



Grade 3 Science
Unit 1 Physical Science
Topic 1 Motion and Forces- 30 days

Unit Overview: In this unit students will learn how to identify forces that affect motion. Students will study patterns in motion and conduct investigations that will allow them to predict the path of an object's motion. Students will then learn about the causes of electric and magnetic forces. Students will explore how electrically charged objects behave and interact with one another. Students will learn about magnetic objects, magnetic fields, and strength of magnetic forces. Practical applications related to electricity and magnetism will then be applied.

Topic Essential Question: How do forces of an object affect its motion?

Lessons

- Topic Launch/Quest Kickoff
- Lesson 1 Motion
- Lesson 2 Patterns in Motion
- Lesson 3 Forces and Motion
- Lesson 4 Balanced and Unbalanced Forces
- Topic Close –Assessment, Quest Findings

NYSSLS Performance Expectations (PE)

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. [Clarification Statement: Examples could include an unbalanced force on one side of an object can make it start moving; and, balanced forces (including friction) acting on a stationary object 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-PS2-2. 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 seesaw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Higher Order Thinking Skills (HOTS)

Higher Order Thinking Skills (HOTS) will be identified within each topic plan. Grade 3 HOTS include:

sequencing	reasoning
categorizing	recognizing attributes
identifying patterns	determining relevant/irrelevant information
cause and effect	distinguishing fact vs. opinion
researching	using complete sentences
brainstorming	inferencing
using logic	academic vocabulary

<p>Topic Opener</p> <p>PE: 3-PS2-1, 3-PS2-2</p> <p>SEP: Planning and Carrying Out Investigations*</p> <p>DCI:</p> <p>PS2.A - Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give 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. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) 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.) <p>CCC: Cause and Effect* Patterns*</p> <p>*Denotes Higher Order Thinking Skill</p>	<p>Savvas</p> <p>Highlighted labs are important to the understanding of the instructional concepts in this lesson and must be completed during Science instructional time.</p> <ul style="list-style-type: none"> uConnect Lab – How do things move?* Quest Kickoff - Pinball Wizard!* Leveled Readers STEM Engineering Reader
<p>Lesson 1- Motion</p> <p>PE: 3-PS2-1, P-PS2-2, 3-5 ETS1-2</p> <p>SEP: Planning and Carrying Out Investigations*</p> <p>DCI:</p> <p>PS2.A - Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give 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. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) <p>ETS1.A - Defining and Delimiting Engineering Problems</p> <ul style="list-style-type: none"> Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. <p>ETS1.B - Developing Possible Solutions</p> <ul style="list-style-type: none"> Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. <p>CCC: Cause and Effect*</p> <p>*Denotes Higher Order Thinking Skill</p>	<p>Savvas</p> <p>Guiding Objective</p> <ul style="list-style-type: none"> Students will observe and measure an object's motion. <p>Literacy Skill</p> <ul style="list-style-type: none"> Draw Conclusions <p>Vocabulary</p> <ul style="list-style-type: none"> position direction motion distance speed <p>Academic Vocabulary</p> <ul style="list-style-type: none"> relative <p>Connect - TE/SB p. 6</p> <ul style="list-style-type: none"> Engineering Connection Write About It* <p>Investigate - TE/SB pp. 7-11</p> <ul style="list-style-type: none"> uInvestigate Lab – How fast can it move?* Video – Motion Literacy Toolbox – Draw Conclusions* Quest Connection* Interactivity – Observing at the Airport Visual Literacy Connection – Which road is faster?* <p>Synthesize - TE/SB pp. 11-13</p> <ul style="list-style-type: none"> Interactivity – Position, Motion, and Speed Quest Check-In – Get Rolling!* <p>Demonstrate - TE/SB p. 12</p> <ul style="list-style-type: none"> Lesson 1 Quiz Lesson 1 Check

<p><u>Lesson 2 Patterns in Motion</u> PE: 3-PS2-2 SEP: Planning and Carrying Out Investigations* DCI: PS2.A - Forces and Motion</p> <ul style="list-style-type: none"> 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.) <p>CCC: Patterns*</p> <p>*Denotes Higher Order Thinking Skill</p>	<p>Savvas Guiding Objective</p> <ul style="list-style-type: none"> Students will use patterns to predict motion. <p>Literacy Skill</p> <ul style="list-style-type: none"> Draw Conclusions <p>Academic Vocabulary</p> <ul style="list-style-type: none"> predict <p>Connect - TE/SB p.16</p> <ul style="list-style-type: none"> Sports Connection* Identify <p>Investigate - TE/SB pp. 17-20</p> <ul style="list-style-type: none"> Video – Patterns in Motion <i>Investigate Lab – How can you describe the motion of an object?*</i> Math Toolbox – Multiply and Divide* Quest Connection* Visual Literacy Connection – How high can it fly?* <p>Synthesize - TE/SB pp. 21-23</p> <ul style="list-style-type: none"> Interactivity – Patterns in the Motion of Rides* Quest Check-In – Bouncing Ideas Around Reading Check – Draw Conclusions* <p>Demonstrate - TE/SB p.22</p> <ul style="list-style-type: none"> Lesson 2 Check Lesson 2 Quiz
<p><u>Lesson 3 Forces and Motion</u> PE: 3-PS2-1, 3-PS2-2 SEP: Planning and Carrying Out Investigations* DCI : PS2.A - Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give 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. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) <p>PS2.B - Types of Interactions</p> <ul style="list-style-type: none"> Objects in contact exert forces on each other <p>CCC: Cause and Effect*</p> <p>*Denotes Higher Order Thinking Skill</p>	<p>Savvas Guiding Objectives</p> <ul style="list-style-type: none"> Students will identify the forces acting on an object. <p>Literacy Skill</p> <ul style="list-style-type: none"> Draw Conclusions <p>Vocabulary</p> <ul style="list-style-type: none"> force friction contact forces noncontact force tension forces gravity spring force <p>Academic Vocabulary</p> <ul style="list-style-type: none"> exert <p>Connect - TE/SB p. 24</p> <ul style="list-style-type: none"> STEM Connection Write About It <p>Investigate - TE/SB pp. 25-29</p> <ul style="list-style-type: none"> Video – Forces and Motion <i>Investigate Lab– What makes it move?*</i> Crosscutting Concepts Toolbox – Cause and Effect* Visual Literacy Connection – What are noncontact forces?* <p>Synthesize - TE/SB pp. 30-32</p> <ul style="list-style-type: none"> Interactivity – Contact and Non-contact Forces Quest Connection* Quest Check-In – Launch Your Pinball!* <p>Demonstrate - TE/SB p.31</p> <ul style="list-style-type: none"> Lesson 3 Check Lesson 3 Quiz

<p>Lesson 4 Balanced and Unbalanced Forces</p> <p>PE: 3-PS2-1</p> <p>SEP: Planning and Carrying Out Investigations*</p> <p>DCI:</p> <p>PS2.A - Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give 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. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) <p>PS2.B - Types of Interactions</p> <ul style="list-style-type: none"> Objects in contact exert forces on each other* <p>CCC: Cause and Effect*</p> <p>*Denotes Higher Order Thinking Skill</p>	<p>Savvas</p> <p>Guiding Objectives</p> <ul style="list-style-type: none"> Students will use evidence to explain how balanced and unbalanced forces affect an object’s motion. <p>Literacy Skill</p> <ul style="list-style-type: none"> Draw Conclusions <p>Vocabulary</p> <ul style="list-style-type: none"> balanced forces net force <p>Academic Vocabulary</p> <ul style="list-style-type: none"> equation <p>Connect - TE/SB p. 34</p> <ul style="list-style-type: none"> Curriculum Connection Reading Check – Draw Conclusion* <p>Investigate - TE/SB pp. 35-37</p> <ul style="list-style-type: none"> Video – Balanced and Unbalanced Forces uInvestigate Lab– How can you hold up an object?* Visual Literacy Connection – How can you move an object? * <p>Synthesize - TE/SB p. 38</p> <ul style="list-style-type: none"> Interactivity - Motion Reading Check – Draw Conclusions* Quest Connection* <p>Demonstrate - TE/SB pp. 39 - 40</p> <ul style="list-style-type: none"> Lesson 4 Check Lesson 4 Quiz Quest Check-In Lab – How can you control your flippers?*
<p>Topic Close</p> <ul style="list-style-type: none"> Assessment and Remediation TE/SE pp. 44-49 Quest Finding p.42 <p>CLRI Literacy Connections:</p> <p>Enrichment: Independent Reading</p> <p>“Fly, Girl, Fly! Shaesta Waiz Soars Around the World” by Nancy Roe Pimm</p> <p>Synopsis:</p> <p>“This is the story of Shaesta Waiz’s determination as she focuses on her goal as the first Afghani woman to fly around the world. A marvelous inspiration for girls and women in all endeavors.”</p> <p>Enrichment: Independent Reading</p> <p>“Interstellar Cinderella” by Deborah Underwood</p> <p>Synopsis:</p> <p>A modern take on the tale of Cinderella takes you on the journey as Cinderella uses her technical skills to fix everything around her, even with push back from the people in her life. She shows her skills by rescuing the prince after his ship breaks down to become his Chief Mechanic.</p>	<p>Topic 1 Enrichment</p> <p>Topic 1- Lesson 1 Enrichment - TE p.11 - This activity extends student understanding of the lesson by having student practice calculating speed.</p> <p>Enrichment Skill- Logic</p> <p>Topic 1- Lesson 2 Enrichment - TE p.21 -This activity extends student understanding of the lesson by having students compare and contrast the different ways that objects move.</p> <p>Enrichment Skill- Inference</p> <p>Topic 1- Lesson 3 Enrichment - TE p. 30 -This activity extends student understanding of the lesson by drawing conclusions from a passage about ways that friction can be reduced.</p> <p>Enrichment Skills-Reasoning</p> <p>Topic 1- Lesson 4 Enrichment - TE p. 38 - This activity extends student understanding of the lesson by having students practice calculating net force after they read about how unbalanced forces are used in the game of soccer.</p> <p>Enrichment Skills-Logic</p>

Enrichment: Independent Reading

“Look Up with Me – Neil DeGrasse Tyson: A Life Among the Stars” by Jennifer Berne

Synopsis:

Be inspired by reading the story of the rise of Neil DeGrasse Tyson in the world of educating the public about the stars and universe – the study of Astronomy. Read how he grew to be curious about what is beyond our Earth and became a renowned Astronomer.

English Language Learners (ELL) Enhancements

To access [hyperlinked](#) material, you must be logged into your BPS Google Drive

Listening

- **Cross- Linguistic Practices**: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates).
- **Activating Prior Knowledge** Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content.
- **Activating Prior Knowledge**
- **Visuals** - GIFs, pictures- will assist students in understanding what they are listening to. Use **visual thinking strategies** to set the lens for learning.
- Video to review or introduce a topic – use **closed captioning** to help students see the words and pronunciations while they listen to the content.
- **Word stretching / Vowel stretching** when instructing allows student to listen closely to the pronunciation of the word.
- **Performance Level Descriptors** this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. Scroll for grade 3.

Speaking

- **Sentence Stems/Frames** - to begin a sentence - such as *Evolution is...* or *I think that evolution is...*
- **Academic Conversation Starters**: Have a visual of a list of academic sentence starters that students can refer to in a discussion.
- **Choral Reading** - To build fluency, self-confidence and motivation with **reading/speaking**.
- Create **movement** to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning.
- **Performance Level Descriptors** This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grade 3

Reading

- Supplementary Text to help reinforce concepts.
- **Visual Aids** - Pictures or models to support vocabulary words and concepts
- Video to review or introduce a topic - use **closed captioning** to help students read along while they listen to the content.
- **4 Square / Frayer models** to help students gain a deeper understanding of vocabulary.
- **Highlighting** important text to assist students in answering questions after the reading.
- **Chunking**-Break reading of text into chunks or paragraphs
- **Performance Level Descriptors** this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grade 3.
- **Vocabulary Morphology**- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary.

	<p>Instructional Accommodations (depending on the student’s needs)</p> <ul style="list-style-type: none"> ● Extended time for tests in class, projects and assignments ● Directions read. Broken down as necessary ● Model how to complete the activity in the lesson ● Oral simplification of directions or questions ● Translated version of test when available. Student may have both version English and native language version ● Use of approved bilingual glossaries from NYS in each subject
<p>Special Education Modifications Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p>Instructional</p> <ul style="list-style-type: none"> ● Pre-teach vocabulary ● Use picture vocabulary ● Scaffold Depth of Knowledge questions ● Provide copy of notes/notes in “cloze” form ● Use of Think, Pair, and Share strategy to help process information ● Scaffold written assignments with the use of graphic organizers ● Allow for multiple ways to respond (verbal, written, response board) ● Provide model of performance task ● Modify informational text to fit the needs of the students ● Provide a digital or paper interactive notebook ● Present complex tasks in multiple ways ● Provide mnemonic strategies for scientific concepts <p>Technology:</p> <ul style="list-style-type: none"> ● Audio reading of text ● Text to type functions ● Videos to clarify/visualize science concepts ● Record class lecture/discussions and make accessible to student ● Nearpod- interactive presentations of notes <p>In Class Assessments</p> <ul style="list-style-type: none"> ● Provide multiple options for projects ● Use of timer in class ● Break all complex tasks into chunks
<p>Step Up to Writing Step Up to Writing materials can be found in BPS Science K-12 Schoology Folder Grade 3 Resources Grade 3 Curriculum Materials SUTW materials</p>	<ul style="list-style-type: none"> ● Breaking Down Definitions ● Four-Step summary Paragraph ● Sketch Then Write Responses ● Traffic Light Colors for Informative/Explanatory Paragraphs ● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing. Scroll for grade 3.
<p>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</p>	<ul style="list-style-type: none"> ● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications ● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population ● All students are given an opportunity to engage in science discourse ● Teacher demonstrates high expectations for all students