



Kindergarten Strand K.3
Forces, Motions, & Interactions
Mystery Science Scope and Sequence
Salt Lake City School District 2023-2024

Strand K.3: FORCES, MOTION, AND INTERACTIONS

The motion of objects can be observed and described. Pushing or pulling on an object can change the speed or direction of an object's motion and can start or stop it. Pushes and pulls can have different strengths and different directions. A bigger push or pull makes things go faster and when objects touch or collide, they push on one another and can change motion.

Standard K.3.1 Plan and conduct an investigation to compare the effects of different strengths or different directions of forces on the motion of an object. Emphasize forces as a push and pull on an object. The idea of strength should be kept separate from the idea of direction. Non-contact forces, such as magnets and static electricity, will be taught in Grades 3 through 5. (PS2.A, PS2.B, PS2.C, PS3.C)

Standard K.3.2 Analyze data to determine how a design solution causes a change in the speed or direction of an object with a push or a pull. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, or knock down other objects. (PS2.A, PS2.B, PS2.C, PS3.C, ETS1.A, ETS1.B, ETS1.C)

Instructional Pacing for Strand K.3			
Jan 8 Pre-Assessment of Unit	Jan 16 Lesson 1	Jan 22 Lesson 2	Jan 29 Lesson 3
Feb 5 Lesson 4	Feb 12 Lesson 5	Feb 20 Lesson 6	Feb 26 Unit Assessment

Scope and Sequence Force Olympics Unit

Date, SEEd Standard, & Mystery Science Lesson	Materials and Assessment
Preparing for this unit Force Olympics Unit In this unit, students are introduced to pushes and pulls and how those affect the motion of objects. Students observe and investigate the	Student Handouts Pages 33-41

<p>effects of what happens when the strength or direction of those pushes and pulls are changed.</p>	
<p>Jan 8</p> <p>Objective: Students design a problem they would like to solve and then design a solution using what they know about the locations of objects and how they can move.</p> <div data-bbox="207 604 795 993" style="border: 1px solid black; padding: 5px;"> <p>SEEd Standard K.3.2 Science and Engineering Practice: Analyze Data & Design Solutions Crosscutting Concept: Stability & Change Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces ETS1.A Defining and Delimiting an Engineering Problem ETS1.B Developing Possible Solutions ETS1.C Optimizing the Design Solution</p> </div>	<p>Have students complete the Lesson 6 assessment as a pre-assessment to compare growth from the beginning of the unit to the end of the unit.</p> <p>Pre-Assessment Lesson 6 Assessment</p>
<p>Jan 16</p> <p>Objective: Students observe different machines and use those observations as evidence for why machines make work easier.</p> <div data-bbox="207 1287 795 1570" style="border: 1px solid black; padding: 5px;"> <p>SEEd Standard K.3.1 Science and Engineering Practice: Plan and conduct an investigation. Crosscutting Concept: Cause & Effect Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces</p> </div> <p>Lesson 1: What's the biggest excavator?</p> <p>In this lesson, students discover that there are pushes and pulls involved in any kind of work, including the work done by machines. In the activity, “Be a Digging Machine,” students pretend to use shovels and excavators to dig a hole for a swimming pool.</p>	<p>Materials per Student No supplies needed.</p> <p>Literature Connection Readworks.org <ul style="list-style-type: none"> ▪ The Flying Machine Epic Books <ul style="list-style-type: none"> ▪ Construction Machines: Excavators ▪ Construction Vehicles: Excavators </p> <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p> <p>Assessment Lesson 1 Assessment</p>

<p>Jan 22</p> <p>Objective: Students observe construction equipment being used in different ways to move objects.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>SEEd Standard K.3.1 Science and Engineering Practice: Plan and conduct an investigation. Crosscutting Concept: Cause & Effect Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces</p> </div> <p>Lesson 2: Why do builder's need so many machines?</p> <p>In this Read-Along lesson, Vivian watches a house being built and wonders why the builders need so many big machines. The lesson includes a short exercise where students act out the “work words” of their favorite machine. You can extend the lesson with the optional activity, Forces at Work, where students watch videos of construction equipment and practice using work words to describe what the machines are doing.</p>	<p>Materials per Student No supplies needed.</p> <p>Literature Connection Readworks.org</p> <ul style="list-style-type: none"> ▪ Engineers solve problems ▪ Will you push or pull? <p>Unite for Literacy</p> <ul style="list-style-type: none"> ▪ Farm tractors at work ▪ How does a crane work? <p>Readworks.org</p> <ul style="list-style-type: none"> ▪ Engineers solve problems <p>Epic Books</p> <ul style="list-style-type: none"> ▪ D is for Dump truck ▪ Goodnight, Goodnight, Construction Site ▪ Mighty, mighty, construction site ▪ Community Helpers: Construction Workers <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p> <p>Assessment Lesson 2 Assessment</p> <p>As an optional activity, we suggest watching videos of construction equipment. Then, discuss what each machine does and identify the "work words" involved. Each of these made-for-kindergarteners videos introduces a different type of construction equipment.</p> <ul style="list-style-type: none"> ▪ Bulldozers push piles of dirt and sand. ▪ Cranes lift heavy objects. ▪ Trucks of all kinds carry or pull heavy things from one place to another.
<p>Jan 29</p>	<p>Materials per Student Game station set printout.</p>

<p>Objective: Students carry out an investigation to determine how far back they should pull a model wrecking ball to knock down a wall, but not the houses behind it.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>SEEd Standard K.3.1 Science and Engineering Practice: Plan and conduct an investigation. Crosscutting Concept: Cause & Effect Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces</p> </div> <p>Lesson 3: How can you knock down a wall made of concrete?</p> <p>In this lesson, students change the strength and direction of a wrecking ball's push in order to solve a tricky problem. The activity, Don't Crush That House, is a game in which students experiment with the force of a paper wrecking ball to knock down a wall of cups. The challenge is: they cannot knock down the paper houses!</p>	<p>Blank paper Scotch tape Yardstick or meterstick</p> <p>In your Mystery Pack String</p> <p>In your Shared Supply Box 2" Binder clips Masking tape Solo cups 9 oz</p> <p>Literature Connection Readworks.org <ul style="list-style-type: none"> ▪ Stuck in the Snow ▪ Paddle a canoe Epic Books <ul style="list-style-type: none"> ▪ Loaders ▪ Cranes ▪ Dump Trucks ▪ Hooray for Construction Workers! ▪ Construction Crew ▪ Let's meet a construction worker </p> <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p> <p>Assessment Lesson 3 Assessment</p>
<p>Feb 5</p> <p>Objective: Students play a game of bumper bowling to observe the way that objects can move in straight lines, zigzags, and back and forth.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>SEEd Standard K.3.2 Science and Engineering Practice: Analyze Data & Design Solutions Crosscutting Concept: Stability & Change Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces</p> </div>	<p>Materials per Student Hardcover books Yardstick or meterstick</p> <p>In your Mystery Pack Tennis balls</p> <p>In your Shared Supply Box Masking tape Solo cups 9 oz</p> <p>Literature Connection <ul style="list-style-type: none"> ▪ Readworks.org ▪ Bowling ▪ Racing across the water </p>

<div data-bbox="215 199 773 310" style="border: 1px solid black; padding: 5px;"> ETS1.A Defining and Delimiting an Engineering Problem ETS1.B Developing Possible Solutions ETS1.C Optimizing the Design Solution </div> <p>Lesson 4: How can you knock down the most bowling pins?</p> <p>In this Read-Along lesson, Daniel worries he will not do well at a friend’s Bumper Bowling party...until he figures out an unexpected way to win. The lesson includes a short exercise where students act out bowling. If you want to extend the lesson, you can try this optional activity, Human Bumper Bowling, where students make a model bumper bowling alley and work together to knock down pins.</p>	<p>Epic Books</p> <ul style="list-style-type: none"> ▪ Construction Machines: Bulldozers ▪ Construction Machines: Concrete mixers ▪ Construction Machines: Front end loaders ▪ Construction Machines: Backhoe Loaders ▪ Construction Machines: Flatbed trucks ▪ Shape up: Construction Trucks ▪ What do construction workers do all day? <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p> <p>Assessment Lesson 4 Assessment</p>
<p>Feb 12</p> <p>Objective: Students investigate how to protect a town from a falling boulder. They design a solution to safely guide the direction of the boulder away from the town.</p> <div data-bbox="215 1224 773 1612" style="border: 1px solid black; padding: 5px;"> <p>SEEd Standard K.3.2 Science and Engineering Practice: Analyze Data & Design Solutions Crosscutting Concept: Stability & Change Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces ETS1.A Defining and Delimiting an Engineering Problem ETS1.B Developing Possible Solutions ETS1.C Optimizing the Design Solution</p> </div> <p>Lesson 5: How can we protect a mountain town from falling rocks?</p> <p>In this lesson, students investigate how pushes can change the speed and direction of falling objects. In the activity, Boulder Bounce, students play a game where they</p>	<p>Materials per Student Tiny Town houses printout Clipboard Hardcover books</p> <p>In your Mystery Pack Dixie cups (3 oz) Push pins. Ping Pong Balls</p> <p>In your Shared Supply Box 2” Binder clips Masking tape</p> <p>Literature Connection Readworks.org</p> <ul style="list-style-type: none"> ▪ Will you push or pull? ▪ Who Can pull harder? <p>Epic Books</p> <ul style="list-style-type: none"> ▪ Pushing and pulling ▪ Changing Direction ▪ Disaster Zone: Landslides <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p>

<p>design a solution that protects a model town called Tiny Town from a bouncing-ball “boulder.”</p>	<p>Assessment Lesson 5 Assessment</p>
<p>Feb 20</p> <p>Objective: Students design a problem they would like to solve and then design a solution using what they know about the locations of objects and how they can move.</p> <div data-bbox="207 604 795 991" style="border: 1px solid black; padding: 5px;"> <p>SEEd Standard K.3.2 Science and Engineering Practice: Analyze Data & Design Solutions Crosscutting Concept: Stability & Change Disciplinary Core Ideas: PS2.A Forces and Motion PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces ETS1.A Defining and Delimiting an Engineering Problem ETS1.B Developing Possible Solutions ETS1.C Optimizing the Design Solution</p> </div> <p>Lesson 6: How could you invent a trap?</p> <p>In this Read-Along lesson, twins Mimi and Lulu try different ways to catch a mysterious nighttime visitor...until they hit on just the right solution. The lesson includes a short exercise where students imagine how to design a good monster trap, and then pretend to be sneaky monsters. You can extend the lesson with the optional activity, Be an Inventor, where students draw their own inventions for machines that do chores.</p>	<p>Materials per Student Blank paper Crayons</p> <p>Literature Connection Readworks.org <ul style="list-style-type: none"> ▪ Edison Tried and Tried Again ▪ Ben Franklin’s Idea ▪ Ben invented Swim Fins Epic Books <ul style="list-style-type: none"> ▪ Inventions help us ▪ 21st century inventions: GPS technology ▪ 21st century inventions: Electric cars ▪ 21st Century inventions: Drones ▪ 21st Century inventions: Robots ▪ 21st Century inventions: 3-D Printers </p> <p>Vocabulary Student slideshow: English Spanish Teacher printout: English & Spanish</p> <p>Assessment Lesson 6 Assessment</p>
<p>Feb 26</p> <p>Have students complete the Lesson 6 assessment to compare growth from the beginning of the unit to the end of the unit.</p>	<p>Assessment Lesson 6 Assessment</p>