

Two lever positions, one load

Autumn 1 · Week 4 · Lesson B · 40 minutes

Learning objective

Compare two lever pivot positions and explain the relationship between effort force and effort travel for the same load rise.

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 ruler/card lever and broad stable pivot
- Light secured load such as an eraser; two marked pivot positions
- Fixed effort point and small target load-height mark
- Optional suitable ruler/tape for travel; force meter only if appropriate for genuine measurements

TEACHING SEQUENCE

Guide the lesson

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

Independent Work · 32 minutes

Retrieve/check setup 4 min; compare middle and near-load pivots 20 min; check controls 2 min; repeat, explain and tidy 6 min. Same load, effort point and small target rise; qualitative effort unless properly measured.

Lundy Loop · 4 minutes

Listen to pupil access/evidence feedback, agree one feasible change and explain limits.

Exit Ticket · 4 minutes

Name pivot, explain lever benefit or force-distance trade-off; attempt then check.

TEACHER ANSWERS

Worked answers and expected evidence

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

Gain and cost

For the same load and rise, near-load pivot increases effort-arm/load-arm ratio. Required effort force falls ideally while effort travel increases. Real friction and bending limit model; accept honest similar/uncertain observations.

1. Predict and prepare

Labels locate effort on bar, pivot as turning point and secured load. Controls: same load and position, same effort point and small target load rise. Prediction: nearer-load pivot may feel easier while effort end travels farther. A prediction is judged by reasoning, not whether expected observation occurs.

2. Record both positions

No fixed numbers expected. Ideal trend: near-load pivot requires less effort force and larger effort travel for equal load rise. Actual observations may be similar/uncertain due to friction, bending or method. Do not fabricate numbers or classify feeling as a force measurement in N. Check controls and record who operated/observed.

3. Check and explain

Corrected control should be specific. Explanation: effort arm becomes longer relative to load arm; smaller effort force ideally lifts same load, but effort end must move farther. Mechanism does not create energy. Friction and bending affect real model. No-equipment route states prediction/explanation, not practical observation.

4. Feedback and exit

Feedback has no prescribed response; adult agrees feasible change and explains limits. Pivot; longer effort arm relative to load arm lowers required effort force ideally; effort moves farther for same load rise and mechanism cannot create energy. Real losses may add effort.

Misconceptions and corrections

- Feeling easier is a numerical force measurement: it is qualitative unless measured using an appropriate meter.
- Changing load rise is harmless: both positions must lift same load through same small rise.
- Diagram predicts exact real values: schematic has no measured scale/data.
- Mechanism creates energy: force gain has distance trade-off, plus real losses.

Teach safely; keep the evidence

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

Safety

- Use light secured load and controlled small lift; never launch objects.
- Adult checks pivot stability, attachment and work area before use.
- Hands clear of pivot; return all small parts and stop if kit shifts.
- Offer preassembled adult-operated model, observer/director route or labelled diagram explanation.

Access and offline alternatives

- Direct/observe instead of touch, and dictate or point for records.
- No-kit route labels evidence as diagram explanation, never performed comparison.
- No internet/video/photography required; native diagram can be edited.

Close and continue

Tuesday ends at 40 minutes. Preserve 32 workshop + 4 feedback + 4 exit. Next current Week 5 investigates fair-test variables with a trolley.

Source and revision

Repository: [MattRoper1977/Lessons](#)

Source path: [Science_Teesside/Grow/SCI_G_W4_Mechanisms.html](#)

Source file Git blob: [8aa3e1f001c3d3c944207d4eb44b93b1df4d7e46](#)

Current source link (mutable): https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W4_Mechanisms.html

Document revision: 2026-09-06

Recorded conversion changes

- Current Tuesday structure kept: 32-minute workshop, 4-minute pupil feedback, 4-minute exit.
- Native editable diagram supports observation/directing and no-equipment explanation.
- Effort stays qualitative unless an appropriate force meter is actually used; no invented measurements.
- Same load, effort point and lift height are explicit controls.
- No publisher media copied; original logo resolution stays with release coordinator.