Condensed BUF: Science & English Language Arts Unit 4

Grade: Kindergarten	**Language**: English	**Content areas:** Science and English Language Arts

Unit Number: 4
Unit Name: Forces and Motion

Unit Essential Question: **How do pushes and pulls affect the motion of an object?**

Unit Standards:

Link to Document with Unpacked Standards for this Unit: bit.ly/U4Kunpacked	

Content Standards – NGSS	**CCSS Writing Standards Fictional Narrative**	**CCSS Reading Standards Literary Texts**
K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]	**W.K.3** Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened. **W.K.6** With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers. **W.K.7** Participate in shared research	**RL.K.1** With prompting and support, ask and answer questions about key details in a text. **RL.K.2** With prompting and support, retell familiar stories, including key details. **RL.K.4** Ask and answer questions about unknown words in a text. **RL.K.5** Recognize common types of texts (e.g., storybooks, poems.) **RL.K.7** With prompting and support, describe

K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.] **K-2-ETS1-1** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. **K-2-ETS1-3** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts). **RL.K.10** Actively engage in group reading activities with purpose and understanding.
Foundational Skills: **RF.K.1** Print Concepts: Demonstrate understanding of the organization and basic features of print. RF.K.1a. Follow words from left to right, top to bottom, and page by page.	**Speaking and Listening:** **SL.K.1**. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.	**Language:** **L.K.1** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. L.K.1a Print many upper-and lowercase letters.

RF.K.1b. Recognize that spoken words are represented in written language by specific sequences of letters.
RF.K.1c. Understand that words are separated by spaces in print.

RF.K.2 Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
RF.K.2a. Recognize and produce rhyming words.
RF.K.2b. Count, pronounce, blend, and segment syllables in spoken words.
RF.K.2c. Blend and segment onsets and rimes of single-syllable spoken words.
RF.K.2d. Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phonemes (consonant-vowel consonant, or CVC) words.* (This does not include CVC's ending with /l/. /r/, or /x/.)
RF.K.2e. Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.

RF.K.3 Phonics and Word Recognition: Know and apply grade-level phonics and words analysis skills in decoding words.
RF.K.3a. Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing the primary or many of the most frequent sounds for each consonant.

SL.K.1a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).
SL.K.1b. Continue a conversation through multiple exchanges.

SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
SL.K.2a. Understand and follow one- and two-step oral directions. CA

SL.K.4 Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.

SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

L.K.1d. Understand and use question words (interrogatives) (e.g., who, what, where, when, why, how).
L.K.1f. Produce and expand complete sentences in shared language activities.
L.K.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
L.K.2a. Capitalize the first word in a sentence and the pronoun I.
L.K.2b. Recognize and name end punctuation.
L.K.2d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships.

RF.K.3c. Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does).		

Language Development Standards
WIDA

ELD-SC.K.Explain.Interpretive
Multilingual learners will interpret scientific explanations by

- Defining investigable questions or simple design problems based on observations and data about a phenomenon
- Using information from observations to find patterns and to explain how or why a phenomenon occurs

ELD-SC.K.Explain.Expressive
Multilingual learners will construct scientific explanations that

- Describe information from observations about a phenomenon
- Relate how a series of events causes something to happen
- Compare multiple solutions to a problem

Language Functions and Associated Language Features
Describe information from observations about a phenomenon through…

- Single words to identify context *(push, pull)* [WORD/PHRASE]
- Relating verbs *(have, be)* to state relationships or attributes SENTENCE] [WORD/PHRASE]
- Pictures, diagrams, to add information or illustrate phenomenon [WORD/PHRASE]

Relate how a series of events causes something to happen through…

- Nouns to represent concepts *(investigation)* [DISCOURSE] [WORD/PHRASE]
- Cohesion to reference ideas, people across text, including pronouns, articles, demonstratives *(it, a, the, this, that)* [DISCOURSE]
- Simple sentences to describe the phenomenon *(The car moves fast.)* [SENTENCE]
- Causal connectors to combine ideas into logical relationships *(so, because, when/then)* [SENTENCE]
- Connectors to link or compare observations *(The car is fast but the scarf is slow.)* [DISCOURSE]

Compare multiple solutions to a problem through…

- Simple statements to represent conclusions *(Pushes make things move.)* [SENTENCE]

ELD-LA.K.Narrate.Interpretive

Multilingual learners will interpret language arts narratives (with prompting and support) by

- Identifying key details
- Identifying characters, settings, and major events
- Asking and answering questions about unknown words in a text

ELD-LA.K.Expressive

Multilingual learners will construct language arts narratives (with prompting and support) that

- Orient audience to story
- Describe story events

Language Functions and Associated Language Features

Orient audience to story through…

- Pictures, words, title, simple statements, or common story expressions to introduce context [DISCOURSE]
- Noun groups to state who or what the story is about *(tall man, baby bear)* [WORD/PHRASE]
- Prepositional phrases to specify location and time *(at Grandma's house, by the river; in the winter, at night)* [WORD/PHRASE]

Describe story events through…

- Connectors to establish sequence *(then, after, and)* [DISCOURSE]
- Pronouns and renaming to reference a character across the text *(the girl=she=Nancy)* [DISCOURSE]
- Verbs to describe character actions *(jumped), feelings (was sad), behaviors (eating)* [SENTENCE] [WORD/PHRASE]

Unit Big Ideas

Science Content Big Idea:

1. Students will understand that the motion of an object can change due to different strengths or different directions of pushes and pulls on the object. **K-PS2-1**
    a. For example, when a person gives a hard push to an empty box, it moves quickly until it stops. When a person gives a gentle push to an empty box, it moves slowly or just a little bit until it stops.
    b. For example, if two objects collide, they push each other into different directions.

Science Inquiry Big Idea:

2. Students will understand that collecting and organizing data can help us interpret and understand whether a design solution works as intended to change the speed or direction of an object with a push or a pull. **K-PS2-2**

a. For example, using a graphic or visual display (pictures, pictographs, drawings, written observations, tables, charts) can help us organize the data we observe when we test design solutions.
b. For example, when we display data related to this experiment, we need to show
    i. the relative speed or direction of the object before a push or pull is applied
    ii. the relative speed or direction of the object after a push or pull is applied
    iii. how the relative strength of a push or pull affects the speed or direction of an object
c. For example, once we acquire all of our organized data, we can compare it to describe the strengths and weaknesses of the design solution. **K-2-ETS1-3, K-2-ETS1-1**

Source: NGSS Thematic Bundle 3

Language Arts Big Ideas: Students will understand that when reading complex, grade level **literary** text (RL.K.10), it is important to

- ask and answer questions about key details in a text. **RL.K.1**
- retell familiar stories, including key details **RL.K.2**
- ask and answer questions about unknown words in a text **RL.K.4**
- recognize common types of texts **RL.K.5**
- describe the relationship between illustrations and the story in which they appear **RL.K.7**

…to be able to write their own **fictional narrative (W.K.3)** where they

- use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events,
- tell about the events in the order in which they occurred,
- provide a reaction to what happened **W.K.3**
- explore a variety of digital tools to produce and publish writing **W.K.6**
- participate in shared research and writing projects **W.K.7**

about an imaginary trip their car went on.

Language Development (ELD) Big Ideas:
Students will understand that…

- **Pushes and pulls are forces that make things move.**
- Multilingual learners will understand that objects move when they are pushed or pulled and that the strength and direction of these forces affect how the object moves. **(ELD-SC.K.Explain.Interpretive, ELD-SC.K.Explain.Expressive)** For example,

    - The teacher may show objects or use toys (e.g., wagon, door, jump rope). Students act out push or pull, then sort picture cards and say, “I push the ___. I pull the ___.”
    - Students roll a ball softly and then with more force. They record observations with picture and sentence: “I pushed it hard. It went far.” / “I pushed it soft. It went slow.”

- The teacher may set up stations where students use a force to move an object. Students use visual sentence frames and word banks to guide oral or written language.

- **We can use our words and pictures to explain how things move.**
  Multilingual learners will understand that they can communicate scientific ideas through speaking, drawing, and writing. (**ELD-SC.K.Explain.Expressive, ELD-LA.K.Narrate.Expressive)** For example,
  - After trying a ramp experiment, students draw the steps and use sentence frames like, "First we put the car. Then we pushed it."
  - The class collaboratively builds a chart titled *How Things Move* using student photos, drawings, and student-generated sentences: e.g., "The ball rolls fast when I push it hard."
  - After group experiments, the class co-creates an entry:
    "We made a ramp. We pushed the car. It went to the basket. It stopped."

- **Scientists test and explain what they see.**
  Multilingual learners will understand that scientists make predictions, observe, test ideas, and explain what happened using language. **(ELD-SC.K.Explain.Interpretive, ELD-SC.K.Explain.Expressive)** For example,
  - Students test toy cars on ramps of different heights. The use graphic organizers with pictures and sentence frames:
    "This ramp is tall, so the car goes fast."
    "That ramp is short, so the car goes slow."
  - Students try two solutions to get a marble through a path. Afterward, they draw and say:
    "The ramp worked. The tube didn't work."
  - After an experiment, students use sentence starters:
    "We pushed it harder, so it went farther."
    "We pulled it, and it turned."

- **Stories can help us understand science ideas.**

Multilingual learners will understand that narrative texts can help them make connections to pushes and pulls in real life. **(ELD-LA.K.Narrate.Interpretive, ELD-LA.K.Narrate.Expressive)** For example,

- The class reads *The Enormous Turnip*. Students act it out using visuals and sentence starters:
  "She pulled the turnip." "It did not move." "They pulled together."
- After reading *Little Blue Truck*, the class co-creates a map with pictures and text:
  "The animals pushed the truck. Then it moved."
- Students launch a toy car and write a fictional story:
  "First, I pushed my car. It went to the zoo. I saw a giraffe!"

Performance-Based Summative Assessment
The culminating performance-based summative assessment for Unit 4 allows students to exhibit the knowledge they developed throughout the unit on how pushes and pulls can make objects move and how the strength or direction of a push or a pull can affect how an object moves. The teacher will establish a scenario for each student or pair of students to answer the essential question: **How do pushes and pulls affect the motion of an object?** Student groups will be given access to the same materials (such as blocks, cardboard, tubes, tape, string, etc.) and a toy car (such as a Hot Wheels toy or Matchbox car). The teacher will designate a starting point for the group as well as an ending point, called the "parking spot" and marked by masking tape or chalk. Students are given ample time to construct a ramp, track, pull system, etc., that gets their car from the starting point to the parking spot with only one touch by student hands. All additional pushes and pulls must be done by external forces (with a material or means between the student hand and the car), such as a dowel pushing the car, or a string attached to the top of the car used to pull it into its spot. Students are given many opportunities to set up and test the route and three opportunities to demonstrate it for the teacher and other classmates. During the demonstration, they verbally describe how they apply strength, direction, pushes, and pulls to the car to get it to go from the starting point to the parking spot.

<table>
<tr><th colspan="3">UNIT FLOW CHART</th></tr>
<tr><td colspan="3">Unit Launch: Initial Science Oracy
Students build background knowledge and oracy around forces in motion including terminology about forces that pull and forces that push.</td></tr>
<tr><td>Science Inquiry and Writing - Weather Observations
Students continue to build oracy, observe, and annotate weather patterns, as started in Unit 1.</td><td>↔</td><td rowspan="3">Oracy for Reading:
Students build oracy around the language of the reading standards AND the content compatible and content obligatory language in the text in anticipation of formal reading instruction.

Reading and responding
(via talking and writing) to various texts, with an emphasis on
literary texts (narratives),
on the following topics:

• Weather patterns
• Forces and motion
• Design solutions/solving problems

Foundational Skills, Speaking and Listening, Language, and Language Development Standards to be integrated will be identified and added later.</td></tr>
<tr><td>Science Inquiry and Writing - Forces and Motion
Students continue to build oracy in order to plan and investigate and compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Foundational Skills, Speaking and Listening, Language, and Language Development Standards are integrated using the language of the inquiry.</td><td>↔</td></tr>
<tr><td>Science Inquiry - Design Solutions
Via research and inquiry, students design a solution to a problem or situation that changes the speed or direction of an object with a push or a pull. They analyze the data from observations, compare the strengths and weaknesses of each solution, and make improvements on the design solution accordingly.

Foundational Skills, Speaking and Listening, Language, and Language Development Standards are integrated using the language of the inquiry.</td><td>↔</td></tr>
<tr><td colspan="3">Narrative Writing- Fictional Narrative
Students will decide upon potential destinations (that are written on paper or tape on the ground), build ramps using provided materials, and launch a toy car down the ramp to determine their destination. They will then create a fictional narrative, explaining what happened on their “trip”, including one or more events in order, and a reaction.</td></tr>
<tr><td colspan="3">↓</td></tr>
<tr><td colspan="3">Performance-Based Summative Assessment
The teacher creates a “parking spot” using tape on the floor or chalk on the blacktop. Students create ramps, tracks, walls, pull systems, etc., to assist their car in making it to its parking spot. They are allowed one physical push, and the remaining ways the car moves must be a push, pull, or change of direction using materials or supplies provided by the teacher (not students’ hands). Students articulate each step of their parking journey orally.</td></tr>
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Unit Storyline
Kindergartners began the school year exploring structures that could be designed to reduce the warming effects of sunlight on the Earth's surface. During Units 2 and 3, they developed understanding around what plants and animals need to meet their needs and survive within their respective environments. Now in Unit 4, science focus shifts to understanding more phenomena related to physical science they experience on a daily basis: forces and motion. **Science Inquiry and Engineering** The inquiry in Unit 4 involves students exploring forces and motion. Students will use their oracy and background knowledge experience in this unit to plan and conduct investigations that compare the effects of different strengths or different directions of pushes and pulls on the motion of an object (K-PS2-1). They will test objects and explore how pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1, K-PS2-2). They will also observe how when objects touch or collide, they can pull or push one another and can change both speed and direction. In addition, students will test how a bigger push or pull can make things speed up or slow down more quickly. These phenomena will be discovered through a variety of inquiry experiences and rely on ample time for exploration, discussion, reflection, and more exploration. As students gather data and compare different test designs, they will be asking questions, making observations, and gathering information about a situation related to motion and direction of an object. They will define a simple problem or scenario and develop a new or improved object or tool to aid the solution, such as tracks or ramps (K2-ETS1-1). Students will need to be able to clearly identify, understand, and explain the problem they are seeking a solution for, such as moving a marble from point A to point B or making a toy car move a certain distance. They will compare and test different designs to prove there can be more than one solution to a problem. In doing so, students will analyze data from tests of two objects designed to solve the same problem and compare strengths and weaknesses of how each performs (K-2-ETS1-3). **Reading** Formal reading instruction during this unit will be implemented via a variety of literacy routines, during which students will read literary texts about pushes, pulls, and forces in the narrative genre, such as The Enormous Turnip* or And Everyone Shouted, "Pull!": A First Look at Forces and Motion*. As they read texts such as these, students will recognize common types of texts, such as storybooks and poems. **(RL.K.5)** They will also ask and answer questions about unknown words in a text and describe the relationship between illustrations and the story in which they appear. **(RL.K.4, RL.K.7)** With prompting and support, students will ask and answer questions about key details in a text and retell familiar stories using key details. (**RL.K.1, RL.K.2**) Additional texts such as Oscar and the Cricket: A Book About Moving and Rolling by Geoff Waring, Roller Coaster by Marla Frazee, Equal Shmequal by Virginia Kroll, Little Blue Truck by Alice Schertle*, or any other fiction story involving forces and motion may be used. It is possible that students will read nonfiction text, such as Motion: Push and Pull, Fast and Slow* by Darlene Ruth Stille, to deepen their science understandings; however, nonfiction texts would *not* be used to engage with literary reading standards.

Writing

With the knowledge students develop throughout the scientific inquiry, exploration, and reading research of this unit on pushes and pulls, students will engage in writing routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two). In kindergarten, writing includes a combination of drawing, dictation, and the beginnings of labeling and sentences through the formation of letter sounds in words and phrases. For example, a student's writing can consist of just a drawing, a drawing with the teacher scribing for the student, a drawing with labels consisting of the initial sounds of the word of the picture being labeled, or a drawing with a completed word or sentence with phonetic spelling. As students engage in inquiry about pushes and pulls, speed, and direction, they can note their observations or questions in a science journal and participate in collaborative writing (Language Experience Approach) about their observations, and teachers can support and assess student writing development.

In this unit, formal writing instruction will be focused on the goal of students producing a **fictional narrative**, where they describe an event that occurred and give details in the order in which they happened (**W.K.3**). The fictional narrative will be directly related to an activity where students create a ramp using materials provided by the teacher (boxes, cardboard tubes, etc.) to release a car (e.g., Hot Wheels toy or Matchbox Car) from it. The height of the ramp and/or strength of the push will determine how far the car will travel. On the floor in front of the ramp will be chart paper, butcher paper, or masking tape with student-generated destinations labeled on it. For example, destinations might be school, the park, a movie theater, a theme park, Disneyland, LegoLand, or a made-up place like Pokémon World. The distance the car travels will determine the location the student travels to. As students release their car and determine their destination, they will write their fictional narrative about this imaginary trip. It can include a single event or several loosely linked events in the order they occurred, including a reaction to what happened. Students will engage in shared research and writing projects with the teacher (**W.K.7**) to develop their ramps and their narratives.

Students will engage in the writing process through shared writing experiences with the teacher during mini lessons. In kindergarten, the writing process looks different because students do not need to participate in every step of the writing process due to the early stages of developmental writing. The writing process can include brainstorming, pre-writing, drafting, revising, and editing to develop and strengthen their piece (not by copying or writing a dictation said by the teacher). With guidance and support, students will use a variety of digital tools to produce and publish their writing. (**W.K.6**) Using digital tools is a new skill for kindergarten and can be achieved in a number of ways, such as by creating digital dictation, photo or clip art illustrations, and/or voice/video recordings of student writing.

Reading Foundational Skills, Language, and Speaking/Listening

As students engage in comprehensive literacy routines, there are many opportunities for integration and incorporation of Reading Foundational Skills, Language, and Speaking and Listening standards in a contextualized and meaningful way. The selection of what specific standards to integrate is based on the needs of the particular group of students in the class, and as such, are selected when teachers develop the learning plan for this unit.

Performance-Based Summative Assessment

Once students have had multiple opportunities to investigate forces and motion through inquiry, have read literary texts about pushes and pulls, and have written their narrative piece about the fictional trip their car took, they will engage in a performance task that serves as the summative assessment for this unit. Using the knowledge they acquired throughout the unit, students will work individually or in pairs to answer the question **How do pushes and pulls affect the motion of an object?** Individuals or partners will construct a ramp and pathway using the provided materials with the goal of having the toy car get as close as possible to a teacher-drawn "parking spot" (drawn using chalk or tape). Students may take into consideration the materials they use, how to influence the direction of a moving object, the amount of strength used to push or pull the object, and the slope of the ramp. Once students give the initial push of the toy car, they may not touch the car with their hands in order to park it but may use materials to aid an additional push, pull, or change of direction. Students will have three opportunities to park their car and will verbally explain how each push or pull assists in the goal of getting the toy car from its starting point to the parking spot.

Disclaimer:

*The texts, websites and resources included in this unit have been suggested by librarians or collected from other sources. These resources have not been vetted for content or readability level. They are not an exhaustive nor recommended list; they have been included as samples to confirm that texts on the topic and in the genre are available in the language of instruction. The district is responsible for obtaining and vetting texts for this unit.

Biliteracy Unit Framework Components

Building Initial Oracy and Background Knowledge: Language Comprehension

Using strategies such as Adapted Reader Theater (ART), TPR, sentence prompts, fishbowl etc. students develop initial oracy and prior knowledge. After starting the unit, oracy for content-specific academic language continues to be developed.

K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Strategies to use may include:

- Concept Attainment (p. 81-82): For example, teachers may have students choose a children's toy from a selection of simple toys, such as toy cars, balls, jump ropes, juggling scarves, pull toys, etc., and direct students to make it move, observing how they did it. Differentiated sentence frame suggestions:
    - *The toy _____. (e.g., The toy **mueve rapido**.*)* *During concept attainment, students use the language they have. Sentence frames help build linguistic repertoire in the language of instruction.
    - *I made my toy move by _____.* (e.g., *I made my toy move by **giving it a little push**.)*
    - Partner A: *I will make the car ____ by ____.*
      Partner B: *I will watch the car ____.*
      Partner A: *Your turn now!*
      Partner B: *Thank you!*

- Sentence Prompts with Picture Cards used to scaffold students in producing complete sentences on topic.
- Total Physical Response (vocabulary development, p. 81): Receptive and productive language will be developed around academic terms associated with forces and motion.

Formative Assessments

Oracy begins with initial content oracy development, then continues throughout the unit so that students develop more complex oracy necessary for further inquiry. In reading, oracy is developed around the language of the reading standards as well as any additional terms or concepts necessary to comprehend a specific text prior to reading.

Reading Comprehension

Before working on the reading standards, oracy on the reading standards is developed, focusing on the language (See above: Building Oracy and Background Knowledge).

RL.K.1 With prompting and support, ask and answer questions about key details in a text.
RL.K.2 With prompting and support, retell familiar stories, including key details.
RL.K.4 Ask and answer questions about unknown words in a text.
RL.K.5 Recognize common types of texts (e.g., storybooks, poems.
RL.K.7 With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).
RL.K.10 Actively engage in group reading activities with purpose and understanding.
Click here to access the outcomes for these Reading Standards.

As part of inquiry into forces and motion, students will read literary texts that are stories involving pushing, pulling, and motion. The texts read with students will serve as sources about how forces and motion affect our daily lives and interactions and to meet reading literary text standards. Therefore, the teacher will engage students in multiple readings of the literary texts, each time reading the text for a different purpose.

Comprehensive Literacy Strategies, literacy routines, and examples:

- Mini-lessons
- Modeled/Shared Reading
- Sentence builders (with cards): Using the sentence frames from TPR, students will rebuild sentences for directionality and reading practice. **RL.K.10**
- Read Alouds (texts including stories involving forces and motion, such as The Enormous Turnip by Katie Daynes, Newton and Me by Lynne Mayer, or And Everyone

Content

Science standards are worked on through inquiry, including experimenting with forces of pushing and pulling. Students will also design a solution to a problem involving the need to change the direction or speed of an object.

Standards:
K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
[Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.]
[Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

Shouted, "Pull!": A First Look at Forces and Motion by Claire Llewellyn: Focus on retelling and using illustrations **RL.K.1, RL.K.2, RL.K.7, RL.K.10**

- In small groups – asking and answering questions about unknown words in a text; retelling familiar stories. **RL.K.1, RL.K.2, RL.K.4, RL.K.10**

Scan the QR code to access the unpacked standards into outcomes:

Additional Standards:

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.1a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.1b. Continue a conversation through multiple exchanges.

SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.

SL.K.2a. Understand and follow one- and two-step oral directions. CA

SL.K.4 Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.

SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Writing

Before working on writing standards, oracy is developed, focusing on the language of the standards. Writing will be integrated into inquiry as students engage in gathering information and participating in creating a mentor text through teacher modeling and shared writing.

W.K.3 Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.

K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Click here to access the outcomes for these Science Performance Expectations.

W.K.6 With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers. **W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). **Click here to access the outcomes for these Writing Standards.** Writing teaching strategies and routines are used to work on the writing standards when conducting science inquiry. The Language Experience Approach (LEA) can be used to document shared experiences in a narrative format. The focus is on writing a fictional narrative text about a force, where they describe a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened, using mentor texts shared through reading activities: · Modeled and shared writing · Mini-lessons · Independent writing · Interactive editing and proofreading · Interactive writing Examples of writing strategies: • Language Experience Approach (p. 57-59 of Teaching for Biliteracy): Class writes about how to make a toy car move. **W.K.3, K-PS2-1** • Guided/Shared Writing: Focus on using complete sentences and first, next, then, and last. Incorporate a graphic organizer for the order of events where students can draw, dictate, and/or write the story. For example, *First, we put the car at the top of the slide. Next, we pushed it hard. Then it went so fast down the slide! Last, it came to a stop at the bottom.* **W.K.3** • Writer's Workshop: Applying sounds to writing, complete sentences. Students write about their experiences with making things move from various inquiry opportunities, utilizing the same graphic organizer as shared writing/LEA collaborative texts. Use sentence prompts to guide as needed. **W.K.3, W.K.7, K-PS2-1**	**Every time students are exposed to new concepts and language; oracy and background knowledge are first developed (see Building Oracy and Background Knowledge).** **The reading and writing standards are integrated into students' inquiry of science standards.** *Example inquiry activities:* • Taking Matchbox Cars or Hot Wheels and experimenting with how they move: indoors, outdoors, on various surfaces, with different strength pushes, being pulled, etc. • Using two playground balls, sit in a circle and experiment with what happens when the balls are pushed toward each other at different strengths and in various directions. Experiment with balls the same size and weight, different sizes, and different weights.	

- Writing narrative text: Students write a fictional story (narrative) about a place their toy car has "visited," where they describe a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened. The visit includes forces or motion in some way, such as pushing, pulling, going fast, going slow, or otherwise. **W.K.3, K-PS2-1**

Scan the QR code to access the unpacked standards into outcomes:

Additional Standards:

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.1a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.1b. Continue a conversation through multiple exchanges.

SL.K.4 Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.

SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Foundational Skills and Fluency: Word Recognition

The teacher identifies the foundational skills and language standards according to the student's needs (using the data gathered from the unit's various reading and writing activities) and the sequence of systematic instruction adopted by the program. Word study instruction is taught within the meaningful context of the unit topic, utilizing familiar vocabulary and terms to exemplify and explicitly practice foundational skills and language standards, and can be delivered in the whole group, small group, or individually.

For example, *Reading Foundational Skills* standards that may be addressed include:

- Experimenting with marbles, cut tubes, and blocks to create tracks, paths, and ramps.
- Having laundry basket races, where one student sits in the laundry basket and another student pushes it either across the carpet or across the grass.
- Playing with juggling scarves - encourage students to find a variety of ways to make theirs move, change the speed, and change the direction.
- Participating in class or small group tug-o-war competitions.

Example engineering/design activities may include:

- Determining a problem or situation they would like to design a solution for, specifically involving changing the speed or direction of an object.
- Planning, designing, and constructing a solution using a variety of materials (e.g., wooden blocks, cardboard, paper towel tubes, tape, paper, etc.).

RF.K.1 Print Concepts: Demonstrate understanding of the organization and basic features of print.

RF.K.1a. Follow words from left to right, top to bottom, and page by page.
RF.K.1b. Recognize that spoken words are represented in written language by specific sequences of letters.
RF.K.1c. Understand that words are separated by spaces in print.

RF.K.2 Demonstrate understanding of spoken words, syllables, and sounds (phonemes).

RF.K.2a. Recognize and produce rhyming words.
RF.K.2b. Count, pronounce, blend, and segment syllables in spoken words.
RF.K.2c. Blend and segment onsets and rimes of single-syllable spoken words.
RF.K.2d. Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phonemes (consonant-vowel consonant, or CVC) words.* (This does not include CVC's ending with /l/. /r/, or /x/.)
RF.K.2e. Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.

RF.K.3 Phonics and Word Recognition: Know and apply grade-level phonics and words analysis skills in decoding words.

RF.K.3a. Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing the primary or many of the most frequent sounds for each consonant.
RF.K.3c. Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does).

For example, *Language* standards that can be addressed include:
L.K.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

L.K.1a Print many upper-and lowercase letters.
L.K.1d. Understand and use question words (interrogatives) (e.g., who, what, where, when, why, how).
L.K.1f. Produce and expand complete sentences in shared language activities.

L.K.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

L.K.2a. Capitalize the first word in a sentence and the pronoun I.

- Testing the solutions for reliability, analyzing the data to compare strengths and weaknesses of the design.
- Redesigning and rebuilding as needed.

Scan the QR code to access the unpacked standards into outcomes:

Additional Standards:

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.1a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).
SL.K.1b. Continue a conversation through multiple exchanges.

SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and

L.K.2b. Recognize and name end punctuation. **L.K.2d**. Spell simple words phonetically, drawing on knowledge of sound-letter relationships. Word recognition teaching strategies are used to work on these standards, asking students to apply them in their reading and writing as part of the inquiry: ● Mini-lessons ● Dictado ● Individual conferences ● Modeling through shared writing For example: ● Print concepts: Students work on print concepts of moving from left to right by using a graphic organizer, which supports writing their narrative from beginning to middle to end, left to right. **RF.K.1** ○ For example, as students prepare to write their narrative about a place their toy car has visited, they will complete a graphic organizer that focuses on moving from left to right. ● Phonological Awareness: Students utilize a familiar text to practice identifying rhyming words. **RF.K.2** ○ For example, when engaging with the book Newton and Me, students will identify rhyming words from the text. ● Phonics and Word Recognition: Students will apply their letter sound knowledge to reading and writing, as well as their high frequency word knowledge. **RF.K.3** ○ For example, as students contribute to the shared writing (LEA), they will apply sounds to writing then reinforce that knowledge by rereading the LEA. ● Conventions of Standard English: Students will identify conventions (capitalization, end punctuation) in shared reading and read alouds and apply those skills to shared writing and independent writing. **L.K.1** ○ For example, after observing punctuation in a text and participating in mini lessons on various options for end punctuation during shared writing, students will apply the punctuation of their choice to their own narrative writing.	requesting clarification if something is not understood. **SL.K.2a**. Understand and follow one- and two-step oral directions. CA **SL.K.5**. Add drawings or other visual displays to descriptions as desired to provide additional detail. **SL.K.6**. Speak audibly and express thoughts, feelings, and ideas clearly.	

Summative Assessment

K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*

Performance Task: The teacher will establish a scenario for each student or pair of students in order to answer the essential question: **How do pushes and pulls affect the motion of an object?** Student groups will be given access to the same materials and a toy car (such as a Hot Wheels toy or Matchbox car). The teacher will designate a starting point for the group as well as an ending point, called the "parking spot", and mark it with masking tape or chalk. Students are given ample time to construct a ramp, track, pull system, etc., that gets their car from the starting point to the parking spot with only one touch by student hands. All additional pushes and pulls must be done by external forces (with a material or means between the student hand and the car), such as a dowel pushing the car or a string attached to the top of the car used to pull it into its spot.

Students are given many opportunities to set up and test the route and three opportunities to demonstrate it for the teacher and other classmates. During the demonstration, they describe how they apply strength, direction, pushes, and pulls to the car to get it to go from the starting point to the parking spot. For example, students may demonstrate and describe their solution as: *We gave a hard push to our car, and it went down the ramp. It went forward very fast. Then it hit the block wall to change direction. After that, we used a string taped to the top of the car to pull it into the parking spot.* A student at lower language proficiency levels will demonstrate their understanding using the same supports as used during instruction, such as sentence frames and visual supports. Sentence frames may include: *I ____ the car. The car went ____.*

Some students may benefit from sentence frames to share their results. In addition, displaying a word bank with TPR pictures including terms such as *push, pull, change direction*, etc., may be helpful for students as they verbally share the results of their design solution.

The Bridge

Bridge - Transfer
Side by Side with pictures

Steps 1, 2, 3, 4:

- **Step 1**: Review the TPR from the unit in English.
- **Step 2**: Make a T-Chart leaving a middle column for pictures.
- Label the left side English in blue and the right side Español in green.
- Elicit key vocabulary from the students based on what they learned in the unit and from the concept attainment and write those words in the English side of the chart. Add pictures as a visual support.
- **Step 3**: Present the same TPR reviewed in Step 1 in Spanish. Have students practice until oracy is built.
- **Step 4**: Work together as a class to identify and write the translation to the matching English word the Español side of the T-Chart.

Anticipated Bridge Chart:

English	Picture	*Español*
to push		*empujar*
to pull		*jalar*
the force		*la fuerza*
the motion		*el movimiento*
fast		*rápido*
slow		*lento*
to go		*ir*

Bridge – Transfer - Practice (includes Listening, Speaking , Reading, and Writing in the other language)
Step 6:

Step 6: After building oracy of the Bridge terms in Spanish and completing the transfer chart, students will participate in reading a rendition of Los Tres Cerditos (The Three Little Pigs), with discussion questions focusing on the forces and motion elements of the story.

They will then write a letter to the wolf, explaining how the forces he used affected the lives of the pigs.

RL.K.2 Con sugerencias y apoyo, recuentan cuentos que les son familiares, incluyendo los detalles clave.
RL.K.3 Con sugerencias y apoyo, identifican personajes, escenarios y acontecimientos importantes en un cuento.
W.K.2 Usan una combinación de dibujo, dictado y escritura para redactar textos informativos y explicativos en los cuales dicen sobre qué están escribiendo y

Bridge: Contrastive Analysis

Step 5:

Step 5: While this is the teaching point planned by the teachers, the teachers also accept and highlight other areas of contrastive analysis noticed by the students.
Metalinguistic Skills:
Phonology: The sounds that c makes in English and Spanish
RF.K.3a Demonstrate basic knowledge of letter-sound correspondences by producing the primary or most frequent sound for each consonant.

ca, co, cu, c+consonant	ce, ci, cy	ch
direction Colin *cambiar* *dirección* *Carla*	force *dirección* *Cinthia*	change Charlie *Pancho*

OR

Syntax and Grammar: Spanish uses accents for emphasis on certain syllables. English does not.
RF.K.3h Reconocen que el acento escrito (acento ortográfico) es una marca sobre una vocal que indica la pronunciación de la palabra de acuerdo

to stop to change direction first next then last		*parar* *cambiar de dirección* *primero* *después* *luego* *al final*

ofrecen algo de información acerca del tema.

con la sílaba que recibe el énfasis al pronunciar la palabra.

English	*Español*
fast next direction	*rápido* *después* *dirección*

COMPLETED SAMPLE Learning Plan for THIS Unit https://bit.ly/U4KLearningPlan	
Day to Day Planning Template – English https://bit.ly/T4BLPT	
Day to Day Planning Template – Spanish https://bit.ly/T4BEP	
6-step Planning Framework for the Bridge https://bit.ly/BridgeFramework6Steps	