Light Straight Into Our Eyes

Teacher		**Class**	Year 6
Subject	Science	**Topic**	How we see things
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Pupils learn that light travels in straight lines into the eye. They model and draw how luminous and non-luminous objects are seen.

Curriculum links

- explain that we see things because light travels from light sources to our eyes or from objects and then to our eyes [2]

Learning objectives

- Students will explain seeing as light travelling straight from source into eye.
- Students will compare luminous sources and non-luminous objects that reflect light to eye.

Success criteria

- I can draw straight arrows to show light entering the eye.
- I can explain luminous and non-luminous objects when I see them.

What students already know

Ask: What do you remember from Year 3 about light sources and shadows? Hands up one light source and one object you cannot see in the dark.

Key words

luminous	makes and sends out its own light [9]
non-luminous	does not make its own light and is seen by bouncing back other light [9]
reflect	when light bounces off a surface [9]
pupil	hole at the front of the eye that lets light in [9]
retina	back surface inside the eye that senses light [9]

Materials

- torches with working batteries
- balls of string
- small dull objects such as books
- rulers
- mini-whiteboards and pens
- small mirror for stretch
- projector for Slides 1-12
- printed copies of Worksheet Task F for plenary

Before the lesson

- Test torches, dim the blinds and set up a dark corner for modelling.
- Load Slides 1-12 and test Video clip 1 (0:00-1:33) on slide 6 and Video clip 5 (0:00-1:06) on slide 8 with sound.
- Cut string lengths, organise trios and place torches, books, rulers and mini-whiteboards on tables.
- Print Worksheet Task F: Fill the blanks copies, one per pair.

Lesson outline

0–8 min **Starter** 8 min · Whole class

To hook curiosity about darkness and recall light sources and seeing.

YOU DO

1. Show Slide 1 title and ask the hook question with lights still on.
2. Show Slide 2 objectives and read the two goals and success lines together.
3. Show Slide 3 key words and drill luminous, non-luminous, reflect and pupil.
4. Take quick answers about seeing in a dark cupboard and link to today's question.

STUDENTS DO

1. Discuss the hook with a partner and share one idea.
2. Repeat key words and predict why a dark room stops us seeing.
3. Listen to objectives and say what a good ray diagram will show.

Say: If I switch off every light and shut the blinds, can light still sneak round the corner to find you? Talk to your partner. Today we will learn that light travels in straight lines and we only see when it gets into our eyes.

Ask: Can you see your partner if every light is off and blinds are shut? (No, because there is no light to reflect off them into our eyes [3].) · What is a luminous object? (Something that gives out its own light, for example the Sun or lit torch bulb [9].)

Check understanding: Thumbs up if you can say one luminous and one non-luminous example; re-teach with Slide 3 cards if unsure.

Support: Point to Slide 3 cards and give examples while pupils repeat: Sun gives out light, book does not.
Stretch: Ask why light could not bend round the door to reach eyes in the dark.

Use: Slides 1-3

8–23 min **Teaching** 15 min · Whole class

To explain straight-line travel from source to object to eye for both kinds of objects.

YOU DO

1. Show Slide 4 photo and explain the Moon makes no light of its own but is seen because sunlight reflects off it into our eyes [4].
2. Show Slide 5 mystery pupil and explain the pupil is the hole that lets light in [9].
3. Play Video clip 1 (0:00-1:33) on Slide 6, then Slide 7 compare, stressing luminous gives out light and non-luminous reflects light to the eye [9].
4. Play Video clip 5 (0:00-1:06) on Slide 8 and model a ray diagram with ruler and arrows towards the eye.

STUDENTS DO

1. Watch both clips and track with a finger which way light travels.
2. Chant the path: source to object to eye, all in straight lines.
3. Copy the teacher arrow directions in the air towards their own eyes.

Say: Light travels in straight lines [3]. A luminous torch gives out light that goes straight to your eye. A non-luminous book makes no light, so light must travel straight to the book, reflect off it, then travel straight into your eyes [3].

Worked example: How we see a book: Step 1 torch gives out light [9]. Step 2 draw a straight arrow with a ruler from torch to book. Step 3 light reflects off the book surface [3]. Step 4 draw a second straight arrow from book to eye with the arrowhead entering the pupil, because light must enter our eyes for us to see it [3].

Ask: How can you see the person sitting next to you? (A light source gives out light which travels in straight lines and reflects off the person before entering your eyes [4].) · Why can you not see them in the dark? (Not all objects give out their own light, so with no source there is no light to reflect [3].) · Where does light enter and where is it detected? (Light enters through the pupil and is detected by the retina at the back [9].)

Check understanding: All hold up one finger for straight, wavy for curved; re-show correct straight arrows if any wavy.

Support: Repeat with torch and book in hand, saying source, reflect, enters while pointing. **Stretch:** Ask pupils to explain why a smaller pupil in bright light still lets us see but protects the eye.

Use: Video clip 1 (0:00–1:33); Slides 4–8; Video clip 5 (0:00–1:06)

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23–45 min **Main activity** 22 min · Groups

To model and draw straight light paths from source to object to eye.

YOU DO

1. Organise threes: torch holder as source, book holder as non-luminous object, observer as eye.
2. Show Slide 10 steps and direct pupils to stretch string in two straight sections, torch to book and book to eye, because light travels in straight lines [3].
3. Show Slide 9 task and direct trios to draw the torch, book and mirror on mini-whiteboards with ruler-straight arrows ending into the eye.
4. Circulate, correct arrows to point towards the eye and prompt full sentences with reflects and enters.

STUDENTS DO

1. In threes model seeing: hold torch, hold book, stretch two straight strings for the two journeys.
2. Draw labelled ray diagrams on mini-whiteboards with straight lines and arrows into the eye.
3. Practise saying: luminous gives out light, the book reflects it, and we see when it enters our eyes [3].

Say: Stretch your first string straight from torch to book. Stretch your second string straight from book to eye. Now draw exactly that on your mini-whiteboard. Use a ruler, add arrowheads showing the direction light travels, and finish inside the eye.

Ask: Why did you use two straight pieces of string, not one bendy one? (Because light travels in straight lines, not in curved lines or as a zig-zag [4].) · How do we see the book in your model? (Light reflects off its surface and into our eyes, and luminous objects give out light while non-luminous objects do not [9].)

Check understanding: Hold up boards on freeze; check all lines straight with ruler, arrows towards eye, labels reflects and enters; remodel one trio as exemplar if needed.

Support: Give a frame with the start drawn: torch to book to eye, so students only add straight lines with a ruler and the words reflects and enters, because light must enter our eyes for us to see it [3]. **Stretch:** Add a mirror as the object and show how the straight path changes direction at the shiny surface but stays straight on each side.

Use: Slides 9–10

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45–60 min **Plenary** 15 min · Pairs

To check explanations of darkness and correct use of straight-line ideas.

YOU DO

1. Show Slide 11 question and give pairs one minute to agree a because sentence about seeing a partner now but not in darkness.
2. Hand out Worksheet Task F and read the word bank aloud: straight, luminous, non-luminous, reflect, eyes, pupil; pairs fill gaps and say each sentence aloud.
3. Show Slide 12 true or false statements and confirm light travels in straight lines [3] and the Moon reflects sunlight to us [4].
4. Collect exit answers and restate the journey: source to object to eye.

STUDENTS DO

1. Think, pair, share a one-sentence because explanation and agree the best scientific version.
2. Complete Worksheet Task F Fill the blanks in pairs and read sentences aloud.
3. Vote true or false and correct the Moon statement to reflects sunlight.

Say: Why can you see your partner now, but not in a completely dark room? Use because. Remember for anything to be seen, light from it must enter the eye [9]. All surfaces reflect light, mirrors in a regular way and dull paper by scattering [9].

Worked example: Model answer: We can see our partner because the lamp gives out light that travels in straight lines, reflects off our partner and enters our eyes [4]. We cannot see in the dark because there is no source, so no light to reflect [3].

Ask: The Moon gives out its own light: true or false? (False, the Moon does not make its own light; we see reflected sunlight [4].) · We see because light comes out of our eyes: true or false? (False, light must enter our eyes for us to see it [3].)

Check understanding: Scan Task F sentences for straight, reflects and enters; reteach the two-part path to any pair missing arrows into the eye.

Support: Provide sentence starters: We can see because light... We cannot see in the dark because there is no..., since light needs to reflect off an object [3]. **Stretch:** Ask what changes if the person holds a lit torch and get pupils to trace the new straight path from torch to eye.

Use: Slides 11–12; Worksheet Task F

Common mistakes

Mistake	How to spot it	How to fix it
Thinking the Moon is luminous like a bulb.	Diagram shows arrows starting at the Moon with no Sun.	Remind that the Moon does not make its own light; draw Sun to Moon to eye because sunlight reflects off it [4].
Drawing rays leaving the eye to the object.	Arrowheads point away from the eye towards torch or book.	Rehearse that light must enter our eyes to see [3]; flip arrows to enter the pupil to the retina [9].
Drawing curved or zig-zag rays or thinking only mirrors reflect.	Wavy lines, or claim dull book sends no light.	Insist on ruler-straight lines [3] and that all surfaces reflect light, dull ones by scattering [9].

Support

- Give a frame with the start drawn: torch to book to eye, so students only add straight lines with a ruler and the words reflects and enters, because light must enter our eyes for us to see it [3].

Stretch

- Add a mirror as the object and show how the straight path changes direction at the shiny surface but stays straight on each side.

For the LSE or teaching assistant

Stay with string-model trios in main task; hold the frame boards, prompt reflects and enters, and check arrows point into the eye.

Check for understanding

Question	Answer
You see a book in a lit room. Draw and explain the light path.	Straight arrow source to book, straight arrow book to eye; light reflects off book and enters eye [3].
Is the Sun luminous or non-luminous, and how is it seen?	Luminous; it gives out light that travels straight into our eyes [9].
Why can you not see the Moon if the Sun is blocked?	Moon is non-luminous and needs reflected sunlight; no source means nothing to reflect into eyes [4].

Homework

Tell someone at home the two straight steps that let you see a book.

Sources

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