The Amazing Laundry Basket Race

By Kristen Peckham

NGSS: KPS2 Motion and Stability— Forces and Interactions

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.]

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experience and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

With guidance, plan and conduct an investigation in collaboration with peers.

Disciplinary Core Ideas

PS2A: Forces and Motion

Pushes and pulls can have different strengths and directions.

PS2B: Types of Interactions

When objects touch or collide, they push on one another and can change motion.

PS3C: Relationship Between Energy and Forces

A bigger push or pull makes things speed up or slow down more quickly.

Crosscutting Concepts

Cause and Effect

Simple tests can be designed to gather evidence to support or refute student ideas about causes.
Summary

Watch a video of our kindergarten class performing The Amazing Laundry Basket Race at https://drive.google.com/file/d/1x9M9ipXymkWzS6GRI93Js7AWPfYhgVfu/view?usp=sharing

With guidance and support, students plan and carry out an investigation of force and motion. Students estimate then record the time it takes to push and pull another student in a laundry basket on two different surfaces. Students identify which type of force is used. They draw a model of the investigation and graph the results of the race, comparing their estimates with actual times. Students record their observations in a classroom chart and investigation journals.

Overview of the Formative Assessment Process in This Resource

Clarifying Intended Learning

Learning Goal:
- Students will understand that forces act on objects to move them.

Success Criteria:
- I can identify a push and/or pull as a force that affects motion.
- I can tell that an object moves in the direction of the push or pull.
- I can recognize that pushes and pulls can speed up, slow down, or change the direction of an object.
- I can say that size, weight, and shape of an object affects its motion.

Elicit Evidence:

Observe and question students as they participate in the investigation. Elicit evidence with classroom discussions, think/pair/share discussions, charts, and graphs. Use Venn diagrams, drawings, and investigation journals to demonstrate understanding.

Interpret Evidence:

Review the evidence to determine if students correctly identified pushes and pulls as forces. Could they draw a model to show that an object moves in the direction of the push or pull? Did students record their findings in their investigation journals? Were students focused throughout the investigation?
Act on Evidence:
Determine next steps. These could include remediation to help students better understand forces or extension to increase their experience and knowledge.

Feedback:
Ask students “How do you know that?” “What would happen if…?” “What makes you think that?” “How do you tell if something moves?” “What can cause motion?” Guide students to identify forces and complete their investigation journals.

Instructional Moves:
The Big, Bad Wolf Challenge can extend learning. Students design houses to withstand the wolf. They discuss which designs worked and why. Students identify the force of air from the hair dryer as a push. They record their observations in an investigation journal.

Instructional Task Description
1. Introduce motion with a game or a dance, such as the Hokey Pokey.
2. In a whole-class discussion, brainstorm ways things can move. Ask students if things can move on their own and graph their answers.
3. Show students a ping-pong ball and challenge them to think of ways to make it move. Demonstrate moving the ping-pong ball with a push, stopping it with a hand, and making it change direction. Allow students to move the ping-pong ball.
4. Continue the class discussion by showing pictures of things that can be moved and asking students to sort them in a Venn diagram as either pushes, pulls, or both.
5. Tell students they will work with a partner to plan an investigation of force with the Amazing Laundry Basket Race.
6. Through class discussions, create a chart with the students’ estimates of the time it will take them to push or pull their partner.
7. Using Think/Pair/Share, ask students to choose two different surfaces for the race. We used carpet and concrete. Ask students to estimate if the race time will be the same on the different surfaces. Record their answers in the classroom chart.
8. Use tape to create a straight raceway on each surface. Ask pairs to push and then pull each other in a laundry basket across each surface.
9. Using a stopwatch, record their times in the classroom chart. Observe how students use the terms push and pull as they race.
10. After the race, guide students to discuss the results. Were their predictions correct? Were they surprised by the results? Were some times faster and some slower? Why? Was it harder to push or to pull? Why? Was it easier to pull on one surface than on the other? Why? Did the size of the student doing the pushing or pulling make a difference? What about the size of the student in the laundry basket?

11. In an investigation journal, students draw and label a model of the race. They record both their estimates and the results of their race. Ask students to note any other ideas they have about the race. What do they still have questions about? What do they want to investigate further?

Differentiation

**For English Language Learners** – Use pictures, gestures, and motions in classroom discussions. Pair students to balance their skills and abilities. Create leveled recording sheets with number lines and sentence frames.

**For Students with Disabilities** – Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). Create leveled recording sheets with number lines and sentence frames.

**For Other General Education Students** – Extend the lesson with opportunities to push and pull on the playground with swings, slides, or games of Tug-of-War.

**Additional Comments and Considerations from the Author(s)**

The Amazing Laundry Basket Race works best as a whole-class lesson but can be adapted to smaller groups or centers. The laundry baskets work well with kindergartners, but older students may enjoy racing wagons, skateboards, or bicycles. This lesson compares race times on carpet and concrete. More variables could be introduced, such as wood or metal surfaces, to increase the complexity.

**Student Materials and Additional Resources Links**

List of Resource Materials

Watch a video of our kindergarten class performing The Amazing Laundry Basket Race at

https://drive.google.com/file/d/1x9M9ipXymkWz6GRl93Js7AWPfYhgVfu/view?usp=sharing


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