

Friction: test the surfaces

Autumn 1 · Week 3 · Lesson B · 40 minutes

Learning objective

Explain friction's effects using a controlled three-surface comparison and repeated stopping-distance evidence.

Evidence to look for

Record actual participation/support and whether the learner identified controls, recorded or interpreted distances and justified a qualified conclusion. Observation/directing is not excluded; model-data interpretation is identified honestly.

Source lesson timing

Elapsed minutes	Source stage	Minutes
0–32	Independent Work	32
32–36	Lundy Loop	4
36–40	Exit Ticket	4

Split slide times are added within their original source stages. Printed tasks and adaptations replace activity within these timings; they do not add extra lesson time.

Equipment and preparation

- Adult-secured low ramp and one small sliding block
- Three level surface samples with a stable ramp join
- Ruler or tape, fixed zero/edge markers, tray or padded stop
- Monday prediction and pupil record; optional offline XLSX for actual measurements

TEACHING SEQUENCE

Guide the lesson

Use the source stage times; choose prompts appropriate to the pupil.

Independent Work · 32 minutes

Retrieve and set up 4 min; test three surfaces with two trials each 20 min; pause and check 2 min; repeat one concern, conclude and tidy 6 min. Alternative uses explicitly labelled source model data within the same time.

Lundy Loop · 4 minutes

Offer accessible pupil feedback, agree one feasible response and explain limits.

Exit Ticket · 4 minutes

Choose a supported, standard or stretch friction explanation; attempt first, then check and improve.

TEACHER ANSWERS

Worked answers and expected evidence

Use after an attempt. Accept equivalent correct explanations; record support given.

Model-data conclusion

Source invented data: card 42/44 cm, fabric 25/27 cm, rubber mat 15/18 cm. Rubber mat produced the shortest run-outs in both trials. This supports greater resistance to sliding in the stated setup, not a universal ranking. No means required.

1. Prediction and controls

A prediction is justified rather than marked right/wrong. Accept names of available surfaces with reasoning about resistance at the contact. Controls: same block, low ramp height/angle, release mark/no push, level samples, ramp join, fixed measuring zero and same block edge. Keep original prediction for comparison.

2. Three surfaces, repeated evidence

No fixed real-data answer: check surface identities, two honestly recorded trials where performed, cm units and relevant controls. A non-slide is not silently converted to 0 cm; identify what happened. Shorter run-out distance supports greater resistance to sliding for this block/setup if relevant controls are maintained. Accept uncertainty or no clear separation.

3. Alternative: model-data interpretation

Rubber mat 15/18 cm is shorter than fabric 25/27 cm and card 42/44 cm. This supports greater resistance to sliding for the stated block/setup if block, release, ramp, join and zero stayed fixed. Material behaviour depends on the actual contacting surfaces and conditions. This is supplied model-data analysis, not the learner's measurements.

4. Check, improve and conclude

Look for one concrete concern, e.g. pushed block, shifted surface or zero. Difference alone is not proof of error. Retrieved value remains separate and original retained. Real conclusion must fit actual evidence; model conclusion can use 15/18 cm versus 25/27 cm and 42/44 cm with setup qualification. Suitable improvement: fixed no-push release or clearer zero, not 'choose numbers that match'.

5. Feedback and exit

Feedback has no prescribed answer; adult responds to one feasible change and explains limits. Exit: brakes/shoes/tyres/handles; pads rub disc/wheel, energy transfers to heat and wheel slows, with tyre-road grip needed too; contrast braking with unwanted heating/wear between engine parts. Qualify effects to intended job.

Misconceptions and corrections

- Friction is always bad: its effects depend on the job.
- Smooth means no friction: smooth surfaces can still grip.
- Shorter distance directly measures a friction force: distance provides comparative evidence under controls, not a force reading in N.
- A surprising result must be deleted: keep it and note a specific method concern if known.

Teach safely; keep the evidence

The source record identifies this conversion; it is not a claim of publication.

Safety

- Use a low adult-secured ramp and light block; clear run and padded stop.
- Hands stay outside the run; agree release signal and no pushing.
- No oils, loose powders, wet floors or pupils sliding on floors.
- Offer quiet observer/director/recorder roles or labelled no-kit data interpretation.

Access and offline alternatives

- Speak, sign, point, draw, dictate or direct instead of manipulating equipment.
- If kit unavailable use the source invented teaching data and label the activity interpretation.
- No HTML, video, online account, photograph or public sharing needed.

Close and continue

Complete Tuesday at 40 minutes: 32 workshop + 4 feedback + 4 exit. Keep evidence for the current Week 4 mechanisms sequence.

Source and revision

Repository: [MattRoper1977/Lessons](https://github.com/MattRoper1977/Lessons)

Source path: [Science_Teesside/Grow/SCI_G_W3_Friction.html](#)

Source file Git blob: [170d772a5e9d23909e95a534c5c1e16ee7df67c8](https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W3_Friction.html)

Current source link (mutable): https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W3_Friction.html

Document revision: 2026-09-06

Recorded conversion changes

- Current Tuesday workshop remains 32 minutes, then four-minute pupil feedback and four-minute exit.
- Paper records and adult demonstration replace HTML controls; observation, direction and dictation are equivalent routes.
- The source's invented teaching data remain clearly identified as model data, never pupil measurements.
- Surface conclusions apply to the tested block and setup, not universal material rankings.
- No publisher footage copied; exact original logo remains for release coordinator to resolve.