

Unit 9 - Moving through the States of Matter

Content Area: **Science**
Course(s): **Chemistry CP**
Time Period: **May**
Length: **6 weeks**
Status: **Published**

Transfer Skills

The kinetic molecular theory of matter is the foundation for the behavior and properties of all substances.

Enduring Understandings

Intermolecular forces affect the properties of all states of matter.

The phase of a substance is determined by distances between the particles and motions of the particles in that substance.

Temperature affects the properties and behavior of matter.

The hydrogen bonding in water accounts for its unique properties.

Essential Questions

How can the physical state of a substance be predicted?

How do substances change from one state to another?

What is the relationship between evaporation and kinetic energy?

What are the features of phase diagrams and heating curves?

Content

Kinetic Molecular Theory, Vapor Pressure, boiling point, critical point, triple point, surface tension, viscosity, diffusion, effusion, compressibility, allotropes, amorphous solid, crystalline solid, manometer, barometer

Skills

Describe general characteristics and properties of solids, liquids, and gases.

Explain why a liquid has a vapor pressure and why a change in temperature causes a change in vapor pressure.

Interpret vapor pressure diagrams, phase diagrams, and heating curves.

Measure the vapor pressure of a contained liquid using a manometer.

Resources

Standards

SCI.9-12.5.1.12.A.2	Develop and use mathematical, physical, and computational tools to build evidence-based models and to pose theories.
SCI.9-12.5.1.12.B.1	Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
SCI.9-12.5.1.12.B.2	Build, refine, and represent evidence-based models using mathematical, physical, and computational tools.
SCI.9-12.5.1.12.B.3	Revise predictions and explanations using evidence, and connect explanations/arguments to established scientific knowledge, models, and theories.
SCI.9-12.5.1.12.B.4	Develop quality controls to examine data sets and to examine evidence as a means of generating and reviewing explanations.
SCI.9-12.5.1.12.C.1	Reflect on and revise understandings as new evidence emerges.
SCI.9-12.5.1.12.C.2	Use data representations and new models to revise predictions and explanations.
SCI.9-12.5.2.12.C	Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.
SCI.9-12.5.2.12.C.1	Use the kinetic molecular theory to describe and explain the properties of solids, liquids, and gases.
SCI.9-12.5.2.12.C.2	Account for any trends in the melting points and boiling points of various compounds.
SCI.9-12.5.2.12.C.b	Heating increases the energy of the atoms composing elements and the molecules or ions composing compounds. As the kinetic energy of the atoms, molecules, or ions increases, the temperature of the matter increases. Heating a pure solid increases the vibrational energy of its atoms, molecules, or ions. When the vibrational energy of the molecules of a pure substance becomes great enough, the solid melts.