

**CONCEPT MAP OF UNIT**

To understand inelastic and elastic collisions as well as temperature, concentration, surface area, and orientation as it pertains to collision theory.

TOPIC

Molecular Collisions

TEACHER

Miranda, Steve, and Kaitlin

GRADE

High School

**LEARNING STANDARDS**

**LEARNING TARGETS**

**OPTIONAL INSTRUCTIONAL TOOLS**

**CHEMISTRY**

Students will be able to:

Netlogo Model

**PERFORMANCE**

**INDICATOR 3.4**

Use kinetic molecular theory (KMT) to explain rates of reactions and the relationships among temperature, pressure, and volume of a substance.

Major Understandings:

3.4c Kinetic molecular theory describes the relationships of pressure, volume, temperature, velocity, and frequency and force of collisions among gas molecules.

3.4d Collision theory states that a reaction is most likely to occur if reactant particles collide with the proper energy and orientation.

3.4f The rate of a chemical reaction depends on several factors: temperature, concentration, nature of the reactants, surface area, and the presence of a catalyst.

- Manipulate the given model
- Explain how surface area, temperature, concentration, and orientation influence molecular collisions
- Explain how surface area, temperature, concentration, and orientation influence inelastic collisions
- Determine the distance traveled given the velocity of the particle

**PHYSICS**

4.1d Kinetic energy is the energy an object possesses by virtue of its motion.

5.1r Momentum is conserved in a closed system.

**MATH**

Definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over the integral.

**CONCEPT**

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Chemistry

Physics

Mathematics

Cross-Cutting

**LESSON ESSENTIAL QUESTIONS**

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How does surface area, temperature,

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Given the velocity of the particles, how far

What factors influence the inelastic

concentration, and orientation influence molecular collisions?

concentration, and orientation influence inelastic collisions?

have the particles traveled?

collisions needed to form a new molecule?

VOCABULARY

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Collision Theory, Kinetic Energy, mass, concentration, surface area, temperature, orientation, Boltzmann's Constant

Inelastic collisions, Elastic collisions, Momentum, Kinetic Energy, mass and velocity

Integral, derivative, function, ratio, velocity

Patterns, factors, relationships

ADDITIONAL INFORMATION

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