What Makes a Planet Habitable?

Engage

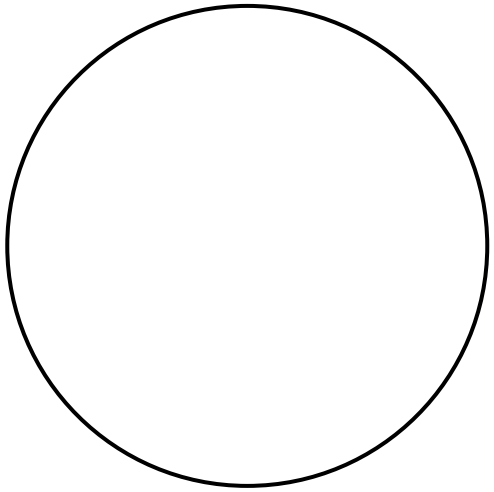
Have you heard the fairy tale called Goldilocks and the three bears? If not, watch the video about the story at
https://www.youtube.com/watch?v=M5Fh7u133Ns
and then answer the following questions.

1. Why is the girl called Goldilocks? _____
_____
2. The porridge that she ate was not too hot, not to cold, it was _____.
3. The chair that she sat in was not too big, it was _____
4. The bed she slept on was not too hard, not too soft, it was _____.

Review Questions:
Answer them like you are telling the story of Goldilocks.
1. What happens to water on Mercury and Venus?
_____
2. Why does this happen? _____
3. What happens to water on Uranus and Neptune?
_____
4. Why does this happen? _____
5. What happens to water on Earth? _____
6. Why does this happen? _____

7. There are two reasons why we have liquid water on Earth. Think of the lessons we just finished and write your ideas below.

Explore
Materials: meter stick and flashlight
What To Do:
1. The flashlight is going to represent the Sun.
2. The circle below is going to represent a planet.
3. Place this paper on the desk or table and hold the flashlight 30cm directly above the paper.
4. Your teacher may dim the lights to help you see.



5. You should be able to see the circle in the light of the flashlight. There should also be a very bright center area.
6. If this planet was very close to the Sun what would happen to the liquid water? _____
7. Place the paper on the floor and hold the flashlight 150cm directly above the paper.
8. Can you see the very bright center area? _____
9. This planet is very far from the Sun. What would happen to the liquid water on this planet? _____
10. Now hold the flashlight 75cm above the paper.
11. Does the bright area cover the entire planet? _____
12. This planet is just the right distance from the Sun. What would happen to liquid water on this planet? _____
_____

Explain

ZONE OF HABITABILITY

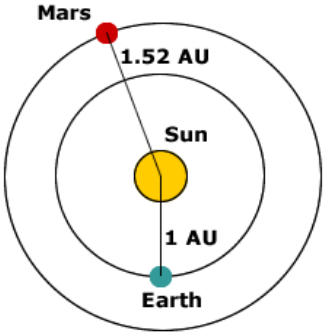
GOLDILOCKS PLANET

ASTRONOMICAL UNIT

Elaborate

The region around a star where the temperature is "just right" is known as the zone of habitability. For a star like our Sun the zone of habitability has been identified as between .84 AU and 1.7 AU.

Astronomers use the AU (Astronomical Unit) to describe distances in our Solar System based on the average distance between Earth and the Sun (approx. 149,570,000 km).



Directions: Look at the chart below and answer the questions.

Object	Distance (AU)
Mercury	0.4
Venus	0.7
Earth	1
Mars	1.5

Questions:

1. Why are Mercury and Venus not habitable? _____

_____

2. Which of the planets of our solar system are in the Zone of Habitability? _____

3. Mars is in the Zone of Habitability but has lost most of its atmosphere. What other factor makes Mars uninhabitable?

_____

1. Watch the video "The Atmosphere Explained: How It Protects and Supports Life on Earth" found at https://www.youtube.com/watch?v=0GhEizC2XfQ
2. Use the Word Bank to fill in the blanks below while your watch the video.

WORD BANK			
gravity	layers	habitable	weather
regulates	life	ozone	freezing
animals	carbon dioxide		

1. The atmosphere is a vast layer of gases that surrounds Earth and is kept in place by _____.
2. It is made mostly of nitrogen and oxygen with smaller amounts of other gases that are essential for _____.
3. It is divided into several _____, each with a unique role in protecting and supporting life on Earth.
4. The lowest layer, the troposphere, is where _____ occurs.
5. Above it lies the stratosphere, which contains the _____ layer that blocks much of the sun's ultraviolet radiation.
6. The atmosphere _____ temperature by trapping heat through the greenhouse effect, preventing the planet from _____ at night.
7. At the same time, it keeps oxygen available for _____ to breathe and _____ _____available for plants to grow.
8. By protecting the surface, maintaining temperatures, and enabling essential life processes, the atmosphere makes Earth a thriving and _____ world in the vast emptiness of space.

Evaluate

Name _____ period _____

EXIT TICKET

What Makes a Planet Habitable?

Use what you have learned in the last three lesson to answer the question below.

Question:

What conditions make the Earth habitable?

Claim:

I think

Evidence #1

The atmosphere

Evidence #2

The atmosphere

Evidence #3

The presence of

Reasoning:

These fact lead to the conclusion that -