Brainstorm Adaptations

Middle School

Objectives

MSLS4-2

- Review the types of Vertebrates
- Learn about the different types of adaptations.
- Discover how an environment could change over time leading to new adaptations.
- Research your animals present day anatomical characteristics and environment. Brainstorm your animals future adaptations.

Vocabulary

- Rainforest
- Adaptations
- Physical/Structural
- Physiological
- Behavioral
- Camouflage
- Defense Structures
- Forage
- Locomotion
- Habitat

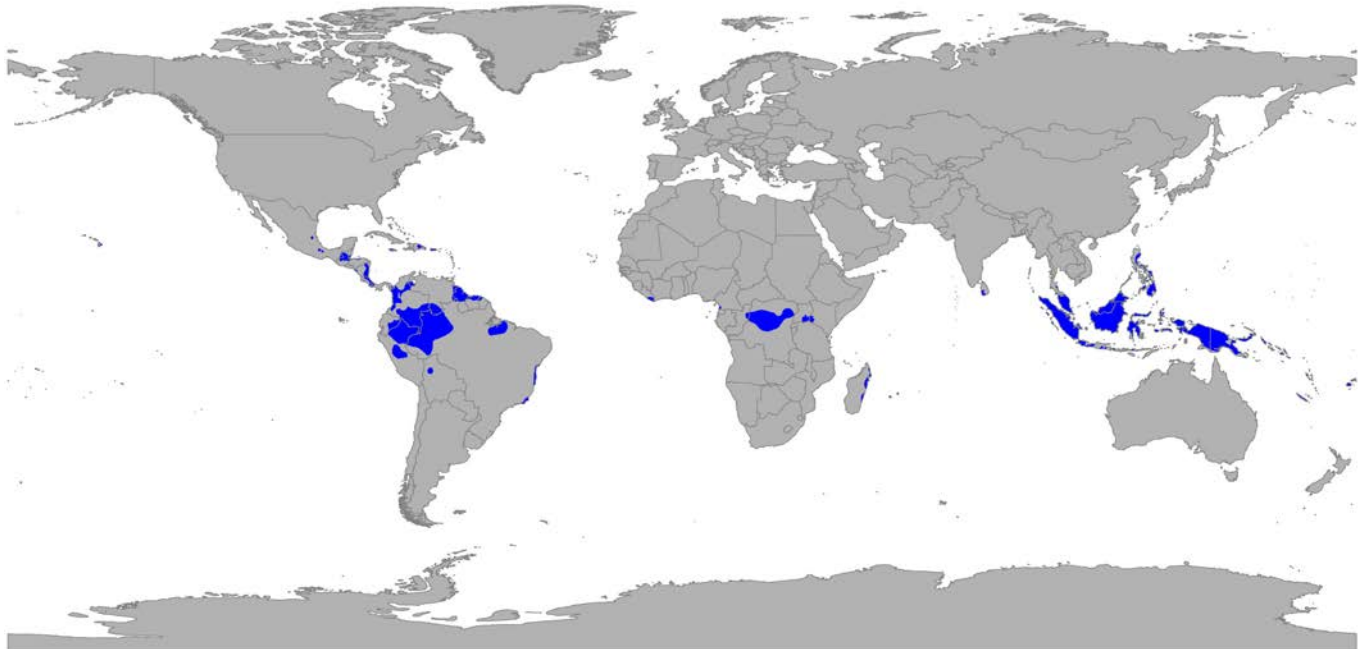
You will need to pick a tropical rainforest vertebrate for your future creature entry. First let's learn about rainforests and the types of vertebrates that live in them. Then, we will dive into the types of adaptations they have.

What is a rainforest?

Discuss with at partner for 30 seconds.

Rainforests

Rainforests make up less than 2% of all the world's land surface but they contain over ½ the world's animal and plant species.
Often called the "lungs of the Earth", rainforests absorb large amounts of carbon dioxide and produce 20-30% of the world's oxygen.



Tropical Rainforests

Tropical rainforests are hot and wet. They receive an average of 66-390 inches of rain per year.

They are extremely lush and dense in vegetation, providing shelter for the whopping 40%-75% of all the Earth's living organisms.

Let's look at some examples of tropical rainforest vertebrates (mammals, birds, reptiles, amphibians & fish).

Mammals

Mammals have four limbs, are warm blooded and have hair or fur.

Leopards, anteaters, monkeys, sloths, tapirs, giant otters, and Amazon river dolphins are just the tip of the trees when it comes to rainforest mammals. There are over 400 species of mammals in the Amazon (largest rainforest) alone.

What other examples of rainforest mammals can you think of?

Birds

Birds are feathered, warm-blooded vertebrates. They have toothless beaked jaws, lay hard shelled eggs, and a have a lightweight skeletons.

The rainforest are homes to over 1,300 bird species. This amounts to over 1/3 of all the bird species on the planet.

Toucans, parrots, eagles, vultures, quetzals (like the one pictured), kingfishers are few of the birds that live in rainforests.

Reptiles

Reptiles are cold blooded, egg-laying, vertebrates with scales.

Rainforests are home to 378 species of reptiles including caiman, green green iguanas, anacondas, various snakes (like the one pictured) and turtles.

Amphibians

Amphibians are cold-blooded animals that start off being aquatic (living in the water) with gills just like fish. Later, they develop lungs and become terrestrial (live on land) or are semi-terrestrial.

There are over 400 species of rainforests amphibians. Included are a variety of salamanders, newts, toads and frogs, like the poison dart frog in this picture.

Fish

Rainforest are home to around 3,000 species of freshwater fish.

This list of fish, includes piranha (pictured), electric eels, catfish, bull sharks, pacus and pancake stingrays.

Once you pick your creature, it's time to brainstorm adaptations. But first, let's look at the types of adaptations animals can have.

Adaptations

An adaptation is an anatomical (body) feature or behavior that helps an animal or plant survive in a specific environment. Adaptations can help animals forage (get food), regulate temperature, defend against predators and move them from place to place.

Anatomical (body) features can be structural/physical or physiological.

For example, a structural adaptation is the shape of hummingbirds. Its beak is specifically adapted to be long to reach the nectar in flowers.

Adaptations

A physiological adaptation is an internal anatomical (body) adaptation that an animal has to help it survive. What we mean by internal is that the animals body will do or produce something automatically. The animal does not have to tell its body to do it.

Some examples of physiological adaptations are producing venom, making milk and making mucus. Another great example is the desert horned lizard which will squirt blood from its eyes to deter predators.

Environment

Animal adaptations are influenced by the environment they live in.

Lets take a look some environmental factors that can lead to adaptations.

- Habitat
- Temperature

Habitat

Changes in the environment often dictate what animal adaptations are passed on from one generation to the next. Consider a habitat that starts to get more rain. More rain will mean vegetation (ex. Trees) will grow taller. How will this effect animals that eat the leaves of trees? Will animals with long or short necks be better at getting food?

If you think long necks, you are correct. This exactly how giraffes ended up with super long necks!

How will the change in your creatures habitat effect your creature? What kind of shelter will it seek? Will it need to find a new type of food? What traits will be selected for in order for it to survive?

Temperature

Animals have different ways of regulating temperature. It is important that animals don't overheat or freeze to death.

Even the slightest temperature change in an environment, can be a big deal to a creature. Feathers and hair are adaptations to keep mammals and birds warm. Aquatic birds produce special oils protect them from getting wet or too cold when they are under water.

Reptiles & amphibians sun bath to keep themselves warm. Some amphibians have adapted the ability to hibernate in the winter to avoid exposure to the extreme cold.

How will your creature adapt to the temperature change?

Adaptations

Now, lets look at some different types of anatomical adaptations.

- Camouflage
- Defensive Structures
- Foraging Structures
- Locomotive Structures

Camouflage

Camouflage is an adaptation that allows an animal to blend in with it’s environment. It helps some animals survive by protecting it from predators. It also helps predators go unnoticed when hunting, increasing their chance of getting food.

Defensive Structures

Animals adapted specialized structures to defend them against predators such as spines, quills, hard plates, sharp claws and horns.

These structures will deter predators from an initial attack and serve as a weapon while under attack.

Foraging Structures

Over time, animals adapt specialized structures to help them get food.

Often, these structures can be super specific. For example, an anteater has a long snout and 2 foot tongue perfectly adapted to fit into insect mounds to retrieve insects and larvae.

Locomotive Structures

Most animals move through their environment. Depending on where they live, they develop unique structures to help them get from place to place.

Whether an animal has long or short limbs, small or large fins, webbed or non-webbed digits, these structures help them survive.

The 3-toed sloth live in trees and has adapted long limbs and claws to help them maneuver there way up and down branches.

Activity: Research

Time to research!

First, select a tropical rainforest vertebrate.

Then, research its present structural traits and adaptations.

Next, research where it lives, its environment and habitat.

Finally, research and explore how you think it may change in the future.

Activity: Brainstorm

It’s time to brainstorm! Get your ideas flowing and think of all the different factors that effect your animal’s adaptions.

Remember these ”rules” when throwing out your idea.

1. There are no wrong answers

2. Try to get as many ideas as possible

3. Record all ideas

4. Encourage each others ideas, no matter how crazy they may be!

Activity: Design

Use your research and brainstorming to evaluate your ideas and draft the following illustrations:

- 1 illustration of your animal in its present environment.
- 1 illustration of your future animal in its future environment.