5E Lesson Plan: Kindergarten Pushes and Pulls

Original 5E Instructional Model Developed by BSCS. Concept Column added by K-12 Alliance/WestEd

Unit Big Idea	Pushes can have different Strengths
Learning Sequence Concept	Using the lens of cause and effect we see that the strength of the push is connected to the speed of the movement.
Performance Expectation	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.*]
Disciplinary Core Ideas	PS2.A: Pushes and pulls can have different strengths PS2.B: When objects touch or collide, they push on one another and can change motion.
Crosscutting Concept	Cause and Effect: Simple tests can be designed to gather evidence to support or refute student ideas about causes
Science and Engineering Practices	Analyzing and Interpreting Data: Use of pictures, drawings, and writing to describe patterns of observations
Phenomenon	Winnie the Pooh stuck in Rabbits House
Materials Needed	Balls, toy car, chair, worksheet, chart, markers

Stage	Teacher does	Student does	3D Concept
Engage 10 minutes	Introduce team lesson phenomena: Winnie the Pooh video Students see Rabbit pulling/pushing Pooh Bear. (video is 2:32 sec. long)	Students watch video then discuss/share out what they noticed.	Pushes and Pulls make things move Cause and Effect: events have causes that generate

Stage	Teacher does	Student does	3D Concept
	Ask students: "What do you notice?" Looking for vocab push/pull/move If students explain/show but don't give, provide vocab, prompt with,"So Pooh Bear moved… (Toy car & chair)"What could you do to make it move?" Reinforce vocabulary as students describe and show how to move items.	Expected student responses: • "Pooh bear is stuck." • "Rabbit pushed/pulled Pooh bear to free him." • "Rabbit couldn't free him by himself. He needed help." • "Give it a push/pull." Selected students come up to show and describe how they would move it.	observable patterns Analyzing and Interpreting Data: Use observations to describe patterns
Explore 15 minutes	Review classroom expectation with the balls. Ask students: • What causes objects to move? • How can you make it move faster/slower? Reinforce vocabulary as students explore: • hard push • gentle push		Pushes can have different strengths Cause and Effect: events have causes that generate observable patterns Analyzing and Interpreting Data: Use observations to describe patterns
	Model for students how to work with a partner and how to roll the ball Have students practice working with their partner: Students	With a partner, students will roll a ball to each other. 1. Make the ball roll slower. 2. Make the ball roll faster. Partners have conversations about what happens with the different pushes	

<table>
<tr><th>Stage</th><th>Teacher does</th><th>Student does</th><th>3D Concept</th></tr>
<tr><td></td><td>practice and follow directions: when the teacher says “slowly,” students roll slowly, when teacher says “fast,” students roll fast.

Teachers observe students interactions with the materials and their explanations.

Questions to probe student thinking through the lens of cause and effect:
• “So what did the ball do when you did…”
• “What happens when you push the ball harder/softer?”</td><td>Anticipated student responses:
• “The ball went fast when I pushed it hard.”
• “The ball went hard when I pushed it.”
• “The ball was slow when I pushed it soft.”
• “The ball didn’t go far when I pushed it gentle.”</td><td></td></tr>
<tr><td>Explain
20 minutes</td><td>Present question to students: “How did you make the ball roll faster/slower?

Co-create a chart using simple drawings for vocabulary words.

Pass out paper and ask students to answer the focus question above.</td><td>Students will draw, write, and talk about how they made the ball roll faster/slower.

Teacher will script what students are writing.

<u>Evaluation of student work:</u>
<table><tr><th>Got it</th><th>On their Way</th><th>Didn’t Get it</th></tr><tr><td>I pushed the ball hard to</td><td>The ball moved fast.</td><td>No response

or</td></tr></table></td><td>Pushes cause motion and can have different strengths

Cause and Effect: events have causes that generate observable patterns

Analyzing and</td></tr>
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Stage	Teacher does	Student does			3D Concept
		make it move faster . I pushed the ball gently to make it move slower.	The ball moved slow	It moved	Interpreting Data: Use and share pictures, drawings, and/or writings of observations