

Unit 2: Force and Motion

Content Area: **Science**
Course(s): **Science 3**
Time Period: **Quarter 2**
Length: **4 weeks**
Status: **Published**

Unit Summary

In this unit of study, students are able to determine the effects of balanced and unbalanced forces on the motion of an object. The Crosscutting Concepts of Patterns and Cause and Effect are identified as organizing concepts for these Disciplinary Core Ideas. In the third-grade performance expectations, students are expected to demonstrate grade-appropriate proficiency by planning and carrying out investigations. Students are expected to use these practices to demonstrate understanding of the core ideas.

Standards

LA.W.3.7	Conduct short research projects that build knowledge about a topic.
LA.W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
LA.RI.3.1	Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
LA.SL.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
MA.3.MD.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Student Learning Objectives

Students will learn to:

- plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.] (3-PS2-1)
- make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.] (3-PS2-2)

Essential Questions

How do equal and unequal forces on an object affect the object?

Can we use patterns that we observed to predict the future?

Enduring Understandings

In Part A: How do scientists play soccer? students will understand that:

- science investigations use a variety of methods, tools, and techniques.
- cause-and-effect relationships are routinely identified.
- objects in contact exert forces on each other.
- each force that acts on a particular object has both strength and a direction.
- an object at rest typically has multiple forces acting on it, but they add to zero net force on the object.
- forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Qualitative and conceptual, but not quantitative, addition of forces are used at this level.)

In Part B: Can we use patterns that we observed to predict the future? students will understand that:

- science findings are based on recognizing patterns.
- patterns of change can be used to make predictions.
- the patterns of an object's motion in various situations can be observed and measured.
- when past motion exhibits a regular pattern, future motion can be predicted from it. (Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.)

Application
