

Friction: Friend and Enemy

Week 3 · Lesson A · Monday · 40 minutes

Name: _____ Date: _____

I can explain what friction does and give examples where it helps and where it hinders.

Start with what you notice

Hand rubbing is optional. If comfortable, gently rub your hands for up to five seconds. Stop if it feels uncomfortable. You can watch the adult or describe a familiar example instead.

Supported: say or point to what you notice. Standard: record what you feel and name the force. Stretch: explain how the movement can warm your hands.

Watch the adult test two surfaces

The adult uses the same block, ramp angle and release point. Only the surface changes. First, predict. Then record only what you actually see.

Before the test	My prediction
Surface I think will resist sliding more	
My reason	

We changed: _____. We kept the same: _____.

What I observed (or label it “model only” if there was no real test):

A short run is evidence of greater resistance in this controlled setup. It is not a direct force measurement. Smooth-looking surfaces can still grip.

Choose the job; judge the force

Discuss, point, draw, write or dictate. An adult can scribe your words.

Helpful or unhelpful?

Start with examples 1 and 3. For each, identify the two touching surfaces and the job. Use the other examples if there is time.

Situation	Helpful, unhelpful or need context?	Which contact / why?
1. Bike brakes		
2. Trainers on a wet floor		
3. Engine parts rubbing		
4. Pushing a heavy box across carpet		
5. A door handle		

Sort the claims

Choose TRUE, FALSE or NOT A SCIENTIFIC CLAIM. Explain a choice aloud or on your selected response page. The cut-out version is on page 6.

Claim	My decision
A. Sliding friction opposes sliding at the contact.	
B. Friction only happens with rough surfaces.	
C. Oil can reduce sliding friction in suitable lubricated contacts.	
D. Without friction between our shoes and the ground, we could not walk in the usual way.	
E. Friction is a bad force.	

Keep the decision tied to the contact and the job. No oil is needed for this activity.

CHOOSE THIS PAGE / SUPPORTED

Show one helpful example

Use with common pages 1–2. You do not need the other two response pages.

Word bank: friction · surfaces · grip · rubbing · slowing · heat · wear

Point, say, draw or write

Friction acts where two _____ touch and slide, or try to slide.

Choose one: a bike brake / a hand on a door handle. Draw or name the two touching surfaces.

Friction is helpful here because _____

Now choose an unhelpful example

Choose one: engine parts rubbing / pushing a box across carpet.

Friction is unhelpful for this job because _____

Check one claim

Can smooth-looking surfaces still grip? Say, point or write one example.

STOP after the shared claim sort. Put your name on your work and keep it for Tuesday. Your prediction comes with you.

CHOOSE THIS PAGE / STANDARD

Explain both sides

Use with common pages 1–2. You do not need the other two response pages.

Draw the force

Draw a box sliding to the right across a floor. Add a labelled arrow for the sliding friction acting on the box.

Build a comparison

Use the two touching surfaces in each explanation.

Friction is helpful on _____ because _____.

But it is unhelpful for _____ because _____.

Correct a claim

“Friction only happens with rough surfaces.” Explain why this is false. Use the smooth rubber / smooth glass example discussed in class.

STOP after the shared claim sort. Label and keep your work for Tuesday. Keep your surface prediction; do not claim a test you did not perform.

CHOOSE THIS PAGE / STRETCH

Make the explanation precise

Use with common pages 1–2. You do not need the other two response pages.

Same force, different job

Compare bike brakes with engine parts. Identify the contacts, explain the effect of friction and explain why the effect helps or hinders the intended job. Include energy transfer or wear.

Test the wording

Someone says: “A smooth surface always has less friction.” Use the smooth rubber / smooth glass example to challenge this. What evidence would you need to compare two surfaces fairly?

A changed case

Two unknown materials touch. Is their friction helpful? Explain what extra information you need before deciding.

STOP after the shared claim sort. Label and keep your work for Tuesday. Your next lesson tests surfaces; today’s reasoning is not a completed investigation.

REUSABLE CARDS / OPTIONAL PRINT

Cut, place and explain

Use instead of writing in the tables. An adult can cut the cards before the lesson.

Helpful / unhelpful: sort by the job. Start with bike brakes and engine parts.

Card	Situation
1	Bike brakes
2	Trainers on a wet floor
3	Engine parts rubbing
4	Pushing a heavy box across carpet
5	A door handle

Claim cards

Card	Claim
A	Sliding friction opposes sliding at the contact.
B	Friction only happens with rough surfaces.
C	Oil can reduce sliding friction in suitable lubricated contacts.
D	Without friction between our shoes and the ground, we could not walk in the usual way.
E	Friction is a bad force.

Sorting labels

TRUE	FALSE	NOT A SCIENTIFIC CLAIM

Place cards in three groups below these labels, or point to a label. Give a reason; moving a card alone is not the whole explanation.