PUSH, PULL, AND SPEED UP

Do bigger forces and bigger masses change motion?



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TODAY WE WILL…



WE ARE LEARNING TO

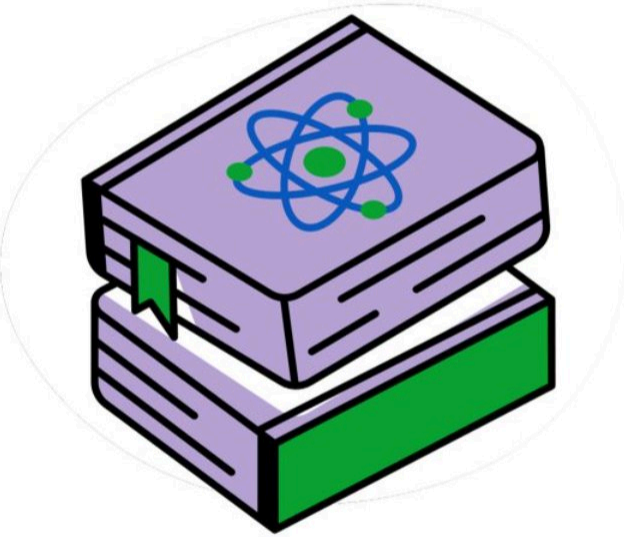
- Plan a fair test of pushes and mass
- Collect evidence on changing motion
- Link net force and mass to acceleration

SUCCESS LOOKS LIKE

- ✓ I can keep variables fair in a plan
- ✓ I can explain results with F = m x a

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FROM PUSH TO MOTION



Unbalanced pushes add up to net force

↓

Net force changes speed or direction

↓

More mass resists that change

↓

Result: acceleration depends on both

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BIG IDEA

A change in motion comes from net force, and mass slows it down.

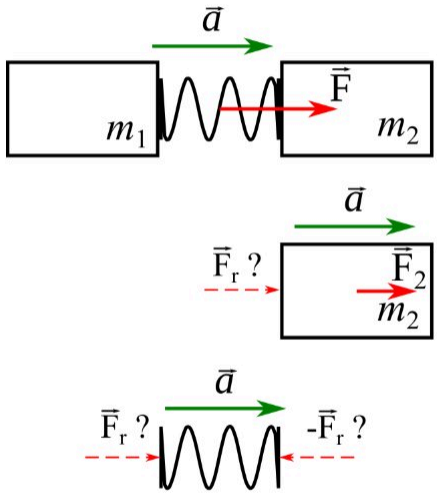
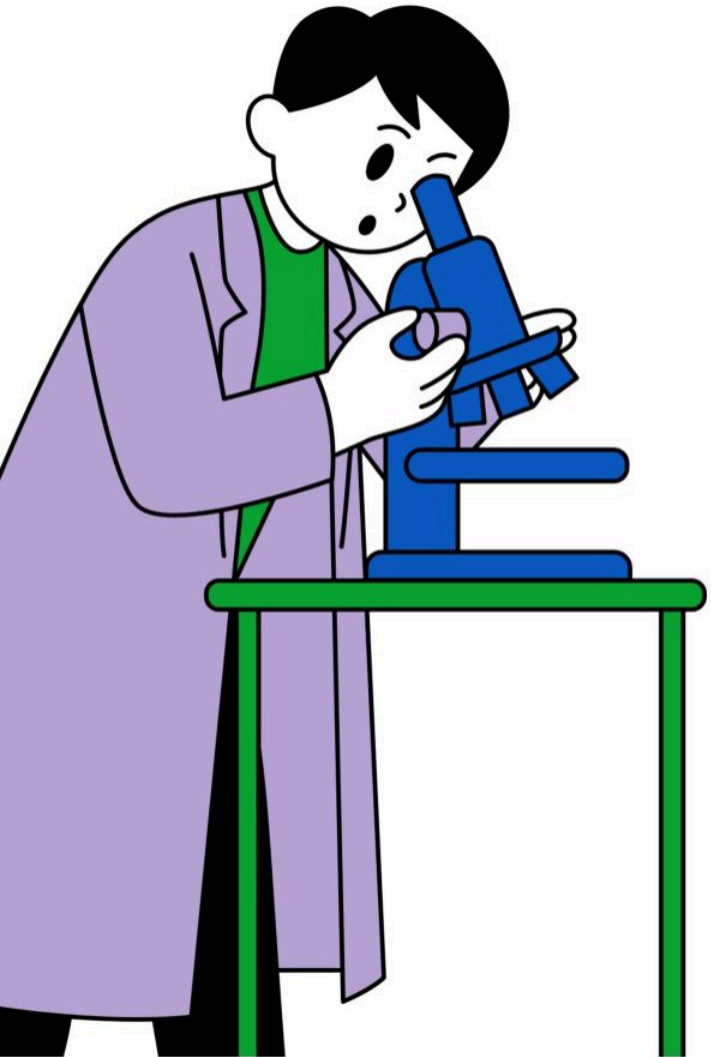


Diagram: Christophe Dang Ngoc Chan (Cdang (talk)) · CC BY-SA 3.0 · Wikimedia Commons



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WHAT COULD THIS BE?

Same push on an empty cart and a full cart. Which speeds up more?



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WATCH: FORCE, MASS, AND MOTION



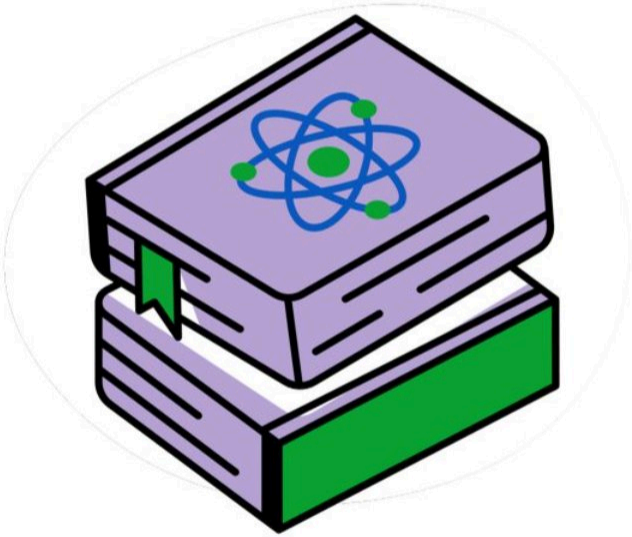


▶ 0:00 – 2:03

- Spot how bigger push changes speed
- Listen for net force meaning sum
- Notice how added mass slows change

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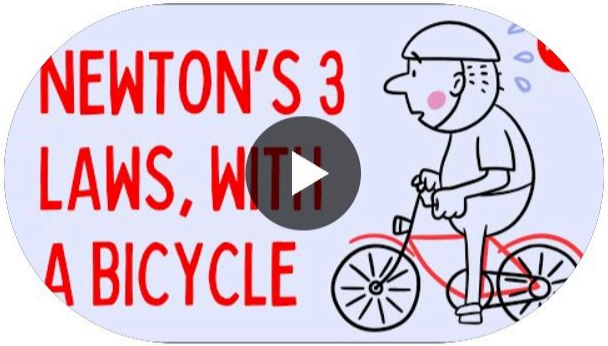
PLAN A FAIR TEST



1. Keep ramp, cart, and distance the same
2. Test 1: change push with 1, 2, 3 bands
3. Test 2: same push, add 500-g masses
4. Time each run, repeat twice

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WATCH: BIKE SCIENCE

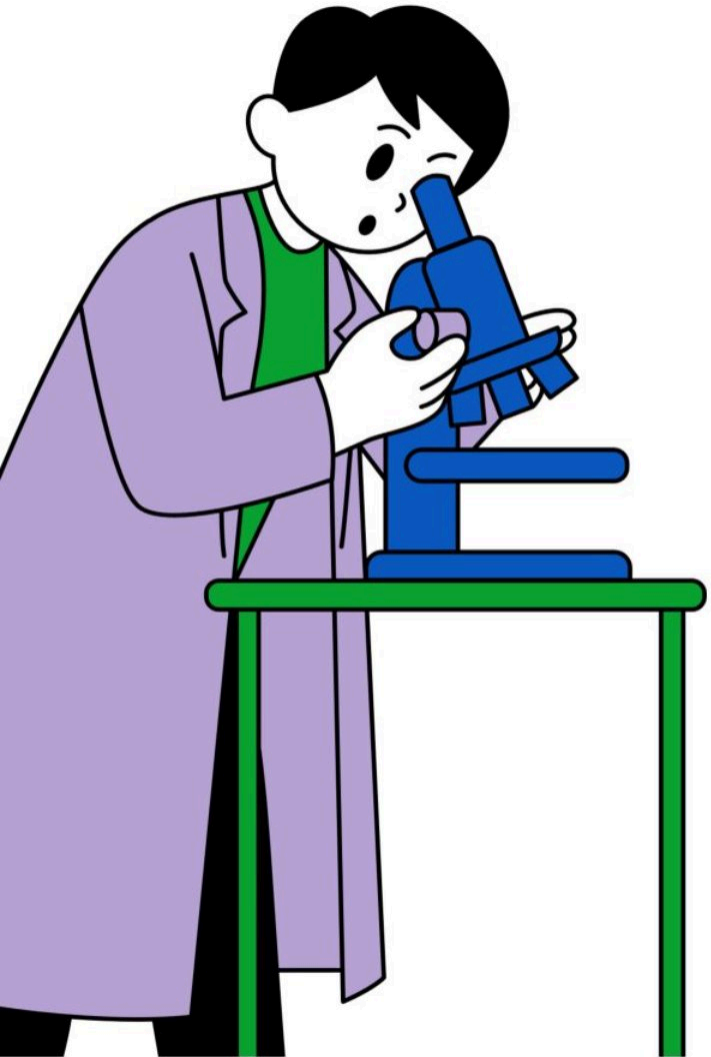


▶ 0:00 – 3:33

- See pedaling force cause acceleration
- Compare light vs loaded bike
- Connect evidence to F = m x a



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YOUR TASK

In your team, run both tests and gather evidence for our claim.

1. Run Test 1 and record roll times
2. Run Test 2 and record roll times
3. Table results: what changed motion?

20 min

Groups of 4

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KEY WORDS

net force

sum of all pushes and pulls

mass

amount of matter, in kilograms

acceleration

how quickly velocity changes

friction

force that opposes sliding

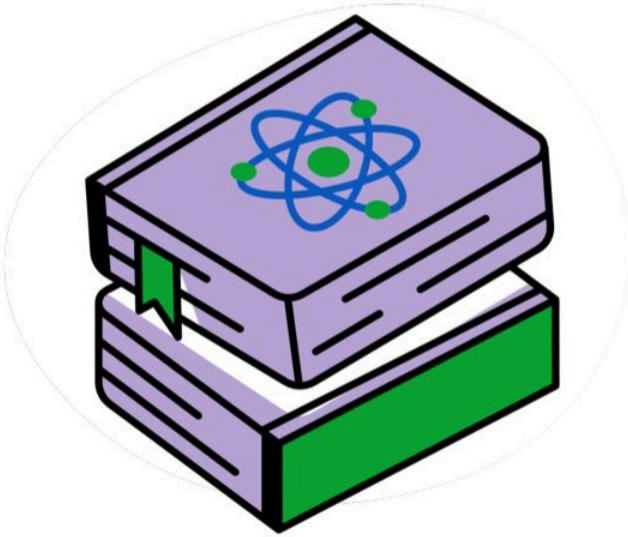


Photo: Ylanite · Pixabay

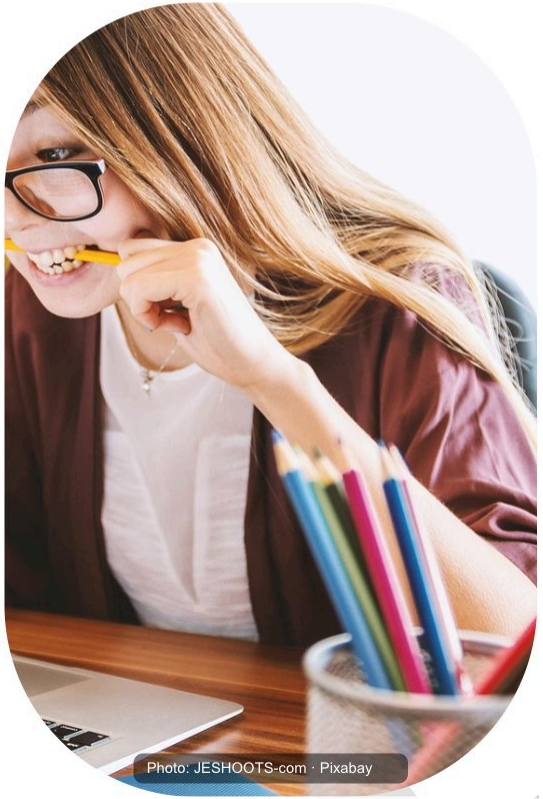


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THINK, PAIR, SHARE



Two students push a desk opposite ways. When does it start moving?



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QUICK QUIZ

1. Net force is zero. What happens to motion?

2. Same mass, double the push. What happens?

3. Same push, double the mass. What happens?



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