energy-forces

Light: colour and the spectrum

Lesson at a glance

Open by comparing a dark jumper with a pale shirt and asking whether light only helps us see. Pupils predict, then leave dark and pale cards under one shared warm lamp or on a sunny sill and feel them with the back of the hand. A teacher demo splits white light through a prism or water tray onto white card; groups name the colours seen, then check the light-rays prism interactive. Pre-made spectrum colour wheels are spun until the mix blurs pale. Results land on one Investigation Journal page before a display-only make-sense talk.

Learning objectives

- Identify natural and artificial sources of light and show that light carries energy
- Split white light into a spectrum and describe the colours seen
- Show that a spinning mix of spectrum colours can blend back toward pale white

Before the bell — prep

Night before: colour spectrum segments on card or paper-plate wheels (one per group) and push a pencil or split pin through the centre — colouring in-class eats the slot. Gather dark and pale cards, white card, one warm lamp (LED often fails) or plan a sunny sill, plus a glass prism or shallow water tray with a small mirror.

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Materials

Item	Qty	Per	Source	Low-cost substitute
dark card (A5 or similar)	1	group	classroom	black sugar paper or the back of a dark book cover
pale or white card (A5 or similar)	1	group	classroom	plain photocopy paper
warm desk lamp (incandescent or halogen) or access to a sunny windowsill	1	class	classroom	one shared warm lamp at the front for a whole-class card comparison; cool LED lamps alone are a weak substitute for feeling warmth
glass prism	1	class	school kit	shallow water tray with a small mirror, or a clear glass of water and strong torchlight onto white card (teacher demo first)
torch	1	class	school kit	phone torch held by the teacher only
white card for catching the spectrum	1	class	classroom	plain A4 paper
card or paper-plate colour wheel (spectrum segments already coloured in)	1	group	classroom	a paper plate divided into coloured segments with markers, prepared the day before
pencil or split pin for spinning the wheel	1	group	classroom	a short straw and a blob of sticky tack as a simple spinner pivot
shallow water tray and small mirror (if no prism)	1	class	classroom	skip if a prism is available; one teacher demo tray is enough for the class
coloured filters or coloured cellophane (optional extension only)	2	class	school kit	skip filters in the core lesson; coloured sweet wrappers washed and dried if used as a quick teacher demo only

Safety watch-point

No touching warm bulbs or hot shades; never look at the sun or into bright lamps; never shine torches into eyes; steady hands with glass and water, wipe spills; mind split pins on wheels.

Teaching moves

- **Light that carries energy:** Board only the light-energy key point. Model aloud wonder–predict–test–observe–think using the two cards under the same lamp or sill. Leave white light and spectrum off the board until a real band appears.
- **Do dark and pale cards warm differently?:** Run one shared warm lamp or sunny-sill comparison, not cool LEDs. Take every prediction before anyone touches. Leave cards about five minutes even if the room fidgets. Feel with the back of the hand only; ask what that tells us about light.
- **Split white light into a spectrum:** Demo one clear whole-class spectrum first (prism in strong light, or water tray and mirror onto white card; torch on dull days). Do not move on until the band is visible. Name white light and spectrum only then. Groups try only if kit is reliable; otherwise name colours from the shared band. Open the light-rays interactive on the prism scene as confirmation, then give Newton one minute.
- **Spin the colour wheel:** Give the wheel a full ten minutes. Spin a teacher wheel first if needed, then every group spins on the desk or between palms. Name the pale grey-white blur aloud — perfect pure white is not required. Skip filter stations unless spare minutes remain.
- **Record the colours and the wheel:** Hand the Investigation Journal page. Prompt: colours you actually saw, what the fast wheel became, which card felt warmer. Accept drawings and own words; do not dictate a layout.
- **Make sense together:** Partner talk, then class share. Echo three links: dark card warmer → light carries energy; prism band → white light is a mix; spinning wheel → colours belong together again. If someone says the prism paints colour on, return to the colours already inside white light. One line on Irish rainbows after rain.

What it should show

Dark card often feels slightly warmer under strong sun or a warm lamp; cool LEDs may show little difference — still treat that as a real result and talk energy. Spectrum shows red at one end and blue-violet at the other; not every named ROYGBIV colour will be clear. Fast wheel blurs to pale grey-white or muddy white, not pure white — that still shows the mix heading back toward white.

Misconceptions & interventions

- **The prism paints or adds colours onto plain white light.** — Point back at the real band on the card and restate Newton's idea: the colours were already inside the white light; the prism only spread them out.
- **When the wheel spins it should look pure bright white, so a grey blur means it failed.** — Name the pale grey-white blur as the honest classroom result and link it to the objective: mixing spectrum colours moves back toward white light.
- **If both cards feel the same, light does not carry energy.** — Own the small difference with cool lights, then reconnect to heat felt from the sun or a warm bulb and to dark surfaces taking energy in better.

Lesson 21

Differentiation

Emerging	Developing	Proficient
• Accept warmer / cooler / about the same for the cards and a short colour list or labelled sketch from the shared spectrum demo. • Pair at the teacher table to spin one wheel and say pale or still colourful.	• Ask why dark surfaces take in more light energy after the card feel. • Order the spectrum colours they honestly saw from red toward violet.	• Critique fairness of the card test (same light, same time, same place) in one spoken sentence. • Link the spinning wheel back to white light as a mix and to rainbows after Irish rain.

Cross-curricular hook

Link to Irish weather and Geography: rainbows after rain are sunlight split by water drops in the air.