

# Test a phase-wheel model

Autumn 1 · Week 7 · Lesson B · 40 minutes

## Learning objective

Describe the Moon orbiting Earth roughly monthly; explain moonlight as reflected sunlight and ordinary phases as changing views of the illuminated half.

## Source lesson timing

| Elapsed minutes | Source stage                 | Minutes |
|-----------------|------------------------------|---------|
| 0–4             | Workshop · retrieve          | 4       |
| 4–24            | Workshop · build and compare | 20      |
| 24–26           | Workshop · check             | 2       |
| 26–32           | Workshop · correct and tidy  | 6       |
| 32–36           | Pupil feedback               | 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-prepared card circles or the pupil's three-circle drawing
- Crayons or pencils; simple labels new, half and full
- A matte ball and a low-power torch operated by an adult, if using the physical model
- A static diagram or adult drawing for an equal offline alternative

**TEACHING SEQUENCE**

# Guide the lesson

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

**Workshop · retrieve · 4 minutes**

First minute inside source 4-minute retrieval. Return Monday's sheet. Success is explaining motion, reflected light and phases; do not present this as a whole-term test or replace accepted private materials.

Completes 4-minute retrieval. Moonlight is reflected sunlight. The Moon/ball stays round while visible illuminated fraction changes. About half is sunlit outside eclipses. Agree before changing room light; no blackout. Adult can do all equipment handling.

**Workshop · build and compare · 20 minutes**

First 4 of source 20-minute build/check-views phase. Adult holds light and guides movement; keep ball above observer's head shadow. No lasers, Sun observation or pupil cutting required. Standard creates labelled phase wheel or three-view strip; supported arranges examples; stretch adds eclipse/model limit explanation.

Observer remains at same location; ball moves around them slightly above shadow height. New near light direction, near-side mostly dark; side about half visible disc lit; opposite light mostly/all visible disc lit. Do not block beam with observer for full position. Still alternative adult draws the same geometry and pupil explains each expected view; call it predicted/modelled, not observed practical.

Within 20-minute phase. Expected new: visible disc mostly unlit; half: one visible half lit, either orientation accepted if model corresponds; full: whole visible disc lit. Circle is view from Earth, not top-down orbit map. A coloured crescent is not the Moon physically changing shape. Adult may scribe/draw as pupil directs.

Completes 20-minute build/compare phase. Supported points to lit portion and one matching label. Standard gives cause linked to orbit and checks three views. Stretch distinguishes Earth-shadow eclipse and one model limit. No requirement to reproduce all eight named phases; current source asks new/half/full.

**Workshop · check · 2 minutes**

Exact 2-minute check inside 32. Correct answer visible lit part. Same observer position matters: another angle sees a different illuminated fraction. Record actual observed explanation/independence. A pupil can pass on partner work and ask adult privately.

**Workshop · correct and tidy · 6 minutes**

First 3 of source 6-minute correction/tidy. Model shows viewing geometry, reflected illumination and round shape. It does not show true size/distance scales, orbital tilt well or real phase-cycle times; torch is near and can introduce shadows not representing normal phases. Use wrong label as specific correction opportunity.

Completes 32-minute workshop; do not start a second 20-minute activity. Adult switches/collects torch. No photo or public display assumed; keep pupil product or witness record. Source numerical distinction remains 27.3 versus 29.5 days if relevant to explanation.

**Pupil feedback · 4 minutes**

First 2 of source 4-minute feedback. Invite science/access voice without requiring public performance or personal disclosure. A chosen partner may relay. Light sensitivity is accommodated without requiring an explanation from pupil.

Adult offers one possible change such as labels, static diagram or normal lighting, explains any limit, and checks whether it helped. Pupil can pass. Feedback is meaningful influence, not a mandatory extra written task.

### Exit Ticket · 4 minutes

Attempt the selected source tier before next slide or answers. Standard about 27.3 days/roughly month, with distinction from 29.5-day cycle. Supported no, reflects sunlight. Stretch geometry versus lunar eclipse. Accept oral/pointed/drawn evidence.

Completes 40 minutes. Source key outcomes: Moon orbits Earth, reflected light, changing visible sunlit portion. Earth's shadow is relevant to lunar eclipses. Correct one response without claiming all Autumn 1 science assessed. Keep honest record of what was demonstrated and assistance provided.

**TEACHER ANSWERS**

# Worked answers and expected evidence

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

**1. Retrieve and choose a route ·4 min**

Moonlight is sunlight reflected from Moon. About half Moon is sunlit outside eclipses; visible lit part changes. Normal lighting/static drawings are valid.

**2. Model three views ·20 min**

Near light direction new, little/none of lit half faces observer. Side half, about half visible disc lit. Opposite full, all/most visible disc lit. Avoid head-shadow eclipsing the full-model position.

**3. Draw or arrange the phase strip**

New visible disc mostly shaded; half one visible half shaded; full unshaded. Either half orientation accepted when it matches actual model direction. Visible sunlit portion changes; ball shape does not. Moon orbits Earth.

**4. Pause and check ·2 min**

The visible lit part changes. Moon/ball remains approximately spherical. Different observer angles see different amounts of illuminated half.

**5. Correct and reset ·6 min**

Model shows changed illuminated portion with viewing geometry. Does not show accurate scales, true cycle timing or orbital tilt well. Lunar eclipse is Earth blocking direct sunlight; ordinary phases are changing view of sunlit half. Torch/head-shadow can create misleading eclipses.

**6. Pupil feedback ·4 min**

No prescribed personal response; accept passing. Example change: static labelled drawing instead of altered light. Adult checks whether it helped.

**7. Exit ·4 min**

Supported no, Moon reflects sunlight. Standard about 27.3 days relative to stars; roughly month accepted. Phase cycle about 29.5 days. Stretch phases result from seeing varying amounts of sunlit half; Earth-shadow alignment is lunar eclipse.

## Misconceptions and corrections

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- The Moon stays approximately spherical; the visible sunlit part changes.
- The Moon reflects sunlight; it is not a light source like the Sun.
- Outside eclipses, about half the Moon is illuminated by the Sun. The fraction of that illuminated half visible from Earth changes.
- Earth's shadow causes a lunar eclipse, not the ordinary monthly phases.
- One orbit relative to the stars is about 27.3 days; a new-to-new phase cycle is about 29.5 days. Both are roughly a month.
- The Moon can be seen during daytime as well as at night.
- The torch/ball model is not to scale and is easily affected by the observer's shadow.

# Teach safely; keep the evidence

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

## Safety

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- Agree before any light-level change; ordinary room light or still diagrams are valid alternatives.
- No blackout, lasers or looking at the Sun.
- Never direct a torch into eyes; adult holds and controls the torch.
- Keep the ball slightly above the observer's/head's shadow so an accidental eclipse does not masquerade as a phase.
- Use pre-cut card or an adult preparing the circles; do not introduce sharp construction tools.

## Access and offline alternatives

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- Use spoken, pointed, drawn, signed or adult-scribed responses; public demonstration is optional.
- No online video or publisher images are needed; all diagrams/tasks are original editable teaching aids.
- Retain a clear visual distinction between a top-down model and the view from Earth.
- No photos or public display assumed; record actual witnessed science and independence.

## Close and continue

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This completes the source W7 Moon sequence. Keep evidence by actual outcome and independence. Do not describe it as full Autumn 1 assessment, resolve Weeks 1–2 separately, and keep existing private pack assessments untouched.

## Source and revision

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Repository: [MattRoper1977/Lessons](https://github.com/MattRoper1977/Lessons)

Source path: [Science\\_Teesside/Grow/SCI\\_G\\_W7\\_The\\_Moon.html](https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W7_The_Moon.html)

Source file Git blob: [cad3ed6bbbb2f2b3a8cd2ee83b6e504388f82386](https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W7_The_Moon.html)

Current source link (mutable): [https://github.com/MattRoper1977/Lessons/blob/main/Science\\_Teesside/Grow/SCI\\_G\\_W7\\_The\\_Moon.html](https://github.com/MattRoper1977/Lessons/blob/main/Science_Teesside/Grow/SCI_G_W7_The_Moon.html)

Document revision: 2026-09-06

## Recorded conversion changes

- Tuesday current source plan: 4+20+2+6 minutes within 32-minute workshop, then 4-minute feedback and 4-minute exit.
- Three equal pupil-drawn circles or a pre-cut phase wheel support editable/offline work.
- No publisher pictures/animations, private-pack assessment replacement or fabricated measurements.
- Physical model optional; an adult's static labelled drawing is an equal response route.