

Hot & Cold Places



VIPERS
Comprehension Pack



Climate Zones

Weather and climate are different things. The weather is what is happening at a specific time. If it is raining or sunny, hot or cold, that is the weather. The climate is the type of weather that a place gets over a long period of time. There is sometimes rain in a desert, but the climate is still arid.

Tropical

Tropical climates are hot and humid. They are close to the equator. Many of the world's rainforests are found in tropical climates. Animals that live in tropical areas have adapted to living in hot areas.

Arid

Deserts are arid areas. These places have high temperatures and not a lot of rainfall. Places with an arid climate tend to be just north and south of the equator. They don't benefit from the same rainfall that tropical areas get.

Mediterranean

The Mediterranean climate isn't just found in the Mediterranean area of Europe. Parts of North Africa, South Africa and Australia also have a Mediterranean climate. These places have warm, sunny summers and wet but mild winters.



Temperate

Britain has a temperate climate. The temperature in temperate areas is generally mild. Summers don't get too hot, and the winters are cold but not too cold.

Temperate climates have four distinct seasons throughout the year.

Polar

Polar climates are very cold with lots of snow. Summers have long days but remain cold. Winters have very short days and are even colder.

VIPERS QUESTIONS

S

What is the difference between the weather and climate?

S

How is a Mediterranean climate different to a temperate climate?

V

What does the phrase "mild winters" tell you about the Mediterranean climate?

R

Which climate zone has four distinct seasons?

V

What does the word "remain" mean?

Stay the same

Change

R

Which climate zone has the most snow?

R

Which climate zones are just north and south of the equator?



Coldest Places On Earth

Lots of places around the world get very cold. Water freezes at 0°C , but many places are colder than that all of the time. These are some of the coldest places on Earth.

Dome Fuji, Antarctica

This is officially the coldest place on Earth. The temperature dropped to -93.2°C in 2010. Scientists used satellites to measure the temperature from space. Temperatures at Dome Fuji rarely get above -30°C . Scientists live here throughout the year. They take samples from the ice. These tell them about the history of the planet. If you want to visit, you'll definitely need a coat!

Vostok Research Station, Antarctica

This was the coldest place on Earth until 2010, when Dome Fuji took the record. The temperature here in 1983 was recorded at -89.2°C . This is also one of the sunniest places in the world, strangely. There are over 22 hours of sunlight each day during December. The sunlight isn't powerful enough to melt the snow and ice. Scientists have discovered microbes living in the water underneath the ice!

Braemar, Aberdeen and Altnaharra, Sutherland.

These two places aren't the coldest in the world, but they are the coldest in Britain. Both of them are in Scotland. The coldest temperature in Britain is -27.2°C . This was recorded in Braemar in 1895 and 1982. Altnaharra plummeted to that temperature in 1995.



Oymyakon, Siberia

The scientists that work at Dome Fuji and Vostok Research Station don't live there permanently. Oymyakon is the coldest place in the world where people live permanently. The lowest temperature ever recorded there was -67.7°C . Apparently, schools will only shut if the temperature drops below -55°C ! Think about those poor children the next time your school is a bit chilly!

RETRIEVAL FOCUS

1. At what temperature does water freeze at?
2. Where is the coldest place on Earth?
3. What was the coldest temperature at Vostok Research Station?
4. Where is the coldest places in Britain?
5. How cold must it be for Oymyakon schools to close?

VIPERS QUESTIONS

V

What does the word "plummeted" mean?

Dropped

Rose

Stayed the same

S

Where was the coldest place before Dome Fuji?

I

Why might the author have meant when they said "you'll definitely need a coat"?

V

Find a word that means somebody lives somewhere all of the time.



Hot And Cold Animals

Humans have not evolved to live at extreme temperatures. We need to use technology and clothing to keep ourselves warm or cool. Many animals have adapted to living in very difficult conditions.

Wood Frogs

Temperatures in Alaska can plummet to as low as -18°C for months of the year. Wood frogs have adapted to these temperatures by freezing solid. They pack their cells with sugar so that they aren't damaged. The frogs are so good at preserving themselves when frozen that they can last longer than many frozen meals. The record seems to be around seven months.

Red Flat Bark Beetle

These tiny beetles live all the way across North America and up to the Arctic Circle. This means that they have to tolerate hot American summers and freezing Arctic winters. They can survive at temperatures down to around -50°C . Their larvae can survive even lower temperatures. Some scientists believe that they can survive down to -100°C . To help them to survive, their blood is filled with something very similar to antifreeze in cars. This means that their blood doesn't freeze.

Pompeii Worms

Nobody knew that Pompeii worms existed until they were discovered in the 1980s. Scientists didn't think that animals could survive at extremely hot temperatures. Pompeii worms live near vents at the bottom of the ocean. Temperatures there



can reach 80°C. They are also very deep underwater. The water around the vents is extremely cold.

Sahara Desert Ants

Until Pompeii worms were discovered, the Sahara desert ant held the record for surviving at extremely hot temperatures. They can survive temperatures over 60°C. One of the ways they avoid overheating is by being very fast. This means that they aren't in contact with the hot sand for very long. They can run as fast as 90cm in a second. That's equivalent to a human running 360 miles per hour! It is the only ant that can gallop. This means all of its legs leave the ground when it runs, much like a horse.

RETRIEVAL FOCUS

1. How cold can it get in Alaska?
2. Which animals live in cold areas but don't freeze?
3. When did scientists discover Pompeii worms?
4. How fast can Sahara desert ants run?
5. Where do Pompeii worms live?

VIPERS QUESTIONS

S

How do red flat bark beetles avoid freezing?

V

Which of these words means "found"?

extremely deep discovered

S

How does running fast help Sahara desert ants?

E

How are Pompeii worms and Sahara desert ants linked?

V

Which word tells you that the water around the vent is very cold?



Hottest Places On Earth

We've all felt hot at some point in our life. Many people have different ways of remaining cool. They might visit the beach or splash in a paddling pool. Some places are too hot to go out. People living in these places try their hardest to escape the sun as much as they can. Most of the hottest places are near the equator. This is a line around the middle of the Earth and gets the most sun.

Death Valley, California

Scientists measure the temperature of a place in several ways. They can measure the temperature of the air or the temperature of the ground. Sometimes these are different. Death Valley has the record for the hottest air temperature. It was measured as 56.7°C in 1913. This was at a place called Furnace Creek. Scientists measured the temperature again in 2021. It was 54.4°C! The average temperature is 47°C in the summer.

Mitribah, Kuwait

Mitribah isn't home to many people, but it is very hot. It is the hottest place in Asia. The temperature in 2016 was recorded as 53.9°C. That is the third-highest temperature ever recorded on Earth.

Ghadames, Libya

People living in Ghadames build huts from mud to protect them from the heat of the sun. These are now protected as a World Heritage Site. The average temperature during the day is 40°C. They get between 10 and 12 hours of sun throughout the year. This means they need a lot of protection.



Faversham, Kent

The hottest temperature recorded in Britain was in Faversham in Kent. The temperature soared to 38.5 in August 2003.

The Isles of Scilly

The hottest temperature in Britain may have been in Faversham, but the Isles of Scilly are the warmest place in Britain on average. The average temperature here is 11.9°C.

VOCABULARY FOCUS

1. Find a word in the first paragraph that means “keeping”.
2. What is the equator?
3. If something is “protected”, what does it mean?

VIPERS QUESTIONS

R

Where are most hot places?

R

Where in Death Valley was the hottest temperature recorded?

R

Where is the hottest place in Asia?

S

Why do people need lots of protection in Ghadames?

I

Why might the author have included the hottest places in Britain?



Your Body

Human beings have evolved to live at comfortable temperatures. If your body gets too hot or too cold, then it can be very dangerous. Luckily, there are lots of signs that you might need to move somewhere warmer or cooler.

What happens when you get too cold?

If your body starts to lose heat quicker than it can produce it, it is called hypothermia. This is a medical emergency. Your normal body temperature is roughly 37°C. Hypothermia occurs at 35°C. That isn't a big difference. It is important to remember that your body is very good at keeping you warm. It will only drop to that temperature if you are in a very cold place or aren't prepared for the weather. It can also be caused if you are exposed to very cold water.

Shivering is your body's first way of warming itself up. Your muscles move around to generate heat. This is a good thing, but it is the first sign that you are getting too cold. The best way to stay warm is to wear lots of layers of clothing and try to stay dry.

Other signs to look out for include:

- Slurred speech.
- Mumbling.
- Slow breathing.
- Being clumsy.
- Feeling drowsy.

Treating hypothermia needs a hospital. You are much better trying to avoid it altogether by staying warm.



What happens when you get too hot?

Human bodies do not cope well with lots of heat. The first thing it does is send more blood to the skin to cool down. This causes the body to sweat. When you sweat, you lose water. This can lead to dehydration. In places where the temperature is warmer than your body, the only way to lose heat is through sweat.

If your body heats up to 40°C, you will likely get heat exhaustion. Lots of things in your body will start to go wrong at this temperature. If a person gets this hot, then the body stops sending blood to the skin. This means that they do not sweat and so it is very hard to cool back down. If the person doesn't cool down quickly, they will get heatstroke. This requires treatment in the hospital and is very serious.

A good way to cool somebody down is to bathe in cold water. The arteries in the groin and armpits are the biggest. Keeping these areas cool with water can help the most.

One of the most important things is to keep hydrated. This means drinking lots of water throughout the day.

RETRIEVAL FOCUS

1. When might you get hypothermia?
If you are too hot If you are too cold
2. What is the normal body temperature?
3. At what temperature might you get hypothermia?
4. How can your body try to warm itself up?
5. What might you get if your body reaches 40°C?

VIPERS QUESTIONS

S

What causes hypothermia?

V

What is the word that describes not having enough water in your body?

S

Why are the arteries in the groin and armpits important?

S

Why should you wear a coat when it's cold?

Answers - Stage 2 - Climate Zones:

S: The weather is what is happening day to day, but climate is what happens over a longer period of time

S: A Mediterranean climate has warm winters, temperate climates have cold winters

V: They aren't very cold

R: Temperate

V: Stay the same

R: Polar

R: Arid

Answers - Stage 2 - Coldest Places on Earth:

1. 0°C
2. Dome Fuji
3. -89.2°C
4. Braemar and Altnaharra
5. -55°C

V: Dropped

S: Vostok Research Station

I: It is very cold, so you will need a coat to stay warm

V: Permanently

Answers - Stage 2 - Hot And Cold Animals:

1. -18°C
2. Red flat bark beetle
3. The 1980s
4. 90cm in a second
5. At the bottom of the ocean near to vents

S: Their blood is filled with antifreeze

V: Discovered

S: Their feet don't touch the hot sand for very long

E: They both live in hot climates

V: Extremely

Answers - Stage 2 - Hottest Places on Earth:

1. Remaining
2. A line around the middle of the Earth
3. They cannot be damaged

R: Near to the equator

R: Furnace Creek

R: Mitribah

S: They get a lot of sun throughout the year

I: To show how hot they get compared to other places in the world

Answers - Stage 2 - Your Body:

1. Too cold
2. 37°C
3. 35°C
4. Shivering
5. Heat exhaustion

S: When your body loses heat quicker than it can produce it

V: Dehydration

S: They are the best way to cool somebody down

S: It will help to keep your body warm