Cross-Curricular Activities Connected to Physical Science, Grade K

The following activities from ***Push, Pull, Go,*** integrate math, social studies, English Language Arts (ELA), art, and more into physical science topics. These cross-curricular connections help students see how science is related to their lives, and the world they live in. These activities reinforce and extend ideas about movement, recognizing forces and their resulting motions and are perfect for learning-from-home lesson plans. Permission is granted to incorporate these activities into teacher and parent lesson plans.

Ramp It Up! (Science)

Encourage students to look for ramps in and around the classroom and the school. Create a chart on which students can list the ramps they find, describe what they are used for, and describe or draw what they look like.

Ramp It Up Challenge (Math)

Challenge students to think of a way to measure the height and/or length of the ramps using nonstandard measurements. Add a column to the class chart to record the height/length, or have students record this information in their science notebooks.

Measuring Distance (Math and Science)

Record the distance the ball travels down the K'NEX ramp and over a variety of surfaces. Help students set up a simple T-chart like the one below to record the distance.

Surface	Distance
Table	_____
Carpet	_____
Hallway	_____

Invite students to measure distance using measuring tools appropriate to that student (e.g., nonstandard and/or standard measuring tools).

Spend time as a class interpreting the data that students collect. Use this opportunity to discuss the concept of friction. Friction is the force between surfaces in contact with each other. Friction affects the distance the ball travels on different surfaces. Expect less friction as the smooth ball rolls on the smooth hallway floor.

With less friction, the ball travels a longer distance. Young learners can experience and explore the differences in the ball rolling over different surfaces without being introduced to the word “friction” at this time.

Big Ball Challenge (Science)

1. Head outdoors or to the gym with a variety of balls. Encourage students to roll different sizes and colors of balls and make observations about how the balls move. Use the following questions to guide an active discussion about the balls and their motion:

- What starts the big ball moving? What stops the big ball?
- How can the direction of the ball be changed? (Reminder: This is a good opportunity to review forces.)
- What is the same about the movement of the big ball and the small ball as we roll them back and forth?
- Do any of the balls take more force to move than another? How do you know?

2. If there is a slide on the playground, ask students to make a prediction about motion if the ball is rolled down the slide. Go outside and test students’ ideas using a variety of balls. Use the following questions to guide this activity:

- What might happen if we put this ball at the top of the slide?
- What is needed for the ball to move?
- How might the ball move? What makes you think so?

3. Have students complete the following sentences. You may choose to have students do this as a class, recording their responses on a class chart, or individually, recording responses in their science notebooks.

Today I found out _____.

Now I wonder _____.

A Counting Force (Science)

1. Guide students to discuss their ideas about how to measure force. Ask:

- Is there a way to measure the amount of force used to push the swing? (Answers will vary.)
- What are your ideas? (Answers will vary.)
- How do you know if you used more force to push the swing than your partner used? (The swing moves higher with more force.)

2. Challenge students to explore the ideas they just discussed. Ask:

- Can you push the swing so that it will swing four times and stop? (Answers will vary.)
- What happens if you use too much force? (The swing moves more than four swings.)
- What happens if you use too little force? (The swing stops before it swings four times.)

3. Challenge students with different numbers of swings. Allow ample time for them to explore and try their ideas. Students are collecting evidence that more force moves the swing higher and for a greater number of swings than less force. Move around the room and encourage students to clarify their understanding.

Story Starter (ELA)

As a class, write a group story on chart paper. Use the following story starter and guiding questions to help your students develop the story.

Story Starter:

A rabbit hops by a very wide swing hung from a very tall tree in the woods.

Which forest animals get on the swing to ride?

How many animals get on the swing at one time?

Which animal pushes? Which animal pulls?

What happens next?

Movement Education (Science)

Take students outside and allow them to observe the pushes, pulls, and predictable patterns of movement on the playground. For example, observe how swings move. Bring students inside and do a quick charting activity. Title the chart “What Do We Know About How Swings Move?” Ask students how the swing outside is the same as and different from the model swing set they built. Provide opportunities for students to observe and chart about other playground equipment and the pushes, pulls, and patterns of movement.

Action Attraction (Science)

Challenge students to explore what might make the dominoes fall more slowly or more quickly. You might prompt students by asking:

- Does spacing make a difference in how a line of dominoes topples over?
- How might you test this question?
- Make a prediction and then try your ideas.

Domino Rally Events (Social Studies)

Do a quick Internet search for videos that show domino challenges that people have set up. Share these videos with students and encourage them to work together in small groups with all 96 dominoes to see how many dominoes they can set up to tumble with one push.

Counting and Setting Up Sets (Science and Math)

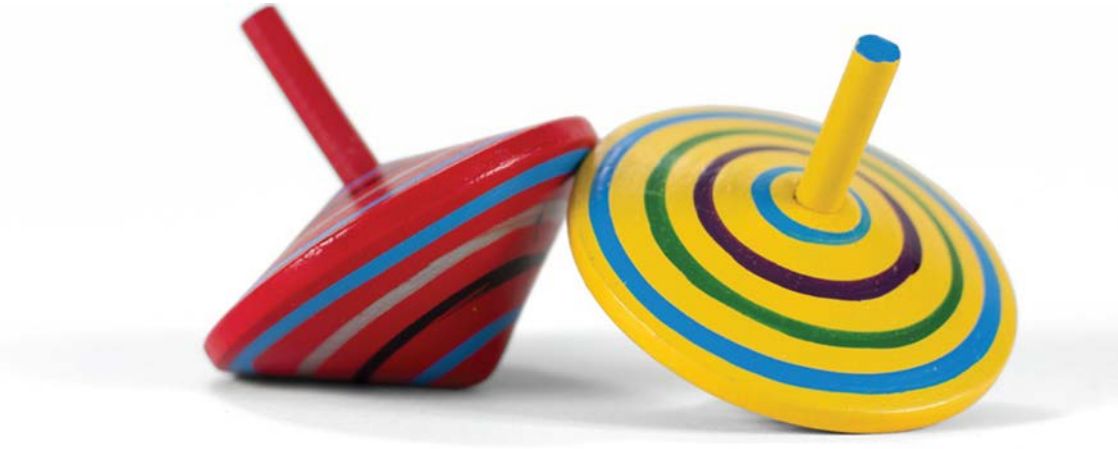
Challenge pairs of students to set up a line of dominoes that not only will fall down with one push but also is set up in sets of two or five. Have students offset the line of dominoes so that before the line is sent tumbling, they can identify and count the sets of two, three, or five.

Spinning Top Exploration (ELA)

1. Bring in a collection of toy tops. Place the tops in a learning center for students to explore.

2. Photograph the tops, and then use the photos to make a class chart. In a class discussion, record students' responses as they describe a specific top and its motion.

3. In addition (or instead), use the photos to make a graph where students can record their favorite top and then interpret the data to determine the class favorite.



Push, Pull, Go—A Motion Story (ELA)

Write a class story that focuses on using motion words (e.g., roll, tumble, swing, spin, twist, twirl).

Toys that Move (ELA)

For circle time, ask students to bring in toys that move. Ask students to put their toy in front of them when they are seated in the circle. Ask guiding questions that encourage students to describe force and motion.

- What is one word that describes how your toy moves?
- How does the toy truck move? (It rolls we push it.)
- Can the truck move faster? (Yes, if we push it harder or with more force.)
- If you see something that spins, put your hands on your head. What do you see that spins?
- Can you find a toy that has moving parts? Which parts move? How do you know?

Fun Machines that Move (Social Studies)

Ask students to share their ideas about the similarities between their inventions and Rube Goldberg machines. Many high schools and colleges have Rube Goldberg contests. Perhaps you could persuade a team of inventors to visit your class.

Paint in Motion (Art)

Cut pieces of construction paper to fit the bottom of small boxes. Allow students to dip a marble in washable paint and then use a little force to gently roll the marble around inside the box. Gravity, too, will do its part. Allow students to add more marbles with different colors of paint. The result? Masterpieces created by motion.

Playground in Motion (Movement Education)

See what kinds of toys and equipment you and your students can come up with to build a big "motion machine" on the playground. For example, consider:

- Hula hoops
- Parachutes
- Assorted balls
- Scooter boards
- Riding toys
- Jump ropes