# Go to the Extreme



Explore EXTREME habitats where amazing LIFE FORMS SURVIVE!

John Parsons

Nelson Literacy Directions

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Vampire squids, fearsome fish and other strange creatures move through the murky depths of the ocean.

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High above Earth, the air is still full of life.

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Many kilometres beneath Earth's surface, there are living things that like to be SQUEEZED!



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Some organisms live in the most extreme places.



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TEXT TYPE
Description

Classroom Use Only

# 1 Hot and Dark

Imagine you're deep underwater. It's pitch black. You're feeling your way around. Suddenly, your gloved hand touches something extremely hot. Poisonous chemicals surround you!

**Place:**
Ocean depths – more than 10 000 metres underwater

**Description:**
Dark, extremely hot, poisonous

**Extreme Life Forms:**
Bacteria

## Where There Is Sun

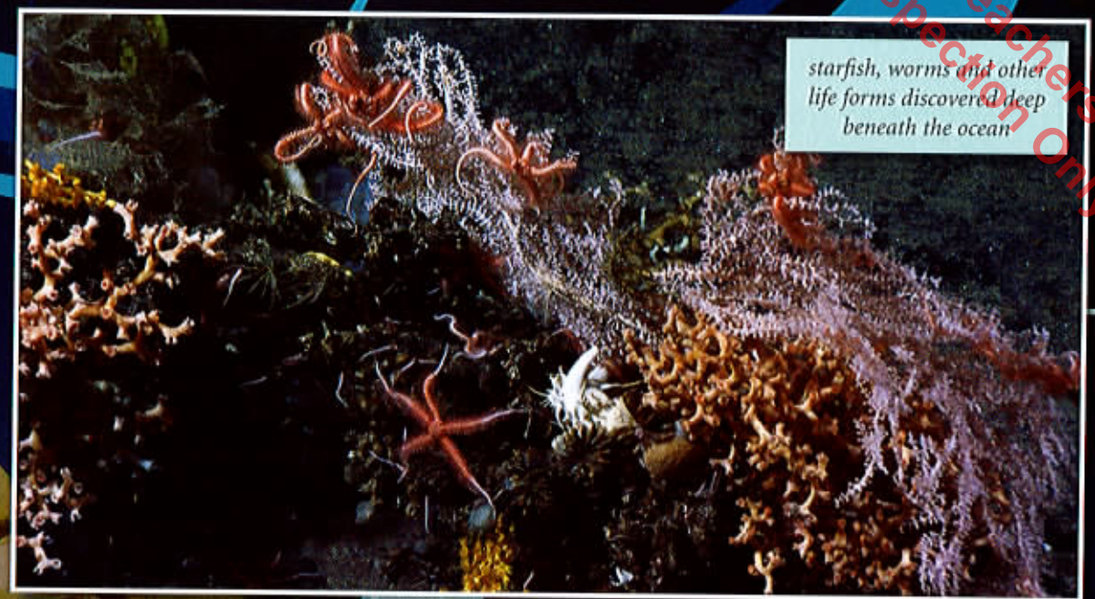
Each plant or animal's energy comes from the Sun first of all. Plants use the Sun's energy to live and grow. When animals eat plants, they use the plants' energy to help them live and grow.

## Where There Is NO Sun

But what if plants live in the deepest oceans where there is no sunlight?

Living things in deep ocean trenches can get their source of energy from vents – see page 6.





*starfish, worms and other life forms discovered deep beneath the ocean*

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## Dark Oceans

*In the ocean, less than one per cent of sunlight can reach deeper than 200 metres. The area deeper than this is known as the aphotic zone ("aphotic" means "no light").*



*sunlight reaching life in the ocean*

## Energy from Vents

Where there is no sun, living things can get energy from **volcanic vents**. These are cracks in the sea floor that release boiling water and steam. The water and steam bubble up like an underwater geyser. These cracks are also called **hydrothermal vents**.

## What Lives in the Boiling Water?

There are minerals and chemicals in the boiling water. Most bacteria would not survive here but some bacteria do. Hundreds of bacteria grow and form huge mats around the volcanic vents.

**HYDROTHERMAL**

"Hydrothermal" is to do with hot water or gas: (*hydro* = water; *thermal* = heat)

Earth Science

### What Are Bacteria?

*We call one of these single-celled living things a bacterium. If there are more, we call them bacteria. One type of bacteria, called Nanoarchaeum equitans, live in a volcanic vent near Iceland. They are the smallest known living things! This single-cell bacterium measures only 400 nanometres in diameter. One nanometer is one-millionth of a millimetre. That's small!*



*bacteria near volcanic vents*



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Earth Science

### Invertebrates Around Vents

*Invertebrates are animals without backbones. Slugs, clams, crabs, moths and snails are all invertebrates. Vertebrates are animals with backbones. Humans, horses, dolphins and birds are all vertebrates.*

*Most animals that live around volcanic vents are invertebrates. But vertebrates cluster around one vent off the coast of Samoa. Thousands of eels gather there. They feed off other animals. The locals call it "eel city"!*



*volcanic vents*

## A Deep, Hot Ecosystem

Slugs graze on the bacteria mats around the vents. In turn, slugs are eaten by small, armoured snails, blind shrimps, crabs and worms. Even though the vents are dark, boiling hot and give off poisonous chemicals, a whole ecosystem continues to form around them!

# 2 Cold and Dark

Imagine you're deep beneath the ocean's surface. It's pitch black. Stinking poisonous gases bubble around you. The worst is rotten-egg gas (hydrogen sulphide). It's freezing cold and you shiver!

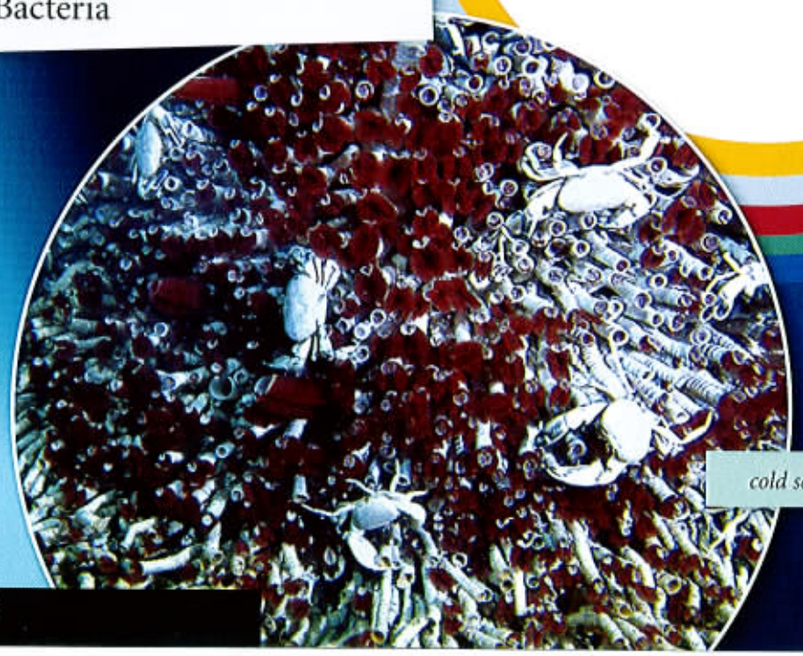
**Place:**
Ocean depths – more than 3000 metres under water

**Description:**
Dark, freezing cold, poisonous

**Extreme Life Forms:**
Bacteria

## Cold Seeps

Other deep, dark parts of the ocean floor leak poisonous gases and salty chemicals. The gases can seep into the water. These places are called cold seeps or cold vents. There is no heat or warmth coming from the ocean floor or the Sun.



*cold seeps*



## What Lives Around Cold Seeps?

Some bacteria live around cold seeps. They use the gases to produce food and energy. Tube worms also live around cold seeps. Scientists have found that some tube worms can live for 250 years!



*tube worm*

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## Where Are Cold Seeps?

Some of the cold seeps are:

- off the coast of Africa
- in the Sea of Japan
- in the Gulf of Mexico.

The deepest cold seep is over six kilometres below the ocean's surface.