Lesson 20

energy-forces

Light: How We Actually See Things

Lesson at a glance

Open with one sealed peep box at the front: pupils peep and cannot see the hidden object. After a quick think-pair-share prediction, each group runs the same test — peep in the dark, then peel the light-hole tape. An IWB interactive traces one torch beam source to mirror to eye. Groups then map three everyday sights (whiteboard, moon, own choice) before drawing one full arrowed path on the Investigation Journal page.

Learning objectives

- Show with a lightproof box that light must reach an object and then the eye before we can see it
- Trace the path from source to object to eye for an everyday sight
- Explain why nothing comes out of the eye, using the box as the evidence

Before the bell — prep

Prep one demo box plus one per group the night before: small everyday object inside, single peephole, separate light hole taped shut, lid sealed. Have a class set of torches ready for dull days and one small mirror per group for the path-tracing step.

Materials

Item	Qty	Per	Source	Low-cost substitute
shoebox with a lid, a peephole and a covered light hole (peephole poked in one end, a small square in the lid taped over)	1	group	brought from home	any cardboard box with a lid, or a large cereal box taped shut
small everyday object to hide inside the box (a rubber, a conker, a small toy)	1	group	classroom	a coin or a bottle cap
torch	1	group	school kit	a phone torch used by the teacher only
small flat mirror	1	group	school kit	a piece of shiny foil taped flat to card

Safety watch-point

Supervise peeling of light-hole tape so lids stay sealed and small objects stay inside. Torch beams stay off faces and eyes; no staring into the bulb.

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Teaching moves

- **Getting Started:** Hold one sealed demo box at the front. Bring two or three pupils up at a time (or walk the rows) so everyone peeps within five minutes. Ask 'your eye is working, the object is there — what is missing?' Take guesses only; do not explain.
- **What Do We Think Is Missing?:** Run a fast think-pair-share. Draw out both ideas — 'seeing shoots out of the eye' and 'light must get in' — then make every pair commit yes/no: will opening a light hole let us see it? Say 'let's test it' rather than correcting.
- **The Box Proves It:** Model wonder–predict–test–observe–think on your front box, then hand out group boxes. Pupils peep first, peel only the light-hole tape (lid stays on), then peep again. On a dull day, shine a torch through the hole. Ask, don't tell: what had to reach our eyes?
- **Follow One Beam of Light:** Drive the IWB ray: torch to mirror to eye. Turn the dial and take class predictions before each move. Stress light arrives at the eye. Say aloud that jumpers and whiteboards scatter light many ways, so reflection is not only for mirrors.
- **Trace Three Everyday Sights:** Groups map source→object→eye for the whiteboard, the moon, and one own choice. Cue the moon trap: it is not a source. If anyone draws an arrow leaving the eye, send them back to the sealed-box evidence.
- **Draw the Light Path:** On the Investigation Journal page, each pupil draws one everyday sight with arrows from source to object to eye, labelled. Circulate for arrows that wrongly leave the eye and ask those pupils what the box showed.

What it should show

With the light hole open (or a torch shone in), the object becomes clearly visible; sealed, nothing is seen. Correct paths always run source → object → eye and end at the eye. A box that still shows nothing usually has the light hole still taped or too little ambient light — add a torch. An arrow leaving the eye is the common recording error, not a real finding.

Misconceptions & interventions

- **"Seeing shoots out of my eyes like a torch — if I look hard enough I'll see it."** — Point back at the sealed box: if seeing came out of the eye, the dark box would have worked. It did not. Have them restate the path ending at the eye.
- **"The moon makes its own light, like a lamp."** — Ask where the moon's light starts. Trace sun → moon → eye on the board or with torch and mirror, and name the moon as a reflector, not a source.
- **"Reflection only happens with mirrors."** — After the IWB beam, hold up a jumper or the whiteboard: light scatters off ordinary surfaces too, which is why the whole class can see the same object.

Differentiation

Emerging	Developing	Proficient
• Sit emerging pupils at the teacher table for the first peep-and-open cycle on the demo box before they try their group box. • Offer a journal scaffold with source / object / eye already labelled; they only add the arrows.	• Prompt a second trial: cover the light hole again and predict before re-opening. • Ask why the whole class can see the whiteboard from different seats (scattered bounce).	• Fast finishers draw the sealed box with no arrow reaching the eye, labelled 'nothing seen'. • Challenge them to explain the moon path in one sentence using only source, bounce, eye.

Cross-curricular hook

Link the moon path to Geography/Space — the moon is seen by reflected sunlight, not its own glow.