

Moon Phase Viewer

Mission: The observatory's moon calendar got scrambled. Move the Moon around Earth, compare the top view with the view from Earth, and rebuild the calendar in the right order.

Big question: Why does the Moon seem to change shape?

Warm-up: Fix the mistake

Each statement has a mistake. Rewrite it correctly.

The Moon makes its own light. ✓ **The Moon reflects sunlight.**

Earth's shadow causes the Moon's phases. ✓ **Phases come from how much of the lit half we see.**

Key vocabulary

Phase	The shape of the lit part of the Moon we see from Earth.
Waxing	The lit part we see is growing.
Waning	The lit part we see is shrinking.
Crescent / Gibbous	Less than half lit / more than half lit.

1 Box 1

Full moon

In the simulator: Move the Moon to make a **Full moon**.

Where is the Moon during a full moon?

☐ On the far side of Earth from the Sun ☐ Between Earth and the Sun ☐ Beside Earth, at a right angle

✓ **On the far side of Earth from the Sun**

New moon

In the simulator: Move the Moon to make a **New moon**.

Why can't we see the new moon?

☐ Its lit half faces away from Earth ☐ Earth's shadow covers it ☐ It is too far away

✓ **Its lit half faces away from Earth**

2 Box 2

Rebuild the calendar

Record the phase name.

Day	Phase	Lit part we see (%)
About day 7	from simulator	from simulator
About day 15	from simulator	from simulator
About day 22	from simulator	from simulator

3 Box 3

Put the phases in order

Order the phases starting at the new moon.

Put in order: First quarter · Full moon · New moon · Third quarter · Waning crescent · Waning gibbous · Waxing crescent · Waxing gibbous

1. **New moon**
2. **Waxing crescent**
3. **First quarter**
4. **Waxing gibbous**
5. **Full moon**
6. **Waning gibbous**
7. **Third quarter**
8. **Waning crescent**

4 Box 4

See every phase

In the simulator: Move the Moon through all 8 phases.

About how many days does it take to go from one full moon to the next?

Answer: _____ days ✓ **29.5 or 29 or 30**

5 Box 5

Legend: which side? 🏆 Legend only

Tonight the RIGHT side of the Moon is lit and it is getting bigger each night. What phase comes next?

☐ First quarter, then waxing gibbous ☐ Waning crescent ☐ New moon ☐ Third quarter

✓ **First quarter, then waxing gibbous**

6 Box 6

Bust the myth

Your friend says, "Phases happen because Earth's shadow covers part of the Moon." Explain what really causes phases.

Look for: The Sun always lights half the Moon; The Moon orbits Earth; We see different amounts of the lit half

Exit ticket: answer the big question in your own words

Why does the Moon seem to change shape?

Look for: The Sun always lights half of the Moon. As the Moon orbits Earth (about 29.5 days), we see different amounts of that lit half. That changing view is the Moon's phases. The Moon doesn't change shape, and Earth's shadow does not cause phases.

Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	1ET-E
 Investigator	RT0-I
 Legend	164-L

! Watch for these misconceptions

- "Seasons happen because Earth is closer to the Sun in summer." It is the tilt, not the distance.
- "Earth's shadow causes Moon phases." Phases come from our viewing angle of the lit half. Earth's shadow causes lunar eclipses.
- "The Sun moves across the sky." The Sun only appears to move because Earth rotates.