Big Idea:
What does science have to do with playing sports?
Guiding Questions:
Why do scientists like to play soccer?
How can you design a simple way to change the speed or direction of an object using a push or pull from another object?
What is motion?
What is a force?
What happens when we push or pull an object?
What happens when I push or pull an object strongly?
What happens when I push or pull an object gently?
21st Century Themes/Skills:

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Pushes and pulls can have different strengths and directions. (K-PS2-1), (K-PS2-2) 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)	With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)	Simple tests can be designed to gather evidence to support or refute student ideas about causes.	SWBAT: Describe motion by observing how an object changes speed and direction SWBAT: Define force by pushing or pulling on an object to idetify the change of speed or direction SWBAT: Explain the relationship between force and motion by designing tests to gather evicence	EXPLORE 1: Lesson Questions: What is motion? What is a force? What happens when we push or pull an object? What happens when I push or pull an object strongly? What happens when I push or pull an object gently? Present students with the first five Lesson Questions on force and motion, and have them complete the first section of the Scientific Explanation: Force and Motion Student Sheet using these questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The resources includes a link to a PDF version of the Student Sheet. Guide students to think about what they already know about each question, and record their prior knowledge in the Prior Knowledge section. Encourage students to think about and record how they know what they do (evidence and reasoning). Introduce the Evidence section, explaining to students that they will fill this in as they go through the rest of the lesson. Have students begin the Evidence section with information gathered during Engage.	Kindergarten- Unit 1 Resources McCracken	EVALUATE 1: Write the words push, pull, force, and motion on the board. Have students write or draw pictures to show what each word means. Tell students to imagine that they are going to compete in a skateboard or bicycle racecourse. Have them illustrate three ideas on how they could use force and motion to win the race. Ask students to use arrows to show the forces in their pictures. EVALUATE 2: Instruct students to complete the Primary Assessment for Force and Motion. Constructed Response Selected Response You may also wish to make your own concept assessment using the tool located at the bottom of the Evaluate section of the Core Interactive Text.	
				EXPLORE 2: Instruct students to read the first section of Explore in the Core Interactive Text: What Is Motion? Emphasize that forces are pushes or pulls, and that forces are necessary to cause motion. To review the second Lesson Question (What is a force?), students should read the next two sections of the Core Interactive Text: Do Forces Always Cause Motion? What Forces Make Things Move? Explain that the next three sections of Explore in the Core Interactive Text describe the relationship between force and motion. As students read these sections, they should complete a Cause/Event/Effect Chart to describe the effects of different kinds of forces: What Happens When We Push or Pull an Object? What Happens When I Push or Pull an Object Strongly? What Happens When I Push or Pull an Object Gently?	Newark		
				EXPLORE 3: Have students work in groups to complete the Hands-On Activity: Cars in Motion. In this activity, students will plan and conduct a series of investigations to compare the effects of different strengths or different directions of pushes and pulls on the motion of toy cars and trucks. Following the activity, regroup as a class and have each group present its findings. Students should talk about: how they chose to measure the distances,their predictions, and their outcomes.			

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				EXPLAIN 1: Lesson Questions: What is motion? What is a force? What happens when we push or pull an object? What happens when I push or pull an object strongly? What happens when I push or pull an object gently? Tell students that they are going to watch the video The Trouble with Force. Explain that in this video, the animals learn that using force can make things move faster, but too much force can make things difficult to slow down. they have watched the video, ask students: When did the animals push? When did the animals pull? Have students work in the same groups they were in for the Hands-On Activity: Cars in Motion. Ask students to explain the results of their activity in terms of forces. Allow students to further experiment with objects in the classroom to develop their ideas. Invite students to put a small toy (an animal, a toy person, or object) in one of the cars. Set up the car course so that there is a barrier (book, block, etc.) to stop the car. Give the car a good push and see what happens. (The car will stop, but the toy, person, or animal will keep moving out of the car.) Have each of the student groups explain what happened in terms of motion and force (push and pull). (e.g., The car was stopped by the barrier. The passenger continues moving in the absence of a force. A seatbelt would decelerate the passenger's movement.) Use arrows to illustrate the directions of the forces at work. Draw the car and the barrier on the board. Draw an arrow to indicate the direction of the force of the car (the direction the car is traveling). Draw an opposite-facing arrow to indicate the force of the barrier. See if students can relate this activity to a real car. Ask students to discuss how wearing a seat belt can help in a situation like this. Set up another course in which two cars are traveling away from each other. Have students draw the two cars and use arrows to illustrate the forces of the two cars.			
				EXPLAIN 2: **Now have students use the evidence that they collected here and in the Explore sessions to complete the sections of the Scientific Explanation: Force and Motion Student Sheet titled "My Claim" and "My claim is true because …" Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet.** **Have groups of 2–4 students share their explanations with each other. Students should then revise or enhance their explanations based on group discussion.**			
				EXPLORE 1: Lesson Questions: What is friction? How does friction change motion? Present students with the final two Lesson Questions and have them complete the first section of the Scientific Explanation: Force and Motion Student Sheet using these questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Guide students to think about what they already know about each question, and record their prior knowledge in the Prior Knowledge section. Encourage students to think about and record how they know what they do (evidence and reasoning). Remind students that they will complete the Evidence section as they go through the rest of the lesson. Have students begin the Evidence section for the two new Lesson Questions with information gathered during previous sessions.			
				EXPLORE 2: Ask: Why do objects slow down as they move across a surface?			

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				Distribute to each student a KWL Chart. Instruct students to complete the first two columns based on what they already know about the answer to this question and what they want to know about the answer. To add [illegible] the first Lesson Question, instruct students to read the following sections of			
				EXPLORE 3: Have students work in groups to complete the Hands-On Activity Friction. In this activity, students will investigate how friction affects the movement of objects. First, students will test the amount of force required to move objects across rough and smooth surfaces. Then, students will use what they learned to design a method for reducing friction. Students will test and evaluate their designs. Following the activity, regroup as a class and have each group present its findings. Students should talk about: how they planned to lower friction, whether their plan made it easier to move the rock, and how friction changes the amount of force needed to move objects. EXPLAIN 1: Lesson Questions: What is friction? How does friction change motion? Have students rub their hands together quickly. Invite students to describe what they feel. (They should feel their hands warming up.) Tell students that the heat they feel has to do with friction. Then, have students watch the video segment Friction. Invite students to recall how the characteristics of surfaces changed the amount of force needed to move objects during the Hands-On Activity: Friction. Ask students to describe the difference between rough and smooth surfaces. Then, have students watch Moving Slower and Rough and Smooth Surfaces and read the passage Let's Use Friction. Have students work in the groups in which they worked during the Hands-On Activity: Friction. First, have students write two or three sentences summarizing the results of their Hands-On Activity in terms of rough and smooth surfaces. Then, have students work together to complete the interactive online Exploration Friction. 1Finally, bring the class back together and invite students to join in with movements and singing while you show the video segment EXPLAIN 2: Now have students use the evidence that they collected here and in the Explore sessions to complete the sections of the Scientific Explanation: Force and Motion Student Sheet titled “My Claim” and “My claim is true because …” Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Have groups of 2–4 students share their explanations with each other. Students should then revise or enhance their explanations based on group discussion. ELABORATE: Applications and Extensions Day 2 – 5 minutes □ Look at the chart and see who was the fastest, slowest, and the same. Ask the kids why this could happen			

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				ELABORATE: Lesson Questions: What is a force? What happens when we push or pull an object? Tell students they are going to read about pushing and pulling forces. Have the students read Force and Dogs. You may choose to read the passage aloud for beginning readers and non-readers. Ask students if they can think of some other times when they feel pushing and pulling in their everyday lives. Have students explore the "Pushing and Pulling" segment of the Fun-damental Making Things Move. Consult the Teacher's Guide for more information about the activity. Have students work together to answer the questions and complete the charts in the Student's Guide Level 1. After they have had a chance to explore the Fun-damental, ask students to think of pushing and pulling forces in their community. You can ask if they have ever seen a train engine pulling cars, or someone picking fruit. Draw a T-Chart on the board and see if students can come up with three examples of pushing and three examples of pulling. Student groups can continue to explore the forces at work with a floating object. Distribute containers and have small groups half fill their containers with water. Ask groups to watch their toy boat (or other object) floating on the water. Discuss the forces at work by asking students the following questions: What is pushing up on the boat? What is pushing down on the water? Explain that the forces are balanced when the boat floats. Ask: What would happen if we put lots of weight in the boat? Have students try it out. (The boat sinks because the force pushing down on the water is greater than the force of the water pushing up on the boat.) Explain that when the boat sinks, the forces are not balanced any more. On the board, illustrate the boat sinking and the boat floating. Help students determine where to draw arrows to show the forces.			