

# Sports Science

## Contents:

- Three, one-hour lessons
- List of Standards addressed

## Afterschool Curriculum:

This material is adapted from PBS Kids *The Ruff Ruffman Show*.

Funding for *The Ruff Ruffman Show* and its video contents are provided by the U.S. Department of Education and the Corporation for Public Broadcasting.



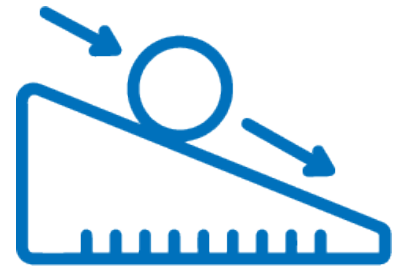
# L1 Push, Pull & Gravity

Lesson 1 of 3

Hi Pals! Ruff Ruffman here! \*Explore sports science as Ruff Ruffman figures out how to deliver a gift for his grandma's birthday ASK – When was the last time that you pushed someone in a wagon on a flat sidewalk? What about down a small hill? What happened?

**Big Question:** How do pushes, pulls, and gravity affect motion?

**Set the Stage:** Click here for [A Plushie for Grandma!](#) video: 8 minutes



## Activity:

**Procedure:** After the intro video – Engage: Let's investigate! Can we imitate Ruff's ramp experiment?

- First, let's find something to act as the Plushie.
- Next, let's assemble materials and tools listed on the right. Now, make a plan!
- Help your child/children draw out a ramp design.
- Work to build a ramp that will send your "plushie" as close to the target, 6 feet away.
- How can we modify the ramp to make the plushie go further than 6 feet?
- How can we modify the ramp to make the plushie go a shorter distance?

## Reflection:

How was the ramp that you built different than that one that you drew? Which materials seemed to work best for the ramp? Which did not work at all? What other materials would you like to try?

## Credits:

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## Materials:

- Computer
- Internet connection
- Computer paper
- pencils and pens
- One ball such as tennis or ping pong
- Objects such as cardboard tubes, cereal boxes, plastic bottles, paper plates, card stock, paper/ plastic cups, shoe boxes, etc.
- Measuring tape
- Ruler

## Standards:

Standards addressed by this activity - BSB – The Do Place:  
NS 4F/P2; NGSS K-PS2.A.2; K-PS3.C.1; K-PS2.A.3



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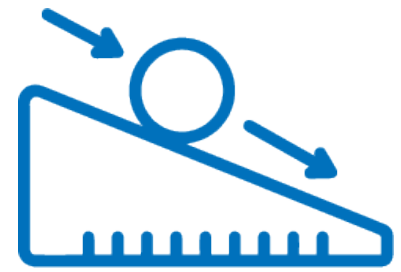
# L2 Motion & Friction

Lesson 2 of 3

Hi Pals! Ruff Ruffman here!\* Explore sports science as Ruff Ruffman figures out how to deliver a gift for his grandma's birthday. What is it like to walk on the ice on the sidewalk?

**Big Question:** How do pushing forces affect motion and friction?

**Set the Stage:** Click here for [Plushie on Ice!](#) video: 3 minutes, 34 seconds



## Activity:

**Procedure:** After the intro video – Engage: Let's create a bottle cap hockey game and play it!

Explain:

All players stand at one end of a table, and a target is placed at the other end. The players take turns sliding their bottle caps toward the target. Everyone will try once, and then get a second try.

- Players can strategically knock an opponent's cap farther away from the target. The player whose bottle cap is closest to the target gets one point. Play twice at each surface for round one.
- For round two, the table will be covered with fabric.
- For round three, the table will be covered with cardboard.
- At the end of three rounds, the player with the most points wins

## Reflection:

Which surface was easiest or hardest to slide on? Why do you think that is so? What other materials could we use in this game? How do you predict the bottle caps will slide on those?

## Enrichment:

Have students work in pairs to play Ruff's plushie game, [Fish Force](#), on the computer.

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## Materials:

- Computer
- Internet connection
- As many bottle caps as you have players
- Piece of cardboard
- Piece of fabric
- Duct tape
- A target (make an X with tape or design your own mark)
- A long table to play the Bottle Cap Hockey game

## Standards:

Standards addressed by this activity - BSB – The Do Place:  
NS 4F/P2; NGSS K-PS2.A.2; K-PS3.C.1; K-PS2.A.3



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# L3 Pull & Friction

Lesson 3 of 3

Hi Pals! Ruff Ruffman here! \*Explore sports science as Ruff Ruffman races over different surfaces to rescue his plushie. Last time we explored pushing things across different places like flat surfaces or hills. Today, we are going to explore pulling things across different surfaces. Have you ever pulled something that was heavy? Did anything make it easier to pull? about down a small hill? WRITE items on the board.

**Big Question:** How do pulling forces affect motion and friction?

**Set the Stage:** Click here for [Pulling for the Plushie](#) video: 6 minutes, 15 seconds



## Activity:

**Procedure:** After the intro video – Engage: Take a spin and learn about friction!

Friction can be a tricky topic for kids because the only example they can usually come up with is rubbing their hands together.

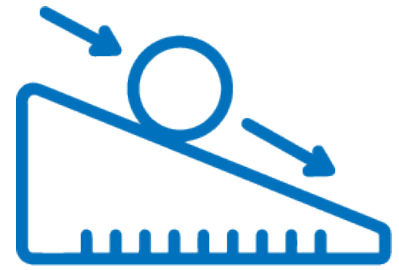
- Haul out those old game boards again and cover them with whatever different textures you can find.
- Use foil, shelf liner, bubble wrap, cardboard, wrapping paper, and a welcome mat.
- Make a ramp out of heavy paper or cardboard.
- Prop one end of the ramp on whatever is handy.
- Roll a toy car down it.
- Measure the distance the car travels on each of the different surfaces.

## Reflection:

Which surface had the best score in terms of distance? Which had the worst? Why do you think that is? Hopefully, they will talk about friction and resistance!

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## Materials:

- Computer
- Internet connection
- Board game boards
- Tin foil, shelf liner, bubble wrap, wrapping paper
- Cardboard
- Match box cars
- Measuring Tape/ Ruler
- Paper/pencil to record distances

## Standards:

Standards addressed by this activity - BSB – The Do Place:  
NS 4F/P2; NGSS K-PS2.A.2; K-PS3.C.1; K-PS2.A.3



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