Nov. K Unit 2: Forces and Motion

Content Area: **Science**
Course(s):
Time Period: **November**
Length: **6-8 Weeks**
Status: **Published**

Unit Overview

This unit explores forces and motion.

Enduring Understandings

Forces such as push and pull move objects in the world.

Motion is caused by a force.

Essential Questions

How do forces and motion cause objects to move in the real world?

Instructional Strategies & Learning Activities

- Unit 2: Forces and Motion

  Student Edition

  Forces and Motion: Unit Opener

  The Unit Opener for "Forces and Motion" introduces the unit project, A Game of Motion. During this unit project, children will:
  - Explore how to create a game of motion using bottle caps and the inside of a box top.
  - Collect data to use as evidence to answer a question.
  - Analyze data to see if the objects worked as intended.

- Unit 2: Forces and Motion
  Student Edition

  Forces and Motion: Unit At a Glance

  Unit at a Glance for "Forces and Motion" includes the unit table of contents, unit vocabulary words, and the vocabulary game, Guess the Word! In this unit, children will:
  - plan and conduct an investigation about the speed of objects;

- gather evidence to support or refute ideas about what causes motion;
- analyze data from tests to determine if a tool works as intended;
- explore pushes and pulls of different strengths and their effect on objects.

- Unit 2: Forces and Motion
- Teacher Edition

Forces and Motion: Integrating the NGSS* Three Dimensions of Learning

This section details the Performance Expectations covered in the unit "Forces and Motion."

- Unit 2: Forces and Motion
Teacher Edition

Forces and Motion: 3D Unit Planning

Planning resources are available for each lesson and hands-on activity in the unit "Forces and Motion."
Launch

- Unit 2: Forces and Motion
Teacher Edition

Forces and Motion: Differentiate Instruction

This page provides differentiated support for this unit's Science & Engineering Leveled Readers, "How Can Objects Move?" and "Magnets Help Us Every Day."

Unit 2: Forces and Motion
- Teacher Edition

Forces and Motion: Connecting with NGSS

These opportunities for informal science learning provide local context and extend and enhance concepts from the unit "Forces and Motion."

- Unit 2: Forces and Motion
- Online Assessment

Forces and Motion: Unit Pretest

The interactive Unit Pretest for "Forces and Motion" focuses on prerequisite knowledge. The test is composed primarily of DOK 1 items that evaluate student preparedness for the upcoming content.

Unit 2: Forces and Motion
-
    - Student Edition

Forces and Motion: Unit Performance Task: Figure 8 in Motion

During the Performance Task "Figure 8 in Motion," children will plan and conduct an

investigation in which they gather evidence to determine the effect of force used to move an object around a figure 8 course.

- Unit 2: Forces and Motion
  Student Edition

  Forces and Motion: Unit Review

  The Unit Review assesses student understanding of key ideas and concepts from the unit "Forces and Motion."

- Unit 2: Forces and Motion
- You Solve It

  Knock Them Down

  In Knock Them Down, students play a game to observe the effects of different pushes and pulls on the motion of objects. Students select the direction and amount of force used to push a ball in order to try to knock over a set of pins.

- Unit 2: Forces and Motion
  You Solve It

  Knock Them Down (Teacher)

  Teacher support materials are available for "Knock Them Down." During this activity, students will play a game to observe the effects of different pushes and pulls on the motion of objects. Students select the direction and amount of force used to push a ball in order to try to knock over a set of pins.

- Unit 2: Forces and Motion
- Student eBook

  Forces and Motion: Unit Review

  The Unit Review assesses student understanding of key ideas and concepts from the unit "Forces and Motion."

- Unit 2: Forces and Motion
- Leveled Readers - Blue

  On-Level: How Can Objects Move?

  The leveled reader "How Can Objects Move?" is designed for on-level readers and can be used to enrich key concepts from the unit "Forces and Motion."

- Unit 2: Forces and Motion
  Leveled Readers - Green

Enrichment: Magnets Help Us Every Day

The leveled reader "Magnets Help Us Every Day" is designed for above-level readers and can be used to extend key concepts from the unit "Forces and Motion."
Launch

- Unit 2: Forces and Motion
Leveled Readers - Red

Extra-Support: How Can Objects Move?

The leveled reader "How Can Objects Move?" is designed for below-level readers and can be used to reinforce key concepts from the unit "Forces and Motion."
Launch

- Unit 2: Forces and Motion
Leveled Readers Teacher's Guide

Topic 5: Motion

The Leveled Readers Teachers Guide provides teaching strategies and support (as well as reproducible English and Spanish worksheets) for the Unit 2 readers "How Can Objects Move?" and "Magnets Help Us Every Day." On-Level and Extra-Support worksheets focus on vocabulary development, while Enrichment worksheets reinforce and enrich content.
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- Unit 2: Forces and Motion

  Online Assessment

  Forces and Motion: Unit Test

  The interactive Unit Test for "Forces and Motion" assesses students' ability to apply knowledge to solve problems and explain phenomena in relation to the Performance Expectations associated with the unit. In this unit, children:
  - plan and conduct an investigation about the speed of objects;
  - gather evidence to support or refute ideas about what causes motion;
  - analyze data from tests to determine if a tool works as intended;
  - explore pushes and pulls of different strengths and their effect on objects.

Integration of Career Exploration, Life Literacies and Key Skills

	Different types of jobs require different knowledge and skills.
9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.

9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology And Design Thinking Integration

Smartboard lessons and technology.

Online Student Textbook

Online Student Simulations

8.2.2.ED.1	Communicate the function of a product or device.
8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.

Interdisciplinary Connections

LA.RI.K.1	With prompting and support, ask and answer questions about key details in a text.
LA.RI.K.2	With prompting and support, identify the main topic and retell key details of a text.
LA.RI.K.3	With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.
LA.RI.K.4	With prompting and support, ask and answer questions about unknown words in a text.
LA.RI.K.5	Identify the front cover, back cover, and title page of a book.
LA.RI.K.6	Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.
LA.RI.K.7	With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
LA.RI.K.8	With prompting and support, identify the reasons an author gives to support points in a text.
LA.RI.K.9	With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).
MA.K.MD.A	Describe and compare measurable attributes.
MA.K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several

	measurable attributes of a single object.
LA.RI.K.10	Actively engage in group reading activities with purpose and understanding.
MA.K.MD.A.2	Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.

Differentiation

- Understand that gifted students, just like all students, come to school to learn and be challenged.
- Pre-assess your students. Find out their areas of strength as well as those areas you may need to address before students move on.
- Consider grouping gifted students together for at least part of the school day.
- Plan for differentiation. Consider pre-assessments, extension activities, and compacting the curriculum.
- Use phrases like "You've shown you don't need more practice" or "You need more practice" instead of words like "qualify" or "eligible" when referring to extension work.
- Encourage high-ability students to take on challenges. Because they're often used to getting good grades, gifted students may be risk averse.

- **Definitions of Differentiation Components**:

    - Content – the specific information that is to be taught in the lesson/unit/course of instruction.
    - Process – how the student will acquire the content information.
    - Product – how the student will demonstrate understanding of the content.
    - Learning Environment – the environment where learning is taking place including physical location and/or student grouping

Differentiation occurring in this unit:

See differentiation suggestions in Instruction above, for struggling and advanced learners.

Modifications & Accommodations

Refer to QSAC EXCEL SMALL SPED ACCOMMOCATIONS spreadsheet in this discipline.

Modifications and Accommodations used in this unit:

IEP and 504 accommodations will be utilized.

Benchmark Assessments

Benchmark Assessments are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a

standard or set of academic standards and goals.

Schoolwide Benchmark assessments:

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

DRA

Additional Benchmarks used in this unit:

Pre-test, followed by Interactive unit tests

Formative Assessments

Assessment allows both instructor and student to monitor progress towards achieving learning objectives, and can be approached in a variety of ways. **Formative assessment** refers to tools that identify misconceptions, struggles, and learning gaps along the way and assess how to close those gaps. It includes effective tools for helping to shape learning, and can even bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply final marks (Trumbull and Lash, 2013). It can include students assessing themselves, peers, or even the instructor, through writing, quizzes, conversation, and more. In short, formative assessment occurs throughout a class or course, and seeks to improve student achievement of learning objectives through approaches that can support specific student needs (Theal and Franklin, 2010, p. 151).

Formative Assessments used in this unit:

See assessments embedded in Instruction above.

Summative Assessments

summative assessments evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

Summative assessments for this unit:

See assessments embedded in Instruction above.

Instructional Materials

HMH Science Demensions program materials

Misc. items for hands on labs

Standards

K-PS2-1.2.1	Simple tests can be designed to gather evidence to support or refute student ideas about causes.
K-PS2-2.2.1	Simple tests can be designed to gather evidence to support or refute student ideas about causes.
K-PS2-1.3.1	With guidance, plan and conduct an investigation in collaboration with peers.
K-PS2-2.4.1	Analyze data from tests of an object or tool to determine if it works as intended.
K-PS2-1.PS2.A.1	Pushes and pulls can have different strengths and directions.
K-PS2-1.PS2.A.2	Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
K-PS2-2.PS2.A.2	Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
K-PS2-1.PS2.B.1	When objects touch or collide, they push on one another and can change motion.
K-PS2-1.PS3.C.1	A bigger push or pull makes things speed up or slow down more quickly.
K-PS2-2.ETS1.A.1	A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.