Chemistry - Unit 7 - Molecular Geometry and Intermolecular Forces

Unit Focus

In this extension unit, students will deepen their understanding of chemical bonding between atoms and how the degree of electron sharing impacts the type of bonds between atoms. From here, students will learn how to use two dimensional Lewis Structures and the Valence Shell Repulsion Theory as the basis for predicting the shapes of small molecules as well as molecular polarity. Students will use this knowledge to identify the intermolecular forces present in a molecule and how these forces explain and predict the physical and chemical properties of that molecule. The unit will then explore the application of this phenomenon to everyday applications.

Stage 1: Desired Results - Key Understandings

Standard(s)

Next Generation Science Standards (content standards)

High School Physical Sciences: 9 - 12

Matter and Its Interactions *(HS-PS1)*

Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. *(HS-PS1-3)*

Motion and Stability: Forces and Interactions *(HS-PS2)*

Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. *(HS-PS2-6)*

Next Generation Science Standards (DCI)

Science: 11

PHYSICAL SCIENCES

A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart.

Madison Public Schools Profile of a Graduate

Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. *(POG.1.2)*

Product Creation: Effectively use a medium to communicate important information. *(POG.3.2)*

Transfer

Students will be able to independently use their learning to...

T1 Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions.

Meaning

Understanding(s)

Students will understand that...

U1 The structure and interactions of matter are determined by electrical forces within and between atoms.

Essential Question(s)

Students will keep considering...

Q1 How can the shape, bond angles, and polarity of a molecule be predicted using VSEPR theory?

Acquisition of Knowledge and Skill

Knowledge

Students will know...

K1 The localized electron bonding model describes and predict the molecular geometry using Lewis diagrams and the VSEPR model.

Skill(s)

Students will be skilled at...

S1 Use Lewis Dot structures to predict molecular shape and polarity (including bond angles, bond polarity, and hybridization).