxygen Group"

→ **P10** *Main Groups & Transition Metals* "Halogens"

→ **P11** *Main Groups & Transition Metals* "Noble Gases"

→ **P12** *Main Groups & Transition Metals* "Elements of the d- and f-Blocks"

ATOMS AND MOLECULES

11-12.3.3.
Compare and contrast the role of electrons in ionic and covalent bonding.

→ **F1** *Chemical Bonding* "The Attraction Between Ions"

→ **F7** *Chemical Bonding* "Electron Sharing"

→ **F8** *Chemical Bonding* "Energetics of Covalent Bonding"

→ **F11** *Chemical Bonding* "Polar Bonds and Molecules"

11-12.3.4.
Identify the basic bonding characteristics of carbon which lead to a large variety of structures.

→ **S1** *Organic Chemistry* "How Special is Carbon?"

CHEMICAL REACTIONS

11-12.3.5.
Identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory.

→ **M2** *Kinetics* "Reactive Collisions"

11-12.3.6.
Write the chemical formula and name for compounds using a table of element names, symbols, and oxidation numbers.

→ **C20** *Chemical Matter* "Naming Compounds"

→ **Stockroom** Many Samples of Ionic and Molecular Compounds

11-12.3.7.
Balance chemical equations.

→ **M1** *Kinetics* "Observing a Reaction"

→ **M3** *Kinetics* "Mechanism of a Reaction"

FORMS OF ENERGY

11-12.3.9.
Explain the relationship among thermal energy, temperature, and the motion of particles.

→ **L2** *Thermochemistry* "Thermal Energy"

→ **G10** *Gases* "The Meaning of Temperature"

→ **G12** *Gases* "Mean Speed and Temperature"

ENERGY TRANSFER AND TRANSFORMATION

11-12.3.10.
Apply the law of conservation of energy to a variety of situations.

→ **L4** *Thermochemistry* "Vibrating Diatomic Molecule"

11-12.3.11.
Explain how energy is related to physical changes of matter (e.g., phase changes, temperature changes).

→ **C13** *Chemical Matter* "Physical Changes"

→ **H20** *Liquids & Solids* "Melting Transition"