Earth's Life Support

Analyze how Earth provides conditions for life.

7.9.C "analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each characteristic of Earth that supports life, then number 1, 2, and 3 beside the explanations of how the Sun's distance, water, and the atmosphere help.

A Planet Built for Life

1. Earth travels at a distance from the Sun that helps keep its surface temperatures suitable for liquid water. If Earth were much closer, stronger solar heating could cause oceans to evaporate. If it were much farther away, water could freeze over much of the planet. Earth's orbit is not a perfect circle, but its average distance stays within a range where energy from the Sun can warm the planet without making all surface water boil or freeze.

2. Earth also has abundant water, a substance needed by all known living things. Liquid water allows materials to dissolve and move, so cells can carry out chemical reactions. On Earth, water cycles among oceans, clouds, ice, groundwater, and living things. This cycling moves water and helps moderate temperatures. Water is not useful for life only because it exists. It must remain available in liquid form in places where organisms can use it, such as lakes, moist soil, and shallow coastal waters.

3. The atmosphere is a mixture of gases surrounding Earth. Its nitrogen and oxygen support important life processes, including the use of oxygen by many organisms. Carbon dioxide is present in a much smaller amount, yet plants use it during photosynthesis. The atmosphere also contains water vapor and gases that trap some heat, preventing extreme cooling. In addition, the atmosphere blocks much harmful radiation from the Sun and burns up many small space rocks before they reach the ground.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why would being much closer to the Sun make Earth less suitable for life?

2. Why must water be available in liquid form for organisms to use it?

3. Identify two ways the atmosphere protects or supports life besides providing oxygen.

4. How do Earth's distance from the Sun and its atmosphere work together to help keep water usable?

3 YOUR TURN

Your own words

Imagine a planet that is much closer to its star and has an atmosphere with almost no gases that trap heat. In 4 or 5 sentences, predict what could happen to its water and explain why these conditions would make life as we know it difficult. Name one change that could improve its chances for life.

ANSWER KEY

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GRADE 7 · TEKS 7.9.C

PART 1 · READ AND MARK

Underline each characteristic of Earth that supports life, then number 1, 2, and 3 beside the explanations of how the Sun's distance, water, and the atmosphere help. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why would being much closer to the Sun make Earth less suitable for life?	**Stronger solar heating could cause oceans to evaporate, leaving less liquid water available for life.**
2	Why must water be available in liquid form for organisms to use it?	**Liquid water lets materials dissolve and move so cells can carry out chemical reactions.**
3	Identify two ways the atmosphere protects or supports life besides providing oxygen.	**It traps some heat to prevent extreme cooling and blocks much harmful radiation. It also burns up many small space rocks.**
4	How do Earth's distance from the Sun and its atmosphere work together to help keep water usable?	**Earth's distance provides enough solar energy to keep water from all boiling or freezing, while atmospheric gases trap some heat and prevent extreme cooling.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Because it is much closer to its star, the planet may receive enough energy to heat liquid water until it evaporates. With few heat-trapping gases, temperatures may also change sharply between day and night. Little available liquid water would limit cell reactions needed by known life. Moving the planet farther from its star, to a distance that allows stable liquid water, would improve its chances.

Accept explanations that connect each characteristic to a life-supporting condition, especially stable liquid water, usable atmospheric gases, temperature moderation, or radiation protection. For the open response, accept scientifically reasonable predictions and one relevant change.