

LISBON SCHOOL DEPARTMENT
UNIT DESIGN OUTLINE

Unit Title: Unit 3: The Laws of Motion

Unit Designers: Jill Denniston

Level(s): Freshmen Time Span: 3 weeks

Content Area:

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|--|--------------------------------------|--|--|
| <input type="checkbox"/> Career Prep | <input type="checkbox"/> Health/PE | <input type="checkbox"/> M&C Languages | <input type="checkbox"/> Social Studies |
| <input type="checkbox"/> English Language Arts | <input type="checkbox"/> Mathematics | <input checked="" type="checkbox"/> Science & Tech | <input type="checkbox"/> Visual & Perf. Arts |

Summary of Unit:

Newton established his three laws of motion by considering common patterns of change in all motion. Newton's laws can be used to analyze and predict changes in the motion of objects.

In this unit students will understand how Newton's first two laws of motion explain how forces cause the motion of objects to change. Newton's third law of motion will explain how you affect Earth when you walk, and how Earth affects you. Students will all so be able to explain how gravitational force is present between you and every other object in the universe.

Content Standards/Performance Indicators:

B. The Skills and Traits of Scientific Inquiry and Technological Design

B.1. Students methodically plan, conduct and analyze data from, and communicate results of in-depth scientific investigations, including experiments guided by a testable hypothesis.

B.2. Students use a systematic process, tools and techniques, and a variety of materials to design and produce a solution or product that meets new needs or improves existing designs.

D4. Students understand that the laws of force and motion are the same across the universe.

Key Pre-Requisites:

Knowledge:

Students should already be familiar with the following vocabulary: net force

Skills:

Use conversion factors to convert between units of measure.

Use a calculator

Enduring Understandings:

Outside forces cause the motion of objects to change.

There is a gravitational force between you and every other object in the universe.

Essential Questions that Guide and Focus This Unit:

How are Newton's Laws used to describe the motion of objects?

How are mass and weight different?

Key Knowledge and Skills students will acquire as a result of this unit:

Knowledge:

How to use Newton's Laws to describe force and explain motion.

Skills:

Make accurate observations using tools

Analyze situations

Design, construct, and test a device to explain Newton's Laws of Motion

How will students provide evidence of their understandings?

Labs:

Penny For Your Thoughts on Inertia: B1 & B2 & D4

Momentum Bashing: B2 & D4

Conservation: It's the Law: B1 & B2 & D4

How Much Do You Weigh? D4

Teaching and Learning experiences used to help students understand:

Lecture

Demos

Labs

Physical Science with Earth Science (Glencoe Science) Chapter 4

Understanding Car Crashes: It's Basic Physics; Teacher Guide from Insurance Institute for Highway Safety

Completing a note taking worksheet for the chapter

Provisions for Extending Learning:

Additional Lab:

Egg Crash! Designing a Collision Safety Device

Online:

Choose one of the following to research online and write a report that explains how Newton's Laws are the same in the universe as they are on Earth. (How the moon orbits the Earth. Describe the motion of the planets. How a rocket moves in outer space. How a satellite is made to orbit the Earth. How walking on the moon compares to walking on Earth.)

Practice Test:

Standardized Test Practice (pages 124 – 125)

How will technology be used to increase student achievement?

Use of video: "Understanding Car Crashes: Its Basic Physics"

Computers/Internet: Online Research Skills

Instructional Resources:

Lab activities

Video Concept Organizer:

Attach a copy of the unit assessment tool, including criteria for evaluation of student performance/product.

Physics Woman