

For 5 to 7 year olds

Context

Some living things, including microorganisms such as bacteria, can survive extreme environments on Earth; they are called extremophiles. Since some living things are so hardy, there is reason to believe that some form of alien life may exist in space, possibly under the surface of Mars. In this activity the children are introduced to a selection of Earth's extremophiles and their habitats. In contrast, they observe living things from under the surface of the school garden and carry out a practical comparative investigation of earthworms. Finally, they learn about the geography and features of Mars, and consider what kind of living things might survive on the red planet.



National curriculum links

Science:

- Identify and name a variety of plants and animals in their habitats, including micro-habitats
- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain find out about and describe the basic needs of animals

Resources

- Trowels or spades (optional)
- Containers
- Shoe boxes with lids or tidy trays
- Paper towels
- Soil
- Sand
- Gravel
- Grass or turf
- Magnifying lenses
- Earthworms

Lesson starter

Watch this video from 1:44:

www.esa.int/spaceinvideos/Videos/2016/05/Paxi_-_Do_Martians_exist

Scientists want to find out whether there are any living things on Mars but Mars is very cold and dry; there is no oxygen for them to breathe.

Show an image of Martian surface: marsmobile.jpl.nasa.gov/images/PIA17931_M34-sol528-wb-fi.jpg

Here on planet Earth, there are places like this and some living things can survive. Show the images of the extremophiles, 'Activity sheet 1.'

- If there are living things on Mars, what might they be like and where might they be? Possibly under the surface or hiding under rocks?



Main activity

Today we are going to investigate a living thing that we can find under the surface of the soil here on Earth! Let the groups observe an earthworm.

- How can we find out the kind of places earthworms like? For example, do they prefer dry soil or damp?
- Can the children think of more conditions to compare?

Make a list of their suggestions. Groups can decide which conditions they would like to investigate.

- How could we do this?

(You may choose to collect earthworms from the school grounds with the children, or provide them. See support notes for more information).

Set up trays to compare contrasting conditions and place earthworms in the middle of the trays. Allow a certain length of time for observations, eg five minutes and then record where the worms are. You could investigate:

- wet and dry soil
- light or dark conditions
- sand or gravel
- soil or grass

Plenary

- What conditions did the worms prefer?
- What kind of worm habitat would you recommend?
- What else could you investigate?

Explain that the Rosalind Franklin rover is going to dig under the surface of Mars to look for living things or things that once lived.

exploration.esa.int/mars/53910-exomars-rover/

These images show what the surface of Mars is like:
www.nasa.gov/mission_pages/msl/images/index.html

- Do you think Rosalind will find alien life there?

**Further activities**

- In a clear plastic container, set up a wormery (see support notes) and observe changes over several days. What do they eat? What eats earthworms? Draw a simple food chain to show this.
- Design an ideal worm home. Label your design.
- Investigate the living things under the soil in the school garden. Identify them. Make an identification chart for others to use.

STEM Vocabulary

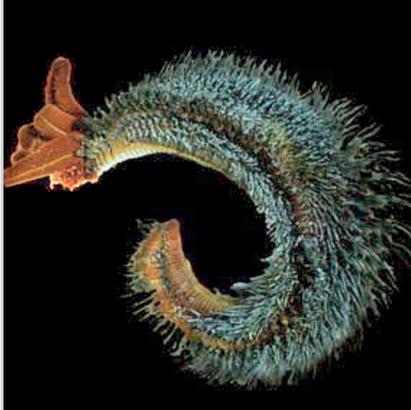
Habitat	Dry	Light
Wet	Dark	Extremophile



Methane worm

Survives in a bubble of methane in ice on the ocean floor

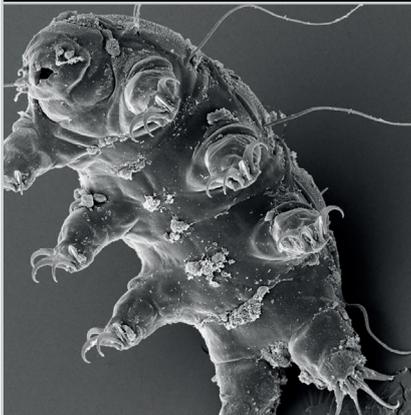
© NASA



Pompeii worm

Survives high temperatures in vents in the Pacific Ocean

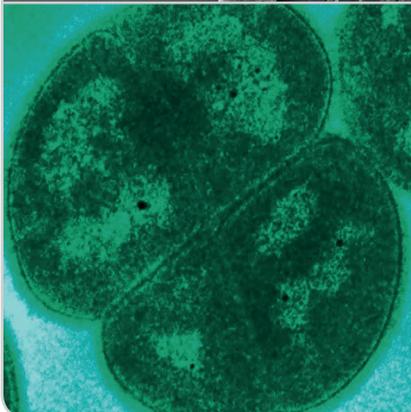
© University of Delaware College of Marine Studies



Tardigrade

Found on the highest mountains and in the deepest seas

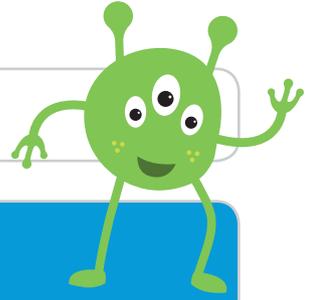
© ESA / Dr. Ralph O. Schill



Deinococcus radiodurans

Found in various extreme habitats including Antarctica and elephant dung!

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Draw where the worms are after five minutes

wet	start	dry

soil	start	sand