

**Project FOCUS
Best Lessons
SECOND GRADE**

Title of Lesson: Matter and Energy

Theme: Physical Science

Unit Number: 3 **Unit Title:** energy/ Pushes and Pulls

Performance Standard(s) Covered (enter codes):

S2P3.b
S2CS1.a
S2CS2.c
S2CS3

Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

Content (key terms and topics covered):

Energy, Pushes and Pulls, Speed

Learning Activity (Description in Steps)

Abstract (limit 100 characters): Students will evaluate how the speed of a moving object affects the distance traveled.

Details: Assessment:

- Remind students about push and pull
- Ask two students to demonstrate push and pull
- You are using FORCE to push or pull something
- When you push or pull something, the object is in motion
- You can measure how far an object moves—with what?
- Explain meter stick/ruler—explain the „zero end“ from the „measuring end“ and how to line up the object with the „zero end“
- Measure an object together

Warm-Up/Attention-Getter:

- Read “What’s Faster Than A Speeding Cheetah?” by Robert E. Wells
- Ask children to read certain pages, recite information from previous pages, and ask children questions comparing different objects discussed in the book
- Draw a chart or graph, Objects vs. Speed

- Go through the book and add objects (falcon, cheetah, rocket, speed of light, etc.) to the bottom line. Then, go up vertically to their relative speed. The book goes in increasing order, so you can make the chart as you read the book
- Ask students to identify which object has the greatest speed and which object has the slowest speed
- Ask students what travels at 20 miles per hour or how fast an elephant travels
- If you have time, give students an object and relative speed not found in the book and ask where they would put that object in the chart or graph
- Today, we are going to see what can change the speed of an animal!
- What can you do to speed up an object? Slow it down?

Mini-Lesson:

- Learn the differences between push, pull, force, motion, and speed.
- Learn how to measure distance
- Learn about inches and centimeters (when measuring distance)
- Learn about charts and how to read the collected data
- Learn how to estimate distance and see how rulers help make a more accurate answer
- Learn how to work together as a group
- Learn how to compare data and how science experiments may require a lot of repetition

Work Period:

Materials: a ramp (wood, hardback book, etc.), 6 books, meter stick or ruler, toy cars

- Break group into two groups of four with their own six books, ramp, and toy car.

Assign each member a designated task—the data recorder, the car person, the book person, and the measurement person.

- Stack the books and have students measure the height of all six books
- Start with one book—set up the ramp and allow toy car to move down the ramp.
- Have students estimate the distance the car traveled (you will get some absurd answers if they have not been exposed to measurements before—the week before this activity, I did an activity where the students measured 10 different objects in centimeters and inches so that they become more familiar with the lengths)
- Measure the distance traveled and record it on the board
- Add another book, repeat procedure six times (six books)
- Make a bar graph of Number of Books vs. Distance Traveled
- Have the two groups compare their data and retry those experiments that differed in measurements greater than 5 inches or 10 centimeters. Explain that you want your answer to be as close to your fellow scientist's answer if you want his or her support.

Summary/Closing:

- Which car traveled the farthest distance? Which car traveled the least?

- Why did the car travel so far?
- Relate the distance traveled to speed. What helped the car travel farther?
- Talk about the actual experiment—what could be slowing down the car? The weight? The “road?” What if I pushed the car down the ramp?
- Ask students to look at the chart and make sure they understand it. For example, ask a student to tell me how far “car with one book” traveled, and so on.
- Ask questions that relate to their life—would it be easier to ride a bike on the sidewalk or in the grass? Would it be easier to pull a wagon through the grass or push a wagon through the grass?

Evaluation:

- You can add so much to this activity, that’s why I liked it so much. You can talk about friction, add in charting and graphs, help students measure objects, or even have students sharpen their estimation skills.
- To leave the children with a solid foundation, this activity requires a lot of previous discussion.
- The students really enjoyed having a particular job and it kept everyone from wandering off or fighting with other children.
- At the end of class, I gave each student their own inch and centimeter rulers that I printed offline and cut out.

Materials Needed (Type and Quantity):

- Materials:** a ramp (wood, hardback book, etc.), 6 books, meter stick or ruler, toy cars
- Break group into two groups of four with their own six books, ramp, and toy car.

Notes and Tips (suggested changes, alternative methods, cautions):

It's helpful if children are already proficient in measuring before you start this activity.

Sources/References:

- 1)
- 2)
- 3)