



Adaptations



Adaptation is the process in which an organism (living thing) adapts to their environment to ensure a better chance of survival. All living things that we see today have adapted to survive. An example is the giraffe. This species, over hundreds of thousands of years, have evolved to have a long neck. That long neck gives them access to the topmost leaves on the tall trees of the savannah, thus giving them a reliable food supply and enhancing their chances of survival.

Adaptations usually occur because of genetic mutations. An animal in a species may be born with a distinct feature, such as a longer neck, that helps them survive in their environment. The offspring of that animal will likely be born with that feature and benefit as well. That strong gene continues to be passed on, helping future generations survive. Animals or plants that don't have strong genes, such as a shorter neck, eventually die out because they haven't adapted to survive.

The environment that an organism lives in determines the kind of adaptations needed to survive. For example, animals that live in colder climates require adaptations that keep them warm. Animals that live in the wide-open savannahs of Africa require strong leg muscles to move quickly from place to place. Adaptations are all around us, all you need to do is look in the mirror to see a whole bunch of them!



1. What is an organism?

2. What is adaptation?

3. What is one example of an adaptation?

4. How do adaptations occur?

5. What does the last line in the text mean?



Types of Adaptations



There are three types of adaptations; structural, behavioral and physiological. Structural adaptations relate to the physical nature of an organism. Behavioral adaptations are things organisms do in order to enhance their chances of survival. Physiological adaptations are body processes that occur on the inside of an organism.

It is easy to name structural adaptations because they are easy to see. Lions have vicious claws that can kill their prey within seconds. Giraffes have long necks that give them exclusive access to the tops of trees. Humans are bipedal (they walk on two legs) which frees up their hands to hold weapons, cook food etc. Elephants have large flappy ears that keep them cool.

Behavioral adaptations are also easy to list because we observe them in nature every day. Bears hibernate in winter to conserve energy. Birds migrate seasonally to find more food. Wolves hunt in packs to give themselves a better chance of catching prey. Humans work in families and communities to ensure their young survive. Penguins huddle to avoid the freezing winds of Antarctica.

Physiological adaptations can be challenging to list. Snakes produce venom to defend themselves and catch food. Spiders make webs to catch flies. Cold-blooded animals are able to survive in colder climates. Camels can conserve water which enables them to survive the harsh desert environment. How many adaptations do you know?



1. What are the three types of adaptations?

2. Give one example of each type of adaptation.

3. What does 'bipedal' mean?

4. Name one adaptation and explain how it helps that organism survive.

5. Name three adaptations that would help an organism survive in a cold climate.



Charles Darwin



Charles Darwin is known as the father of evolution. He was an English scientist who studied nature in the 1800s. Charles is known for his theory of evolution by natural selection. His research found that organisms which have the most helpful traits for their environments were most likely to survive. These traits would then be passed onto their offspring who would also have a good chance of survival. This would continue for thousands of years. Organisms with strong genetics (traits) would survive, and those with inferior features would die young and therefore wouldn't pass their (weak) genes onto offspring. In this way, only the strongest genes would get passed on to the next generations. This is called 'survival of the fittest'.

Charles' research had some fascinating findings. In one study of mice, he compared black mice to white mice. These particular mice lived in an area with very dark rocks. At one point, half of the mice were black, and half were white. The white mice were more visible to birds than the black mice. This meant white mice were eaten more often than black mice, and only the surviving mice could produce offspring. As black mice had a greater chance of having offspring, the next generation of mice contained more black mice than white mice. This would continue until there were no white mice left. This was a perfect example for Charles to document in his research. It clearly showed that organisms who adapt to their environment have a greater chance of survival. Charles wrote and presented his theory in 1858 and published his book 'On The Origin of Species' in 1859. He is one of the greatest scientists of all time.



1. What is Charles Darwin known for?

2. What did his research find?

3. What is offspring?

4. Explain how the black mice had a greater chance of surviving.

5. What did his research on mice prove?



Giraffe Adaptations



Giraffes are fascinating animals. They have been evolving for millions of years and have many interesting adaptations that help them survive in their environment. Giraffes predominantly live in savannah areas in the sub-Saharan region of Africa.

Their structural adaptations allow them to feed easily and also to defend themselves against predators. Giraffes are the tallest animals in the world at an average height of around 5m. Their height and long neck allows them to eat leaves that other animals could only dream of eating. This is a significant advantage. Imagine having a buffet all to yourself...that's the life of a giraffe. Their long tongues can pull leaves from trees and their spotted patches are used for camouflage. Giraffes have strong legs that help them run fast and defend against predators in the savannah.

Behaviorally, giraffes like to gulp water. This adaptation means they can drink large amounts of water quickly without choking. Giraffes can drink up to 45 liters (10 gallons) of water in just a few minutes! Furthermore, they are an intelligent species. Their intelligence has an impact on their behavioral adaptations as their environment changes. Physiologically, Giraffes can produce thick saliva that forms a protective coating around its tongue. This allows the giraffe to eat from trees with thorns, something that other animals cannot do.

Giraffes have truly adapted to their environment and are worthy members of the savannah.

1. Where do giraffes predominantly live?

2. Name three structural adaptations of giraffes.

3. What does the author mean when they say giraffes have a buffet all to themselves?

4. Why do giraffes gulp water?

5. Why do they produce thick saliva?





Emperor Penguins



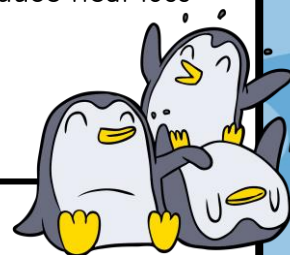
Antarctic animals are exposed to some of the coldest environments on earth. Emperor penguins have many adaptations that ensure they survive in these harsh conditions.

They have a thick, windproof coat. Many Antarctic animals have either a windproof or waterproof coat. Emperor penguins are a very good example of this. These birds have four layers of scale-like feathers. These layers overlap each other, forming a good protection from the wind, even in blizzard conditions. They also have a layer of thick blubber to keep them warm. These fat layers act like insulation, trapping body heat in. This is a little like wrapping yourself in a blanket, but on the inside. Blubber layers can also be used as an energy reserve.

Physiologically, emperor penguins can dive to a depth of 1,800 feet (550 meters) and hold their breath for up to 22 minutes, so are able to reach and exploit food resources that other birds can't reach.

Emperor penguins have unique behavioural adaptations that enable them to survive the harsh winter. They form large huddles. Not only does this share body warmth, but it also shelters many of the penguins from the effects of the wind. By alternating which penguins are exposed to the wind, this benefit is shared equally amongst the group. Huddling can reduce heat loss by up to 50%.

Emperor penguins are fascinating animals and have adapted well to survive.



1. How many layers of scale-like feathers do they have?

2. What does the author compare blubber to?

3. Why is it important for penguins to be able to hold their breath for a long time?

4. Why do penguins huddle?

5. Write down three penguin adaptations and why they're important.



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Adaptations usually occur because of genetic mutations. An animal in a species may be born with a distinct feature, such as a longer neck, that helps them survive in their environment. The offspring of that animal will likely be born with that feature and benefit as well. That strong gene continues to be passed on, helping future generations survive. Animals or plants that don't have strong genes, such as a shorter neck, eventually die out because they haven't adapted to survive.

The environment that an organism lives in determines the kind of adaptations needed to survive. For example, animals that live in colder climates require adaptations that keep them warm. Animals that live in the wide-open savannahs of Africa require strong leg muscles to move quickly from place to place. Adaptations are all around us, all you need to do is look in the mirror to see a whole bunch of them!



1. What is an organism?

An organism is a living thing.

2. What is adaptation?

Adaptation is the process in which an organism adapts to their environment to ensure a better chance of survival.

3. What is one example of an adaptation?

Giraffes long neck, elephants nose, lions claws, sharks teeth etc.

4. How do adaptations occur?

Adaptations usually occur because of genetic mutation. An animal may be born with a distinct feature that gives them an advantage.

5. What does the last line in the text mean?

It means that humans have many adaptations that they can see just by looking in the mirror.



Types of Adaptations



There are three types of adaptations; structural, behavioral and physiological. Structural adaptations relate to the physical nature of an organism. Behavioral adaptations are things organisms do in order to enhance their chances of survival. Physiological adaptations are body processes that occur on the inside of an organism.

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Physiological adaptations can be challenging to list. Snakes produce venom to defend themselves and catch food. Spiders make webs to catch flies. Cold-blooded animals are able to survive in colder climates. Camels can conserve water which enables them to survive the harsh desert environment. How many adaptations do you know?



1. What are the three types of adaptations?

The three types of adaptations are structural, behavioural and physiological.

2. Give one example of each type of adaptation.

Answers will vary. Lions have sharp claws, Bears migrate and snakes have venom.

3. What does 'bipedal' mean?

Bipedal means that an organism can walk on two legs.

4. Name one adaptation and explain how it helps that organism survive.

Answers will vary.

5. Name three adaptations that would help an organism survive in a cold climate.

Thick coat of fur, blubber under the fur, huddling to protect from the wind, white fur to use as camouflage, cold blood etc.



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1. What is Charles Darwin known for?

Charles is known for his theory of evolution by natural selection.

2. What did his research find?

His research found that organisms which have the most helpful traits for their environments were most likely to survive. These traits would then be passed on.

3. What is offspring?

Offspring are organisms young/babies.

4. Explain how the black mice had a greater chance of surviving.

They had a greater chance of surviving because they were camouflaged by the dark rocks, whereas the white mice were not and therefore exposed to predatory birds.

5. What did his research on mice prove?

His research on mice showed that organisms who adapt to their environment have a greater chance of survival.





Giraffe Adaptations



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Giraffes have truly adapted to their environment and are worthy members of the savannah.

1. Where do giraffes predominantly live?

Giraffes predominantly live in savannah areas in sub-Saharan Africa.

2. Name three structural adaptations of giraffes.

Tall, long neck, long tongue, spotted patches, strong legs.

3. What does the author mean when they say giraffes have a buffet all to themselves?

It means they have access to food that no one else can get to, which means they have no competition for food.

4. Why do giraffes gulp water?

To drink large amounts of water quickly without choking.

5. Why do they produce thick saliva?

They produce thick saliva so they can eat from trees with thorns. The saliva protects their tongue.





Emperor Penguins



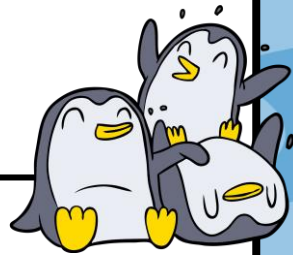
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Emperor penguins are fascinating animals and have adapted well to survive.



1. How many layers of scale-like feathers do they have?

They have four layers of scale-like feathers.

2. What does the author compare blubber to?

They compare it to wearing a blanket on the inside.

3. Why is it important for penguins to be able to hold their breath for a long time?

It is important because it gives them access to food that other animals can't reach.

4. Why do penguins huddle?

They huddle to share body warmth and to protect each other from the wind. They rotate the circle so they aren't all exposed at the same time.

5. Write down three penguin adaptations and why they're important.

Blubber is important for keeping them warm in the cold conditions. Holding their breath is important to get to food deep in the water. Huddling is important for staying warm.