

Poster Information

In this activity, you and your child will learn about what life needs and what planets may meet these needs by viewing the information provided on the posters.

What You Need:

- ☀ 10 sheets of bright poster board
- ☀ Print-outs of the information below in bright colors
- ☀ Tape or glue to adhere information to the poster boards
- ☀ Scissors
- ☀ Images related to Astrobiology
- ☀ Hand-outs of *Search for Life on Other Planets*
- ☀ Crayons or pencils for children to mark hand-outs.

What to Do:

Attach the information below on bright poster board and place posters around the room for the parents and children to view.

Invite the parents and their children to view the posters and answer the questions. The children can record their findings on the "*Search for Life on Other Planets*" sheet.

Poster 1:
What do you need to be able to live?

Answer: Water, food, shelter or protection from being too cold or too hot.

Do you think all living things need these same things?

Answer: Yes! Life as we know it needs water, nutrients, and some form of protection.

Poster 2:

Where do you get your nutrients and energy to make your body run?

Answer: The food you eat!

Where do plants get their nutrients?

Answer: From the soil.

Where do plants get their energy to grow?

Answer: Plants get energy from the Sun!

Poster 3:

What surrounds our world and protects us from dangerous rays from the Sun, and helps to keep our temperature on Earth just right?

Answer: The Atmosphere!

Poster 4:

An **extreme environment** is one where conditions are "extreme", such as very hot or very cold. Can you think of others? What about deserts?

Answer: a few might be:

Very acidic

Very salty

Very dry

Very high radiation

Very high pressure

Can you think of where some extreme environments might exist on Earth?

Poster 5:

An **extremophile** is a living thing that thrives in an extreme place – like one that is really hot or really acidic. They can live where most organisms cannot because they have adapted special mechanisms for survival. They still need water, energy and nutrients, and protection!

Do you think that extremophiles can live in:

(Facilitator: have Yes and No printed on the answer cards that cover the image and information).

Geothermal hot springs where temperatures can get as hot as – or hotter than boiling water?

Yes.



Grand Prismatic Spring; Hot Springs, Midway & Lower Geyser Basin; M Storey; 1966 / <http://www.nps.gov/archive/yell/slidefile/thermalfeatures/hsandterraces/midwaylower/Images/06118.jpg>

No.

Sorry – some organisms are very hardy – even at these very high temperatures! Look under “Yes!”

Hot springs, like those in Yellowstone National Park, have a range of temperatures, and a range of organisms that live at different hot temperatures. These are called **thermophiles**. *Each different color in the pond in the picture is a different kind (species) of microorganism living at a different temperature.*

The hottest temperatures are in the middle of the hot spring pool. As long as the temperature is less than about 115 degrees Celsius (~240 degrees Fahrenheit), life can live in hot springs!

Poster 6:

Do you think that extremophiles can live in:

(Facilitator: have Yes and No printed on the answer cards that cover the image and information).

Really really salty water – maybe 10 *times* saltier than the ocean?



<http://science.nasa.gov/newhome/headlines/lms/owenslake.htm>

No.

Sorry – some organisms are very hardy – they can live in very salty water where most organisms cannot! Look under “Yes!”

The Great Salt Lake in Utah is 10 times saltier than the ocean but it brims with halophiles – organisms that thrive in extreme conditions of high salinity. Diverse life such as algae, brine flies, brine shrimp live here. The halophiles give the salty water the pink color.

Poster 7:

Do you think that extremophiles can live in:

(Facilitator: have Yes and No printed on the answer cards that cover the image and information).

Really really acidic water – like vinegar?

Yes



Image courtesy of Carol Stoker, NASA Ames Research Center,
<http://www.nasa.gov/centers/ames/news/releases/2003/03images/tinto/tinto.html>

The Tinto River, in Spain, is very, very acidic, with a pH between 1.5 and 3.1 – or an acidity between vinegar and stomach acid. It also has lots of metals in the water, which make the color red. Acid-loving extremophiles live even here!

No.

Sorry – some organisms are very hardy – they can live in very acidic water where most organisms cannot! Look under “Yes!”

Poster 8:

Why are we interested in knowing the extreme conditions in which life exists on Earth?

How might this help us as we explore our solar system?

Answer: Different planets have different conditions. Knowing where life can exist can help us figure out which planets and moons in our solar system – if they have similar extreme conditions – may have, or have had, life!

Poster 9:

What is one thing that ALL life as we know it needs?

Answer: Water!

Look at the pictures of the different planets. Do you see evidence of water? Evidence for water in the past? Which planets or moons in our solar system have – or had - liquid water at their surface?

- a) Earth only
- b) Earth and Mars
- c) Earth and Venus
- d) Earth, Mars, and Jupiter's moon Europa
- e) Pluto only

Answer: d) Earth, Mars, and Jupiter's moon Europa. Mars may have had water in the past, and Europa has liquid water beneath its icy surface. Venus is too hot, and Pluto is too cold.

Poster 10:

What planets in our solar system may have – or once had – life?

- a) Earth only
- b) Earth and Mars
- c) Earth and Venus
- d) Earth, Mars, and Jupiter's moon Europa
- e) Pluto only

Answer: d) Earth does! And Mars, with evidence of past water, may have had life in the past. Europa has water under its icy surface; life *may* live here now!

The Search for Life on Other Planets

To live, I need _____ and

and _____.

ALL organisms need _____ and

_____ and _____.



I get my nutrients from _____.

The _____ protects me from bad radiation from the Sun and helps to keep Earth's temperature juuuuuuuuuuuuuuuust right!

Extremophiles can live in extreme environments.
They can live where most organisms cannot.

Organisms can / cannot live in very hot hot-springs,
like in Yellowstone National Park.

Organisms can / cannot live in very salty seas,
like in the Great Salt Lake.

Organisms can / cannot live in water that
is more acidic than vinegar, like the Rio Tinto in Spain.

On what planets might conditions be - or have been - right for
life? Circle them!

Earth? Mars? Venus? Pluto? Europa?



Possible Images for Posters

Planetary Photojournal

<http://photojournal.jpl.nasa.gov/index.html>

Titan - <http://photojournal.jpl.nasa.gov/target/Titan>

Europa - <http://photojournal.jpl.nasa.gov/target/Europa>

Mars - <http://phoenix.lpl.arizona.edu/images.php?gID=0&cID=4>

And <http://themis.asu.edu/theme-channels>

And http://themis.asu.edu/theme-mts_chaos

Extreme Environments

<http://www.lpi.usra.edu/education/fieldtrips/2007/> (photographs)

Micro*Scope

<http://starcentral.mbl.edu/microscope/portal.php?pagetitle=assetfactsheet&imageid=88>

Astronomy Picture of the Day Search

http://antwrp.gsfc.nasa.gov/cgi-bin/apod/apod_search