



High School Physics Curriculum Pacing Guide

Force & Motion

Crosscutting Concepts: Cause and Effect; Scale, Proportion, and Quantity; Systems and System Models

Topics: Newton’s Laws; Free Body Diagrams, Types of Forces; Centripetal Acceleration and Force; Newton’s Gravitational Law

7-week Instructional Segment

Anchoring Phenomenon	Standard	Instructional Segment	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
How does mass affect the rate of free fall acceleration and force?	SP2. a, b, c, d, e	Force and Motion	From <i>A Framework for K-12 Science Education</i> : <i>By the end of grade 12</i> PS2A: Forces and Motion <ul style="list-style-type: none"> ● Newton’s 2nd Law accurately predicts changes in the motion of macroscopic objects. PS2B: Types of Interactions <ul style="list-style-type: none"> ● Newton’s Law of Universal Gravitation provides the mathematical model to describe and predict the effects of gravitational forces between distance objects. ● Forces at a distance are explained by fields 	<ul style="list-style-type: none"> ● Constructing Explanations ● Developing and Using Models ● Using Mathematics and Computational Thinking ● Planning and Carrying Out Investigations 	Background: Student experimental designs should be approved by teacher before proceeding. By the end of this unit, students are using the following language in their speaking, writing, and problem-solving processes; during EXPLAIN or ELABORATE. <ul style="list-style-type: none"> ● Inertia ● Newton’s Laws ● Acceleration ● Force ● Free Body Diagram ● Equilibrium

			<p>permeating space.</p> <p>PS2C: Stability and Instability in Physical Systems</p> <ul style="list-style-type: none"> • Systems often change in predictable ways; understanding the forces that drive the transformations and cycles within a system as well as the forces imposed on the system from the outside, help predict its behavior under a variety of conditions. <p>PS3C: Relationship between Energy and Forces</p> <ul style="list-style-type: none"> • Each force between two interacting objects acts in the direction such that direction would reduce energy in the force field between objects. However, prior motion and other forces also affect the actual direction of motion. 		<ul style="list-style-type: none"> • Non-equilibrium • Force resolution • Normal force • Friction force • Gravitational force • Tension force • Spring force • Circular motion • Centripetal force • Universal Law of Gravitation
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This instructional segment will connect to instructional segment three: energy and momentum.