

Physics

I. Enduring Understanding:

The motion of an object can be described, predicted and explained using some fundamental laws of physics.

Essential Questions:

How do you describe, predict and represent motion?

What is the nature of Force?

How do you predict and explain the motion of an object by understanding the interactions of it with other objects?

How can we use the conservation laws to describe and predict the motion of an object?

Student Outcomes: Students will:

- A. Understand that motion can be described, predicted and explained.
 - 1. Distinguish between velocity and acceleration.
 - 2. Identify displacement, velocity, and acceleration graphs.
 - 3. Use equations of motion to predict the motion of an object.
 - 4. Use concepts of displacement, velocity, acceleration, and time to describe the motion of an object.
 - 5. Represent the motion of an object graphically, verbally, and with equations.

- B. Understand the nature of forces.
 - 1. *Use the interaction model of force to identify the forces acting on an object.*
 - 2. Use force diagrams to represent forces.
 - 3. Identify different types of forces.
 - 4. *Identify the effect a force has on an object.*

- C. Be able to predict and explain the motion of an object by understanding the interactions of it with other objects.
 - 1. Use the force-acceleration model to predict the motion of an object.

- D. The conservation laws can be useful in describing and predicting the motion of an object.
 - 1. *Recognize that energy is conserved.*
 - 2. *Be able to quantitatively trace the energy that is transferred between objects.*
 - 3. *Use the concepts of potential energy, kinetic energy, and work to predict the motion of an object and the characteristics of the system.*
 - 4. Recognize that momentum is conserved
 - 5. Be able to quantitatively trace the momentum that is transferred between objects.

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6. Use the concept momentum and impulse to predict the motion of an object and the characteristics of the system.

II. Enduring Understanding:

The behaviors of electromagnetic systems can be described, predicted and explained using fundamental laws of physics.

Essential Questions:

What is the nature of Electrical Forces?

What is the nature of magnetism?

How can we analyze the properties of an electric circuit?

Student Outcomes: Students will:

- A. Understand the Nature of Electrical Interactions
 1. What changes must occur for an object to become charged
 2. Identify electrons and protons as the carriers of charge.
 3. *Be able to use the laws of electrical interactions to predict the behavior of charged objects.*
 4. Recognize the effect of conductors and insulators on charged objects.
 5. Be able to use the concept of electrical potential energy to predict the behavior of charged objects.
- B. Understand the nature of magnetism.
 1. Explain why some materials are magnetic and some are not.
 2. Identify the role of electron motion in the phenomena of magnetism.
 3. Predict the effect of magnetic forces on charged objects.
 4. Explain how electricity can be produced through magnetism.
- C. Be able to analyze the properties of an electric circuit.
 1. Diagram and Explain the movement of electrical charge through conducting materials comprising a circuit.
 2. Distinguish between voltage, current, capacitance and resistance.
 3. *Be able to describe and predict the current, voltage, resistance, power and capacitance of a circuit.*
 4. Understand the relationship between voltage, current and resistance.