Solar System Snapshots

Compare Earth with the Sun, a moon, and two planets.

SC.8.E.5.7 "Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each fact that tells about an object's distance, gravity, movement, temperature, or atmosphere. Write D, G, M, T, or A beside the underlined fact to show which property it describes.

Earth as a Comparison Point

1. Earth is a baseline for comparing Solar System objects. It is 1 astronomical unit, or AU, from the Sun, and its gravity is set to 1 in the table. Earth completes one orbit in about 365 days. Its nitrogen-oxygen atmosphere helps keep average surface temperature near 15°C. The Sun has far stronger gravity, rotates, and has a hot hydrogen-helium atmosphere.

COMPARISON DATA

Object	Average distance from Sun	Gravity, Earth = 1	Main movement
Sun	0 AU, at the center	27.9	Rotates in about 25 Earth days at its equator
Earth	1 AU	1.00	Orbits the Sun in 365 days
Moon	About 1 AU, with Earth	0.17	Orbits Earth in 27.3 days
Mars	1.52 AU	0.38	Orbits the Sun in 687 days
Jupiter	5.20 AU	2.53 at cloud tops	Orbits the Sun in 11.9 Earth years

2. The Moon circles Earth every 27.3 days, while both travel around the Sun. The Moon's gravity is about one-sixth of Earth's. Its extremely thin exosphere cannot hold heat like Earth's atmosphere, so temperatures change sharply between lunar day and night. Mars is farther from the Sun, with lower gravity, a thin mostly carbon-dioxide atmosphere, and an average surface temperature near −60°C.

3. Jupiter is over five times farther from the Sun than Earth. It takes about 11.9 Earth years to orbit the Sun, yet it spins once in roughly 10 hours. At its cloud tops, Jupiter's gravity is about 2.5 times Earth's. Its hydrogen-helium atmosphere has clouds and storms, and its cloud-top temperature is near −145°C, much colder than Earth's average surface temperature.

2 ANSWER WITH EVIDENCE

Use the passage

1. Compare Mars with Earth in distance from the Sun and time needed to complete an orbit.

2. How do the Moon's gravity and atmosphere affect its temperatures compared with Earth?

3. Compare the Sun with Earth in gravitational force and movement.

4. Compare Mars and Jupiter with Earth by using one atmospheric condition and one temperature condition for each object.

3 YOUR TURN

Your own words

Choose Mars, the Moon, Jupiter, or the Sun. Write four sentences comparing your chosen object with Earth in gravity, distance or movement, temperature, and atmosphere, then explain one effect those conditions would have on people or equipment.

ANSWER KEY

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GRADE 8 · SC.8.E.5.7

PART 1 · READ AND MARK

Underline each fact that tells about an object's distance, gravity, movement, temperature, or atmosphere. Write D, G, M, T, or A beside the underlined fact to show which property it describes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Compare Mars with Earth in distance from the Sun and time needed to complete an orbit.	**Mars is 1.52 AU from the Sun, compared with Earth's 1 AU. Mars takes 687 days to orbit the Sun, compared with Earth's 365 days.**
2	How do the Moon's gravity and atmosphere affect its temperatures compared with Earth?	**The Moon has about one-sixth of Earth's gravity and an extremely thin exosphere. Because it cannot hold heat like Earth's atmosphere, lunar temperatures change sharply between day and night.**
3	Compare the Sun with Earth in gravitational force and movement.	**The Sun's gravity is 27.9 times Earth's gravity, while Earth's is set to 1. The Sun rotates in about 25 Earth days at its equator, while Earth orbits the Sun in 365 days.**
4	Compare Mars and Jupiter with Earth by using one atmospheric condition and one temperature condition for each object.	**Mars has a thin, mostly carbon-dioxide atmosphere and an average surface temperature near −60°C, colder than Earth's average near 15°C. Jupiter has a hydrogen-helium atmosphere with clouds and storms, and its cloud tops are near −145°C, much colder than Earth's average surface temperature.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Jupiter is more than five times farther from the Sun than Earth and needs 11.9 Earth years for one orbit. Its gravity at cloud tops is about 2.5 times Earth's, while it spins in roughly 10 hours. Jupiter's hydrogen-helium atmosphere has clouds and storms, unlike Earth's nitrogen-oxygen atmosphere. Its cloud tops are much colder than Earth's average surface, so people would need protection from the cold and could not breathe its gases.

Accept equivalent comparisons that use the stated values or accurate relationship words such as farther, lower, stronger, colder, thinner, or longer. For the open response, accept any selected object if all four property areas are compared accurately and the stated effect follows logically from the conditions.