Astronomers uncover 7 warm, rocky, Earth-like planets 39 light-years away

By Washington Post, adapted by Newsela staff on 02.27.17
Word Count **891**
Level **1030L**

An artist's conception of the view from the surface of the exoplanet TRAPPIST-1f. Image courtesy of NASA/JPL-Caltech handout illustration

About 39 light-years away from Earth, scientists have found a new solar system. This system is special because it has seven planets similar to Earth. They are rocky and warm enough to possibly support life.

The discovery is the first time astronomers have ever found so many rocky planets orbiting a single star. Researchers say the system is good study of worlds outside our solar system. It could be the best place in the galaxy to search for life beyond Earth.

"Before this, if you wanted to study terrestrial planets, we had only four of them and they were all in our solar system," said lead author Michaël Gillon. He is a scientist at the University of Liège in Belgium. "Now we have seven Earth-sized planets to expand our understanding."

Another Habitable Zone Nearby

The newly discovered solar system is like a smaller version of our own. The star at its center, called TRAPPIST-1, is much smaller than our sun and about a quarter as warm. Its planets circle tightly around it. TRAPPIST-1 is so cool that all seven of the bodies get just the right amount of warmth to hold liquid water. Three of them receive the same amount of heat as Venus, Earth and Mars, putting them in "the habitable zone," where life might thrive.

Still, "Earth-like" is a generous term to describe these worlds. They may be about the same size and receive the same amount of energy from their star, but there is much more that makes Earth livable. Scientists still need to find out what makes up the planets. They also need to see if they have atmospheres and if those atmospheres have the right chemicals to support life. A planet's atmosphere is the gases that surround it. Earth's atmosphere is made of gases like nitrogen and oxygen.

"You can bet people will be rushing to take those measurements," said Elisabeth Adams, a scientist at the Planetary Science Institute, who was not involved in the study. "That's going to be fascinating to see."

TRAPPIST-1 Has Seven Earth-like Planets

Gillon and his fellow scientists have been interested in TRAPPIST-1 since late 2015. They used European Southern Observatory's Transiting Planets and Planetesimals Small Telescope, called "TRAPPIST," in Chile, to study the star. They sensed small dips in the star's brightness at regular intervals. These dips were caused by planets crossing between the star and Earth and blocking some of its light.

Last May, the scientists published that they had discovered three rocky bodies orbiting the star. They named them TRAPPIST-1b, -1c and -1d. Later, Gillon realized that the dip in brightness he thought came from 1d was actually caused by three planets all crossing at the same time.

Then, the team used the Spitzer Space Telescope, which offered a constant view of the TRAPPIST-1 system, for 20 days. They realized TRAPPIST-1 actually had seven planets. The planets were renamed TRAPPIST-1b through -h in order of their distance from the star.

The scientists discovered that the six inner planets exert a gravitational force on each other. The level of each gravitational force is related to the planets' masses. Therefore, the astronomers could use these forces to figure out what makes up the planets.

The planets' orbits also suggest that they formed farther out from their sun and then moved inward, Gillon said. This means they may have water, as water tends to concentrate on the edges of the solar system.

Planets Are Close Enough For Atmospheric Studies

For years, scientists have found evidence that our galaxy, the Milky Way, is full of Earth-like planets. However, the TRAPPIST-1 researchers say this solar system is our best target yet to search for life outside of Earth. The star is dim enough that the planets are easy to see, and they are close enough to study the planets' atmospheres.

Planets e, f and g are the most interesting targets for scientists because of their position in TRAPPIST-1's livable zone. However, even if they turn out to be warm and wet, these worlds might not be great places to live. The planets' closeness to the star and their closeness to one another means that they are probably tidally locked, like Earth's moon. This means that one side of each planet always faces the sun while the other is stuck in constant darkness. The temperature across the planet would be very different, creating powerful winds.

Adams of the Planetary Science Institute warned that it is very hard to tell whether a planet is livable from a distance. For instance, an outside observer might think Venus and Mars are livable, while they are not.

"There are a lot of ways in which a planet could be like Earth, but not enough," Adams said.

Still Just One Habitable World For Now

She also added that the very idea of a "habitable world" is just an idea. Scientists have only one source of information about livable planets, and that is Earth. They do not know what it would take for there to be life on another planet. "We don't actually know the parameters that are needed for life on another world," Adams said.

Still, even if no life is discovered on them, the TRAPPIST-1 planets present a new window on how solar systems work. The planets' varying masses and distances allow for detailed comparisons of the worlds.

Quiz

1 According to the article, scientists believe the planets around TRAPPIST-1 might have the right conditions to support life.

Which piece of evidence BEST explains what has caused scientists to believe this?

(A) The discovery is the first time astronomers have ever found so many rocky planets orbiting a single star. Researchers say the system is good study of worlds outside our solar system. It could be the best place in the galaxy to search for life beyond Earth.

(B) TRAPPIST-1 is so cool that all seven of the bodies get just the right amount of warmth to hold liquid water. Three of them receive the same amount of heat as Venus, Earth and Mars, putting them in "the habitable zone," where life might thrive.

(C) The scientists discovered that the six inner planets exert a gravitational force on each other. The level of each gravitational force is related to the planets' masses. Therefore, the astronomers could use these forces to figure out what makes up the planets.

(D) The planets' closeness to the star and their closeness to one another means that they are probably tidally locked, like Earth's moon. This means that one side of each planet always faces the sun while the other is stuck in constant darkness.

2 Which section of the article BEST explains how scientists identified the planets around TRAPPIST-1?

(A) "Another Habitable Zone Nearby"

(B) "TRAPPIST-1 Has Seven Earth-like Planets"

(C) "Planets Are Close Enough For Atmospheric Studies"

(D) "Still Just One Habitable World For Now"

3 Read the paragraph from the section "TRAPPIST-1 Has Seven Earth-like Planets."

> *The scientists discovered that the six inner planets exert a gravitational force on each other. The level of each gravitational force is related to the planets' masses. Therefore, the astronomers could use these forces to figure out what makes up the planets.*

Which of the following, if it replaced the word "exert" in the sentence above, would CHANGE the meaning of the sentence?

(A) apply

(B) direct

(C) reduce

(D) maintain

4 Read the selection from the section "Still Just One Habitable World For Now."

> *Scientists have only one source of information about livable planets, and that is Earth. They do not know what it would take for there to be life on another planet. "We don't actually know the parameters that are needed for life on another world," Adams said.*

Which answer choice is the BEST definition of "parameters" as it is used in the third sentence?

(A) limits

(B) affairs

(C) boundaries

(D) circumstances