

Seasonal Night Sky

Mission: The planetarium needs a star guide for the whole school year. Move Earth around its orbit and find out which constellations can be seen at midnight each season, and why they change.

Big question: Why do we see different constellations in different seasons?

★ Warm-up: Notice & wonder

Think about the night sky where you live.

Have you ever noticed the same stars in the sky all year? What do you wonder? ✓ **Some stars stay all year (like the Big Dipper), but many change with the seasons.**

Why can't we see stars during the day? ✓ **The Sun's light is so bright it hides them.**

Key vocabulary

Orbit	The path Earth travels around the Sun (one trip = 1 year).
Constellation	A group of stars that forms a pattern in the sky.
Revolution	One complete trip around the Sun.
Night side	The half of Earth facing away from the Sun.

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Predict

PREDICTION If Earth moves halfway around its orbit (to July), will we still see Orion at midnight?

☐ Yes, the stars never change ☐ No, we will see a different constellation ☐ We will see no stars

Move to July

In the simulator: Drag Earth (or use the slider) to **July**.

You predicted: _____. What do we see in July?

☐ Scorpius ☐ Orion ☐ No stars

✓ **Scorpius**

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Star guide

Fill in the star guide for each season.

Month	Constellation at midnight
January (winter)	from simulator
April (spring)	from simulator
July (summer)	from simulator
October (fall)	from simulator

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Where is Orion in July?

In July, Orion is still out there. Why can't we see it?

- ☐ Orion is on the same side as the Sun, so it is in the daytime sky ☐ Orion burns out in summer
☐ Clouds cover it every July ☐ Orion moves to the other side of the galaxy

✓ **Orion is on the same side as the Sun, so it is in the daytime sky**

Rotation or revolution?

Sort each effect by its cause.

Sort: Day and night · Sun rises in the east · Different constellations each season · Stars seem to move across the sky in one night · Orion returns every January

Earth's rotation (spin, 24 h)	Earth's revolution (orbit, 1 year)
Day and night Sun rises in the east Stars seem to move across the sky in one night	Different constellations each season Orion returns every January

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Complete the year

In the simulator: Visit all four constellations by moving Earth around the whole orbit.

How many months until the January stars come back to the midnight sky?

Answer: _____ months ✓ **12**

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Legend: 6 months later 🏆 Legend only

Leo is overhead at midnight in April. When will Leo be hidden near the Sun?

- ☐ October ☐ May ☐ January ☐ Never

✓ **October**

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Explain it (CER)

Why do we see different constellations in different seasons?

Claim

Look for: Names Earth's orbit; at least 6 words

Evidence

Look for: Names constellations from your star guide; at least 10 words

Reasoning

Look for: Explains we see stars on the night side, away from the Sun; at least 10 words



Exit ticket: answer the big question in your own words

Why do we see different constellations in different seasons?

Look for: Earth orbits the Sun once a year. At night we look out from the side of Earth facing away from the Sun, so as Earth moves around its orbit, our night sky points toward different stars. That is why Orion is a winter constellation and Scorpius is a summer one.



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	CK1-E
 Investigator	10Q-I
 Legend	1FH-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.