Lesson 23

energy-forces

Light: reflection, colour and a closer look

Lesson at a glance

Hook with a torch aimed at a hand mirror so a bright spot lands on the wall, then ask how the light got there. Groups rotate three stations — bounce a beam to a target, split white light with a prism (or water-tray mirror), and compare tiny print bare-eyed then through a magnifier — before a deeper bounce investigation with roles, prediction and a retarget. Pupils tidy notes on the Investigation Journal page, then consolidate bounce and spectrum on the light-rays interactive in guided mode.

Learning objectives

- Show that light can bounce off a mirror to hit a target
- Observe white light splitting into a spectrum of colours
- Use a magnifier to make small print look larger and say that lenses bend light

Before the bell — prep

Print tiny-print and target cards the day before. Pre-stage Bounce kits (torch, hand mirror, target) on Bounce tables so reset is seating only. Set prism and/or water-tray angled-mirror spectrum setups; dim blinds a little. Spare Bounce kits cover extra trios.

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Materials

Item	Qty	Per	Source	Low-cost substitute
small hand mirror	1	group	school kit	a clean stainless-steel spoon back or a CD shiny side used carefully as a reflector
small LED torch	1	group	school kit	phone torch held by the teacher at the demo table only
plastic or glass triangular prism (for the whole-class demonstration at the front)	1	class	school science kit	shallow clear tray of water with a small mirror propped at an angle under the surface, white card, and a torch (aim at the submerged mirror; never look at the sun)
shallow clear tray, small mirror, and white card (backup for the front demonstration if there is no prism)	1	class	classroom	white plate or lid under a clear tub of water with any small hand mirror angled in
hand magnifier	1	group	school kit	a clear curved plastic bottle base washed and dried (weaker but usable)
tiny-print cards (provided printable)	1	group	provided printable	a postage-stamp corner of a newspaper weather line or a short playful sentence written tiny by hand on a sticky note (no science claim about light)
target cards (Blue target / Red target)	1	group	provided printable	a sticky note with a drawn star and the colour name written large

Safety watch-point

Never shine torches in eyes; never look at the sun or focus sunlight with a magnifier. Two-hand mirrors and glass; wipe water spills at once.

Teaching moves

- **Getting Started:** Before pupils arrive, park station trays aside and hold one torch and mirror only. Dim blinds half-closed, bounce a bright spot onto the wall or board, and take two or three ideas on how the light got there — keep it playful; wrong ideas are useful.
- **What light can do:** Project only the short board key points. Run one full worked model on the mirror alone (wonder → predict → test → observe → think), then send groups to stations on the curiosity choice. Head off 'the eye sends light' and 'the mirror makes light' in one line: light comes from a source, bounces or bends, then reaches the eye.
- **Explore the light stations:** Run six tables in parallel where kit allows — two Bounce, two Split, two Closer-look — and call rotations every 5–6 minutes. Watch for aiming at the mirror not the target, more than one colour at B, and bare-eyes then magnifier at C. If only one spectrum setup, host B yourself; fold waiters in with colour and tilt questions. Protect equal hands-on at A and C.
- **Bounce and hit the target:** Call stop, park prism and water tray, and send every trio straight to a pre-staged Bounce table. Name roles (torch still, mirror tilt, spotter). Insist on a spoken prediction before any tilt, then hit and retarget once. Circulate with: 'Did the light travel in a straight line to the mirror, then change direction?'
- **Record what light did:** Paper Investigation Journal only. Use the short board checklist: mirror, split colours, magnifier change, bounce hit and what they tilted. Coach observation versus idea in talk only. Fast finishers add a simple arrow sketch of the bounce path on spare paper.
- **The path light takes:** Drive the light-rays interactive in guided mode on the IWB; pupils predict aloud before each step. Lock only the two big rules — bounce direction and spectrum split — tied to the hands-on. Use the prism scene as rescue if Station B was faint. Ask once: 'Does light leave our eyes to see the board?'
- **What we found out:** Take three partner shares, then revoice bounce and spectrum firmly in child language; magnifier bending light is a short Station C recap only. Count mirrors and magnifiers back in; dry trays; torches off.

What it should show

Bounce: spot lands on the target when the torch stays still and only the mirror tilts; light goes to the mirror then off in a new direction. Spectrum: a band of colours (even faint) from prism or water-tray angled mirror. Magnifier: tiny print becomes larger/clearer; with prompt, pupils say the curved glass bends light. Odd bounce usually means the torch was waved at the target — fix the torch and re-tilt.

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Misconceptions & interventions

- **'My eyes send out light to see' or 'the mirror makes the light.'** — Point at the torch: light comes from a source, bounces or bends, then reaches the eye. Nothing leaves the eye — check again in the light-rays step.
- **Pupils shine the torch straight at the target instead of at the mirror.** — Stop the trio and re-model: torch fixed, beam to the mirror only, tilt until the spot climbs onto the card. Success is a bounce path, not a direct hit.
- **'Coloured glass makes the rainbow colours.'** — Link Station B and the guided prism scene: the colours were already inside the white torchlight; the prism (or water-tray setup) spreads them so we can see the band.

Differentiation

Emerging	Developing	Proficient
• Start less confident pairs at Station A first — clearest success with torch, mirror and target. • At bounce investigation, keep torch fixed on a book so they only manage the mirror tilt.	• After one hit, move the target once and re-predict before tilting again. • Prompt at Station C: 'The print looks bigger — what did the curved glass do to the light?'	• Try a second bounce path with a spare small mirror if one is already on the Bounce kit. • Fast finishers sketch the bounce path with arrows on spare paper and say whether light went straight then changed direction.

Cross-curricular hook

English oral language: partner shares which station surprised them most and why, using bounce, spectrum and bend.