by Suzanne Sherman

What makes Earth a suitable home for living things?

Earth Is

## Earth is a special planet.

This gorgeous, swirly marble is the only place we have ever called home. Life of some kind teems on nearly every part of this most hospitable planet's surface. Why here? Earth is only one of eight planets in our **solar system**, the system that includes all objects **orbiting** our Sun. Why haven't scientists found signs of life on Mercury, Venus, Mars, or another planet farther away? What makes Earth so habitable?

The answer has to do with Earth's place in space. Scientists use the childhood tale "Goldilocks and the Three Bears" to describe the uniqueness of Earth. In that classic tale, a girl named Goldilocks samples three bowls of porridge. The first bowl of porridge is too hot, and the girl pushes it away. The second bowl of porridge is too cold, and she rejects that bowl, too. The temperature of the third bowl of porridge is "just right," and Goldilocks helps herself to a meal on the house. Goldilocks goes on to



What makes Earth the only planet in our solar system known to support life?

test three chairs, followed by three beds. In each case, she finds the conditions of the first two unacceptable and third "just right." Just as the third bowl of porridge, chair, and bed are the only ones that meet Goldilocks's requirements, Earth is the only planet that meets ours. Earth is the third planet from the Sun in our solar system. It meets all the requirements for living things. Earth has a source of energy, its surface temperatures are not too hot or too cold, and it has liquid water. Our blue planet is "just right" for life to flourish.

Why isn't there life on the second planet from the Sun—Venus? Venus is about the same size as Earth and even had flowing water at one time. Because all life as we know it requires liquid water to survive, scientists regard the presence of water as a promising sign of the potential for life. But Venus orbits too close to the Sun for its water to flow. At a blazing 460°C (860°F), all the water on Venus exists in the form thick vapor. Mercury, too, is scorching hot. As the planet closest to our Sun, Mercury's surface temperatures reach 427 °C (800°F).

Our nearest planet neighbors on the other side, away from the Sun, are too cold to sustain life. Mars also once had liquid water flowing in rivers, lakes, and oceans. But with an average surface temperature of Mars at about -60°C (-80°F), its water remains frozen.

The distance of Mars from the Sun is not the only factor that renders that planet cold and lifeless. Another factor against Mars's potential for hosting life is its insufficient **atmosphere**. An atmosphere is a layer of gases that surround a planet

> VENUS Venus once had flowing water. Now all the water there exists in gas form.

MARS Mars once had flowing water, too. Now all the water on Mars is frozen.

Earth's atmosphere is partly a result of what happens deep below the ground. Materials inside Earth are constantly moving, bringing particles that were once trapped in the ground up to the surface and to the atmosphere. Slowly, during processes like mountain building, and quickly, during processes like volcanic eruptions, carbon and other elements are churned up. Cycles—like the carbon cycle—keep the right amount of carbon dioxide in our atmosphere. Carbon dioxide and other gases act like a blanket, keeping Earth's surface temperatures consistently warm. Mars has no internal churning and moving of particles to its surface and into its atmosphere. Although its atmosphere consists almost entirely of carbon dioxide, it is far too thin to provide any warmth.

So here we are, on the third planet from the Sun—"just right" for life in so many ways.



Describe three features of Earth that support life.

or moon. Earth's life-supporting atmosphere is composed mainly of nitrogen and oxygen and smaller amounts of other important gases.

> Earth's atmosphere retains heat and helps regulate its temperature.

## **IN YOUR SCIENCE NOTEBOOK**