

Unit 3: Motion

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Course(s): **Science Gr 3**
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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Unit 3: Motion

Grade 3

Belleville Board of Education

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Unit Overview

Unit 3: Motion

In this unit, students will

- explore types of forces and motion
- learn about the relationship between forces and motion
- identify patterns in motion

Vocabulary

- frame of reference
- motion
- position
- speed

Enduring Understanding

- Motion is the change in position of an object
- Scientists learn more about animals by studying movements

- Unbalanced forces affect motion of an object (speed up, slow down, change direction)
- Speed is affected by forces
- Speed is calculated using time and distance

Essential Questions

Essential Questions:

- What is motion?
- What are some patterns in motion?
- What causes patterns of motion?
- What is needed for a change in motion to occur?
- What causes changes in speed and direction?

Exit Skills

By the end of Grade 3, Science Unit 3, the student should be able to:

- provide evidence that patterns can be used to predict future motion
- describe ways that unbalanced forces affect the motion of an object
- identify specific reasons why motion changes as a result of the forces acting on them
- define problems related to forces and motion

New Jersey Student Learning Standards (NJSLS-S)

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the content-level and cross-curricular **New Jersey Student Learning Standards** applicable to the unit. Do not list standards that are not used in the unit.

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.
3-PS2-2.1.1	Patterns of change can be used to make predictions.
3-PS2-2.3.1	Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
3-PS2-2.PS2.A.1	The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: 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.)

Interdisciplinary Connections

LA.W.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
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.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
MA.3.MD.A.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
MA.3.OA.D.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.5	Use appropriate tools strategically.

Learning Objectives

Students will demonstrate ability to:

- develop and understanding of how to use a change in position to determine the motion of a person or object
- examine how balanced and unbalanced forces affect the motion of an object
- observe types of motions (up and down, back and forth, around and around, and zig zag) and measure objects' motions in various solutions

- determine whether an object is in motion
- explain how to determine the speed of an object
- describe how unbalanced forces affect the motion of an object (speed up, slow down, change direction)

Suggested Activities & Best Practices

HMH Science Dimensions, Unit 3- Lesson 1:

- **Engage:** "Can You Solve It?" lesson
- **Explore/Explain:** "Here or There", "Speed it Up" lessons and hands-on activity (Exploration 1 & 2)
- **Elaborate:** Take it Further - People in Engineering extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 3 - Lesson 2:

- **Engage:** "Can You Solve It?" lesson
- **Explore/Explain:** "Back and Forth, Up and Down" lessons and hands-on activity (Exploration 1)
- **Elaborate:** Take it Further - Careers in Science and Engineering extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 3 - Performance Task (Hunting for Treasure)

- **State Your Goal**
- **Research**
- **Brainstorm**
- **Make a Plan**
- **Communicate**

HMH Science Dimensions, Unit 3 - Unit Project (Motion Detectives):

- **Research and Plan**
- **Analyze Results**
- **Restate Question**
- **Claims, Evidence, and Reasoning**

Evidence of Student Learning - Checking for Understanding (CFU)

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

By identifying the **Evidence of Student Learning with Checking for Understanding (CFU)** techniques used during the lesson and/or for Closure (Madeline Hunter), please list the variety of means used to assess students' learning.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit tests

Primary Resources & Materials

- **HMH Science Dimensions - Grade 3. 2018**

Ancillary Resources

- Scholastic News
- Science Weekly
- National Geographic Kids
- Bill Nye the Science Guy and appropriate educational videos
- TeacherTube/Youtube

Technology Infusion

- HMH Online Resources
- Brainpop
- SMARTboard
- PowerPoint
- Social Media
- Relevant YouTube/TeacherTube videos
- HMH Science Dimensions Digital Components
- Laptops
- Kahoot
- Quia

Alignment to 21st Century Skills & Technology

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Mastery and infusion of **21st Century Skills & Technology** and their Alignment to the core content areas is essential to student learning. The core content areas include:

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics;
- World languages;
- Technology;
- Visual and Performing Arts.

21st Century Skills/Interdisciplinary Themes

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the **21st Century/Interdisciplinary Themes** that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the **21st Century Skills** that will be incorporated into this unit.

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please remember: Effective educational **Differentiation** in a lesson lies within content, process, and/or product.

Please identify the ones that will be employed in this unit.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides

- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Intervention Strategies

Please identify Intervention Strategies that will be employed in the unit, using the ones identified below.

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Special Education Learning

Please identify the **Special Education Learning** adaptations that will be employed in the unit, using the ones identified below.

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding

- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

Please identify the **English Language Learning** adaptations that will be employed in the unit, using the ones identified below.

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Sample Lesson

Using the template below, please develop a **Sample Lesson** for the first unit only.

Unit Name:

NJSLS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology: