

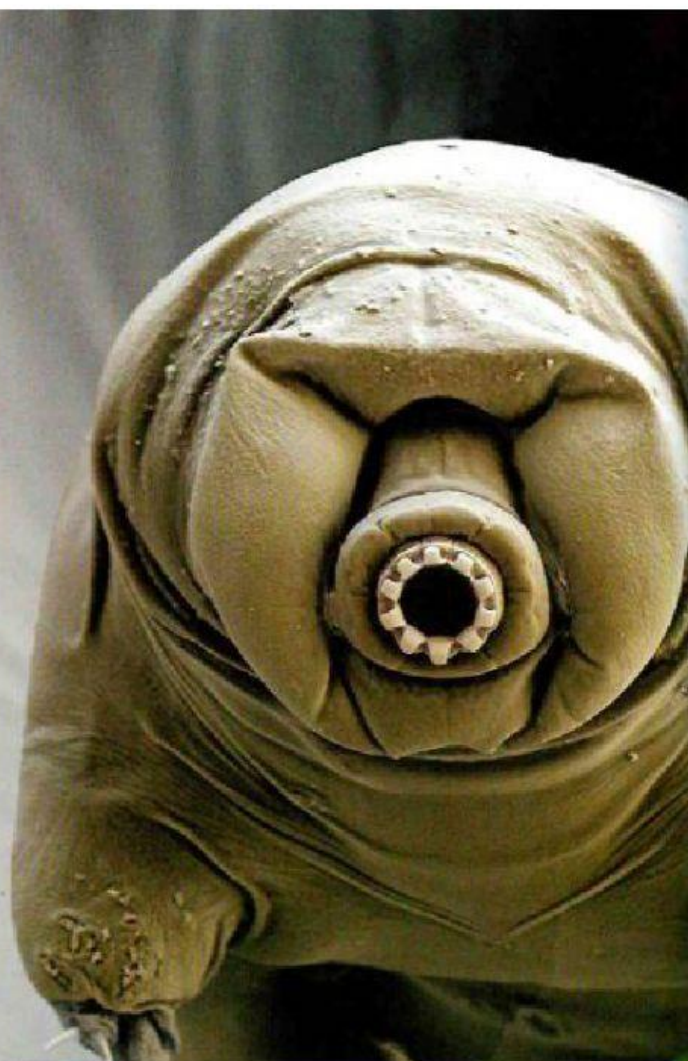
1 What are the necessary elements for life?

Discuss. Then listen and read.  053

Have you ever wondered how polar bears can **handle** the extreme cold of the Arctic? On a **typical** day, Arctic temperatures can be as low as -30°C (-58°F). That's *really* cold! And what about camels? How can they survive in the heat of the Sahara Desert, where it sometimes reaches 50°C (122°F)? It's because these animals have **adapted** to their **harsh environments**. However, like other **mammals**, the polar bear and the camel can only exist in a certain range of **conditions**. But there are much smaller creatures that can live in far more extreme environments.

One example of an amazing survivor is the tardigrade. Nicknamed the 'water bear', this tiny organism is less than a millimetre long. Tardigrades can handle temperatures from -200°C (-328°F) to 151°C (304°F). They can survive despite a **lack of** water and **oxygen**. They can even survive in outer space! In 2011, scientists successfully sent tardigrades to the International Space Station on the space shuttle *Endeavour*.

Apart from the tardigrade, there are many **varieties** of even smaller, single-celled microbes that scientists refer to as **extremophiles**. These microscopic organisms live in some of the harshest environments on the planet. Some live in places where there are very high **levels** of salt, like the Dead Sea. Others live within solid rock. Extremophiles like very hot or very cold environments.



Strain 121, for example, is a type of bacteria with remarkable abilities to tolerate temperatures of 121°C (250°F). It lives on a volcanic vent at the bottom of the Pacific Ocean and feeds on iron! Methanogens, on the other hand, **thrive** under 18 m. (60 ft.) of Antarctic ice, where there is no light and no oxygen.

Scientists find these organisms very interesting because they help us understand how **life** might exist on other planets. 'We're looking for worlds where [the necessary elements] for life can be found,' explains astrobiologist Kevin Hand. 'We want to know, what does it take for a world to be habitable?'

2 LEARN NEW WORDS Listen and repeat. 054

4 Read and write the words from the list. Make any necessary changes.

condition	environment	handle	harsh	lack of
level	life	thrive	typical	variety

In 2004, National Geographic Explorer Kevin Hand and film director James Cameron went on a deep-sea expedition to a mid-ocean ridge. There they discovered a _____ of different animals living in this _____ 3,600 m. (11,800 ft.) below the surface of the sea. It's a _____ place to live because of the high _____ of poisonous chemicals in the water. There is also a complete _____ light. However, animals like giant tube worms, crabs and vent fish can _____ these extreme _____. Although the water is extremely hot and full of chemicals, they don't just survive - they _____ here.

5 **LEARN NEW WORDS** Listen to these words and match them to the synonyms.

Then listen and repeat. 🔊 055 056

creature	exist	remarkable	tolerate
1. _____ to be		3. _____ interesting	
2. _____ animal		4. _____ to handle	