

## Extreme Living



photo by James St. John

### Mini Fact:

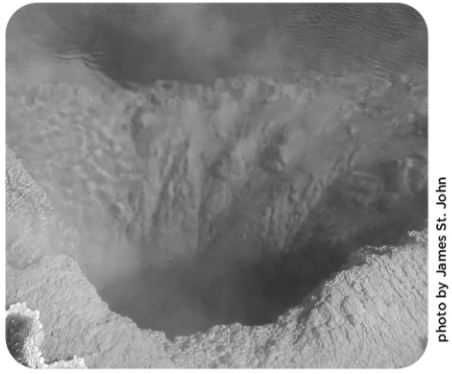
Hot springs get their bright colors from special bacteria that can withstand extreme heat.

Have you ever marveled at the different life all around us? It turns out that there is life in a lot more places than we ever imagined. Scientists have found life in boiling acid, on volcanic vents, inside nuclear reactors, deep under the ice, high above the clouds and way below the bottom of the sea. Creatures living in these extreme habitats are called **extremophiles** (x-TREME-uh-files). The Mini Page takes a look at extremophiles this week.

**Extremophiles**

Until recently, people thought all life needed certain things to survive. These include:

- protection from radiation
- a certain range of acid levels
- water
- a narrow range of temperature
- energy that comes, at least at one point, from the sun.



Black Pool in Yellowstone National Park is very hot and was once a dark black color because of the extremophile bacterial mats that lived in it.

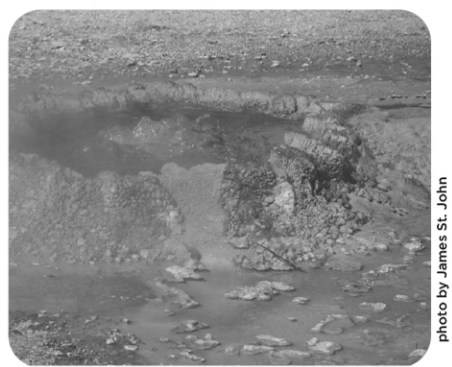
But many creatures can survive without any of these expected ingredients. They live in extreme conditions. These creatures might think the way we live is extreme. For example, oxygen would kill some of them.

**Changing our world**

These creatures may “breathe in” carbon dioxide or even metals such as uranium or arsenic. Many breathe out oxygen, much like we breathe out carbon dioxide. Experts believe these creatures helped create our oxygen-rich world billions of years ago. They make it possible for oxygen-breathing animals, including humans, to exist.

Most extremophiles are tiny creatures called **microbes** (MY-krobes). A microbe is too small to see without a microscope.

Millions of tons of microbes live beneath the Earth's surface. Experts believe the total weight of the microbes living under the surface is more than the total of all other life on Earth.



Bright extremophile bacterial mats exist alongside the Chinese Spring in Yellowstone. The spring's temperature averages 197.4 degrees. That's hot!

**Radiation lovers**

Microbes can live inside the water cores of nuclear reactors. They have even been found at the sites of nuclear disasters, such as Chernobyl in Ukraine in 1986.

Larger life forms, such as **fungi**, or mold, have also been found inside the radioactive Chernobyl reactor. Some fungi inside Chernobyl actually “eat” radioactivity.

Microbes have been found deep inside radioactive rocks in gold mines about two miles underground. The radioactivity prepares mineral food so the microbes can “eat” it.

These microbes live slow lives. They don't waste much energy. Their cells divide and reproduce as little as once every 300 years. In comparison, common microbes on the Earth's surface may reproduce every 20 minutes. Because they use so little energy, microbes in these radioactive rocks may live for millions of years.



After a disaster at a nuclear power plant called Chernobyl, a city in northern Ukraine was evacuated and deserted.

## Resources



**On the Web:**


- [bit.ly/MPextremophiles](https://bit.ly/MPextremophiles)

**At the library:**

- “Extremophiles: Life in Extreme Environments” by Harry Breidahl

## Try 'n' Find

Words that remind us of extreme beings are hidden in this puzzle. Some words are hidden backward and some letters are used twice. See if you can find:



ACID, BREATHE, CHERNOBYL, EARTH, ENERGY, EXTREME, FOOD, FUNGI, ICE, MICROBES, MICROSCOPE, MOLD, NUCLEAR, OXYGEN, POOLS, RADIOACTIVE, SURFACE, VENTS.

K	A	C	I	D	P	C	H	E	R	N	O	B	Y	L
P	O	O	L	S	X	H	N	U	C	L	E	A	R	Q
S	R	A	D	I	O	A	C	T	I	V	E	M	U	J
H	M	K	Z	M	I	C	R	O	S	C	O	P	E	Z
T	Y	F	U	E	X	T	R	E	M	E	C	U	E	B
R	A	E	H	T	A	E	R	B	V	F	U	N	G	I
A	D	L	O	M	J	H	S	T	N	E	V	I	W	N
E	C	A	F	R	U	S	F	E	N	E	R	G	Y	C
Q	B	K	E	C	I	G	W	N	E	G	Y	X	O	D
Y	N	S	E	B	O	R	C	I	M	T	F	O	O	D

## Cook's Corner


### Astounding Asparagus

**You'll need:**

- 1 pound fresh asparagus
- 1 tablespoon olive oil
- 1/4 cup sliced almonds
- 1/3 cup grated Parmesan cheese

**What to do:**


1. Break off bottom ends of asparagus spears.
2. Heat 2 inches of water in a large skillet until boiling.
3. Place asparagus spears in boiling water and cook for 2 minutes until bright green.
4. Remove asparagus from heat and rinse under cold water. Set asparagus aside.
5. Discard water from skillet. Heat olive oil in same skillet. Add asparagus and sliced almonds. Stir to coat with olive oil and heat through.
6. Sprinkle with Parmesan cheese and serve. Makes 4 to 6 servings.



\* You'll need an adult's help with this recipe.

## 7 Little Words for Kids


Use the letters in the boxes to make a word with the same meaning as the clue. The numbers in parentheses represent the number of letters in the solution. Each letter combination can be used only once, but all letter combinations will be necessary to complete the puzzle.



FREE	CHEE	PACI	ZER
PAJA	TAH	MAS	OUS
VAC	FIC	DOW	ION
AT	GEN	ER	SHA

Answers: freezer, Pacific, shadow, generous, cheetah, pajamas, vacation.


## Mini Jokes



**Fred:** What's the best kind of music to listen to when you fish?

**Fern:** Something catchy!

## Eco Note



Climate change will increase the financial costs of flooding across the United States by more than 25% by 2050, according to a new study published in Nature Climate Change. Researchers from England's University of Bristol used advanced modeling to determine that the annual cost of flood damage will increase from the current \$32 billion to \$40.6 billion in less than 30 years.

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## For later:

Look in your newspaper for articles about things living in extreme places and talk about them with your friends.

## Teachers:

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