FACILITATION GUIDE · 60-MINUTE LESSON · GRADE 5 · 5-ESS1-1 · 5-ESS1-2

Grand Tour of the Solar System

Earth, Sun, Moon & the Solar System: Support an argument that the apparent brightness of the sun and stars is due to their distance from Earth; represent data to reveal patterns in shadows, day and night, and the seasonal appearance of stars.

Learning target: I can use a model to explain patterns caused by Earth's rotation and orbit and describe the scale of the solar system.

Success looks like: Students use the vocabulary correctly, complete the virtual field trip, and score 80% or higher on the evidence-based exit ticket.

Materials: Student devices, the printed lesson worksheet (one per student), projector for the mini-lesson presenter.

LESSON AT A GLANCE — 60 minutes

Time	Part	Teacher does	Students do
0:00-0:08	Warm-up	Project the warm-up. Circulate, then call on 2-3 students. Save question 3 for the debrief.	Answer Part 2 of the lesson worksheet; share with a partner.
0:08-0:20	Mini-lesson	Teach with the 4-step presenter. Run each quick check with the whole class.	Complete worksheet Parts 4-11 as each slide appears; answer checks with fingers.
0:20-0:48	Virtual Field Trip	Launch Grand Tour of the Solar System. Assign mission levels; circulate with the answer key.	Play solo or in pairs; record code pieces; complete any written evidence task.
0:48-0:52	Debrief	Ask 2 debrief questions and revisit warm-up question 3.	Finish worksheet Part 13 (prediction check + one thing learned).
0:52-1:00	Exit ticket	Hand out the exit ticket. Collect and sort with the mastery guide.	Answer with evidence independently.

Key vocabulary

Word	Student-friendly definition
Rotation	Spinning on an axis. Earth rotates once about every 24 hours.
Revolution / orbit	Traveling around another object. Earth orbits the Sun in about 365 days.
Axis	An imaginary line through Earth from pole to pole; it is tilted about 23.5°.
Moon phase	The shape of the lit part of the Moon we see from Earth.
Star	A ball of hot gas that makes its own light. The Sun is our closest star.

1. WARM-UP

0:00–0:08 · 8 min

Warm-up expectations (post these): Answer in Part 2 of the lesson worksheet (or on this sheet). Number each answer to match the question. Answer in complete sentences. For math, show your work. Work silently for 5 minutes, then share with a partner for 2 minutes. Be ready to share one answer with the class.

#	Question	Look for
1	Where does the Sun rise, and where does it set?	It rises in the east and sets in the west.
2	What is the difference between a day and a year on Earth?	A day is one full spin (rotation) of Earth, about 24 hours. A year is one trip around the Sun (revolution), about 365¼ days.
3	Draw your shadow at noon and at 5 p.m. Which is longer? Why do you think so?	The 5 p.m. shadow is longer because the Sun is lower in the sky.

2. MINI-LESSON

0:08–0:20 · 12 min

Project the Lesson presenter from the room page. It runs the whole hour: target and agenda, warm-up with timer, hook vote, 4 teaching steps (key idea, interactive tool, turn and talk, check for understanding), I do / we do / you do, a work-time screen with a timer and expectations, debrief, and the exit ticket. Press N for teacher notes, T to pause the timer, and P to pick a student.

Hook (1 min): This morning the Sun was in the east. At dismissal it will be in the west. What moved? Class vote: The Sun moved / Earth spun / Both moved

Step 1 (3 min): Rotation makes day and night

Teach	Earth spins on its axis from west to east once every 24 hours. The half facing the Sun has day. The Sun only looks like it moves.
Interactive tool	Visual: Our solar system (not to scale)
Students do	Draw Earth, mark Indiana, and shade the night side. Label "day" and "night."
Turn and talk	If Earth stopped spinning, what would happen to day and night where you live?
Worksheet Part 5A	Earth ROTATES on its axis once every 24 hours. This causes DAY AND NIGHT.
Check for understanding	Why does the Sun seem to move across the sky? Answer: (B) Earth rotates

Step 2 (3 min): Shadows change during the day

Teach	Shadows point away from the Sun. When the Sun is low (morning, evening) shadows are long. At midday the Sun is highest, so shadows are shortest.
Interactive tool	Simulation: Move the Sun and watch the shadow

Students do	Make a table with 3 times (9 a.m., noon, 4 p.m.). Record the shadow as long or short.
Turn and talk	Why would a shadow be longer at 5 p.m. than at noon? Use the word "angle" or "low."
Worksheet Part 6A	Shadows are LONGEST in the morning and evening and SHORTEST near noon, when the Sun is HIGHEST.
Check for understanding	At 8 a.m. the Sun is in the east. Which way does a flagpole's shadow point? Answer: (B) West

Step 3 (3 min): Tilt causes seasons

Teach	Earth's axis is tilted about 23.5°. When our hemisphere tilts toward the Sun, we get more direct light and longer days: summer.
Interactive tool	Board and notes
Students do	Draw Earth tilted toward the Sun and label "summer in Indiana."
Turn and talk	Earth is actually a little closer to the Sun in January. Why isn't January summer in Indiana?
Worksheet Part 7A	Seasons are caused by Earth's TILTED axis. When Indiana tilts TOWARD the Sun, it is summer.
Check for understanding	What causes summer in Indiana? Answer: (A) Northern Hemisphere tilts toward the Sun

Step 4 (3 min): The Moon reflects sunlight

Teach	The Moon makes no light. Half of it is always lit by the Sun. As it orbits Earth (about 29.5 days), we see different amounts of the lit half: phases.
Interactive tool	Simulation: Move the Moon and watch the phase from Earth
Students do	Write the name of the phase at each Moon position you try.
Turn and talk	Why can't we see the new moon, even though it is still up there?
Worksheet Part 8A	The Moon REFLECTS sunlight. One full cycle of phases takes about 29.5 days.
Check for understanding	Why do we see Moon phases? Answer: (A) We see different parts of the lit half as it orbits

I do: worked example (shown one step at a time)

1. Imagine Earth spinning on its axis, with Indiana marked by a dot.
2. Step 1: When Indiana faces the Sun, it is daytime (noon when it faces it directly).
3. Step 2: As Earth keeps spinning west to east, Indiana turns away: sunset, then night.
4. Step 3: One full spin takes 24 hours: one day.
5. Step 4: Earth also orbits the Sun once a year, always tilted the same way. Tilt toward the Sun = summer.

What to say on every slide is in the presenter script PDF.

We do: guided practice

At 7:00 a.m. a tree's shadow is long and points west. Predict its length and direction at 6:00 p.m.

1. At 7 a.m. the Sun is low in the east, so the shadow points away from it: west.
2. Through the day, Earth rotates, so the Sun appears to move across the sky toward the west.
3. At 6 p.m. the Sun is low in the west.
4. The shadow will be long again and point away from the Sun: east.

Answer: Long and pointing east

You do: independent check (2 min)

Which pattern is caused by Earth's REVOLUTION around the Sun, not its rotation? (A) Day turns into night (B) The seasons change over a year (C) The Sun rises every morning (D) Shadows change during one day

Answer: (B) The seasons change over a year. Students who miss it: 3-minute reteach at the teacher table, then start the room at the Explorer level.

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

3. VIRTUAL FIELD TRIP: GRAND TOUR OF THE SOLAR SYSTEM — 0:20–0:48 · 28 min

Launch: project the start screen, read the story aloud, and assign mission levels (Explorer = extra support, Agent = on level, Legend = challenge). Students can open Supports any time for read-aloud, bigger text, a word bank, and a scratch pad.

- Frame it as a real trip: "Buses leave in 1 minute!" Project the start screen and read the story together.
- Stops go in order along the route. Remind students that each stop's info card is their "tour guide," so they should read it first.
- Ask early finishers to write a postcard (3 sentences) home describing the most interesting stop.

Students turn in: the completion code plus their copied "turn in your work" block (Canvas Text Entry).

4. DEBRIEF — 0:48–0:52 · 4 min

1. Explain to a partner why we have day and night using the words rotate and axis.
2. Why does the Sun look so much brighter than other stars?
3. What would happen to seasons if Earth had no tilt?

Close the loop: return to warm-up question 3. Answer: The 5 p.m. shadow is longer because the Sun is lower in the sky.

5. EXIT TICKET — 0:52–1:00 · 8 min

Print the exit ticket PDF (page 2 is the key and mastery guide). Every item requires evidence: Part A asks students to justify each choice, Part B asks for an explanation, and Part C applies the standard to a new

situation using Claim-Evidence-Reasoning. Sort results into Mastered, Approaching, and Beginning to plan tomorrow's groups.

LESSON RESOURCES

Resource	How it fits the lesson
Warm-up worksheet (PDF)	Optional standalone warm-up (also Part 2 of the lesson worksheet), with a key.
Mini-lesson presenter	Projectable, step-by-step interactive lesson with tools and quick checks (room page).
Lesson worksheet (PDF + key)	One printable packet students complete during the whole lesson: short fill-ins and quick checks in 13 small parts that match the presenter slides.
Grand Tour of the Solar System (.html)	The virtual field trip for Canvas, with differentiated levels, supports, and a turn-in.
Exit ticket (PDF + key)	Evidence-based check with a rubric and a mastery sorting guide.
NASA Space Place (extra)	Kid-friendly articles and games on seasons, moon phases, and planets. https://spaceplace.nasa.gov/
NASA Science: Solar System (extra)	Planet facts, images, and scale information. https://science.nasa.gov/solar-system/
PhET: My Solar System (extra)	Model orbits and gravity in the browser. https://phet.colorado.edu/
If the Moon Were Only One Pixel (extra)	A scrolling scale model of the solar system. Great hook. https://www.joshworth.com/dev/pixelspace/pixelspace_solarsystem.html

ANSWER KEY: GRAND TOUR OF THE SOLAR SYSTEM

Stop 1: The Sun (code piece: O)
1. Why does the Sun look so much brighter than other stars? -> It is much closer to Earth
2. True or false: The Sun is a star. -> True
3. What keeps the planets orbiting the Sun? -> The Sun's gravity
Stop 2: The Inner Planets (code piece: R)
1. Put the inner planets in order from closest to the Sun to farthest. -> Mercury -> Venus -> Earth -> Mars
2. Match each planet with its fact. -> Mercury = Smallest planet; Venus = Hottest planet; Earth = Liquid water on its surface; Mars = Red, rusty dust
Stop 3: The Asteroid Belt (code piece: B)
1. The asteroid belt is located between which two planets? -> Mars and Jupiter
2. What does the asteroid belt separate? -> Inner rocky planets from outer gas giants
3. Tap the last rocky planet before the asteroid belt. -> Tap Mars
Stop 4: The Gas Giants (code piece: I)
1. Put the outer planets in order from closest to the Sun to farthest. -> Jupiter -> Saturn -> Uranus -> Neptune
2. Tap the planet that takes the LONGEST to travel once around the Sun. -> Tap Neptune
3. Sort the planets into inner (rocky) or outer (gas giant). -> Inner rocky planet: Mars, Venus, Mercury, Earth | Outer gas giant: Saturn, Neptune, Jupiter, Uranus
4. Tap the largest planet in the solar system. (Numbers show the order from the Sun.) -> Tap Jupiter
Stop 5: Looking Back at Earth (code piece: T)

1. Match each motion to how long it takes. -> Earth rotates once = About 24 hours; Earth orbits the Sun once = About 365 days; A full cycle of Moon phases = About 29.5 days
2. What causes day and night on Earth? -> Earth rotating on its axis

Final code: ORBIT