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

effects of what happens when the strength or direction of those pushes and pulls are changed.	
Jan 8 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. **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 Pre-Assessment	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. **Assessment** Lesson 6 Assessment
Jan 16 Objective: Students observe different machines and use those observations as evidence for why machines make work easier. **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 Lesson 1: What's the biggest excavator? 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.	**Materials per Student** No supplies needed **Literature Connection** Readworks.org The Flying Machine Epic Books Construction Machines: Excavators Construction Vehicles: Excavators **Assessment** Lesson 1 Assessment

Jan 22 Objective: Students observe construction equipment being used in different ways to move objects. **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 Lesson 2: Why do builder's need so many machines? 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.	**Materials per Student** No supplies needed **Literature Connection** Readworks.org Engineers solve problems Will you push or pull? Unite for Literacy Farm tractors at work How does a crane work? Readworks.org Engineers solve problems Epic Books D is for Dump truck Goodnight, Goodnight, Construction Site Mighty, mighty, construction site Community Helpers: Construction Workers **Assessment** Lesson 2 Assessment 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. ▪ **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.
Jan 29 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. **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	**Materials per Student** Game station set printout Blank paper Scotch tape Yardstick or meterstick **In your Mystery Pack** String **In your Shared Supply Box** 2" Binder clips Masking tape

PS2.B Types of Interactions PS2.C Stability and Instability in Physical Systems PS3.C Relationship between Energy and Forces Lesson 3: How can you knock down a wall made of concrete? 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 in order to knock down a wall of cups. The challenge is: they can't knock down the paper houses!	Solo cups 9 oz **Literature Connection** Readworks.org **Stuck in the Snow** **Paddle a canoe** Epic Books Loaders Cranes Dump Trucks Hooray for Construction Workers! Construction Crew Let's meet a construction worker **Assessment** Lesson 3 Assessment
Feb 5 Objective: Students play a game of bumper bowling to observe the way that objects can move in straight lines, zigzags, and back and forth. **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 Lesson 4: How can you knock down the most bowling pins? In this Read-Along lesson, Daniel worries he won't 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	**Materials per Student** Hardcover books Yardstick or meterstick **In your Mystery Pack** Tennis balls **In your Shared Supply Box** Masking tape Solo cups 9 oz **Literature Connection** Readworks.org Bowling Racing across the water Epic Books 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? **Assessment** Lesson 4 Assessment

students make a model bumper bowling alley and work together to knock down pins.	
Feb 12 Objective: Students conduct an investigation of 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. **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 Lesson 5: How can we protect a mountain town from falling rocks? 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 design a solution that protects a model town called Tiny Town from a bouncing-ball "boulder."	**Materials per Student** Tiny Town houses printout Clipboard Hardcover books **In your Mystery Pack** Dixie cups (3 oz) Push pins Ping Pong Balls **In your Shared Supply Box** 2" Binder clips Masking tape **Literature Connection** Readworks.org Will you push or pull? Who Can pull harder? Epic Books Pushing and Pulling Changing Direction Disaster Zone: Landslides **Assessment** Lesson 5 Assessment
Feb 20 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. **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	**Materials per Student** Blank paper Crayons **Literature Connection** Readworks.org Edison Tried and Tried Again Ben Franklin's Idea Ben invented Swim Fins Epic Books Inventions help us 21st century inventions: GPS technology 21st century inventions: Electric cars 21st Century inventions: Drones

ETS1.A Defining and Delimiting an Engineering Problem ETS1.B Developing Possible Solutions ETS1.C Optimizing the Design Solution Lesson 6: How could you invent a trap? 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.	21st Century inventions: Robots 21st Century inventions: 3-D Printers **Assessment** Lesson 6 Assessment
Feb 26 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. **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 Unit Assessment	Have students complete the Lesson 6 assessment to compare growth from the beginning of the unit to the end of the unit. **Assessment** Lesson 6 Assessment