

## Lesson at a Glance

Students will recognize that people are animals with unique adaptations and be able to identify several animals and their adaptations. Older students will be able to identify and describe how the adaptations will help them or hinder them from adapting to climate change.

## Grade

4-5

## Time

Two 1-hour sessions

## Core Connections

4<sup>th</sup> Grade

- Social Studies 1.3.b *Explain viewpoints regarding environmental issues*
- Science 5.2.b *Cite examples of physical features that allow particular plant and animals to live in specific environments*

5<sup>th</sup> Grade

- Science 5.2.c *Describe how a particular physical attribute may provide an advantage for survival in one environment but not in another*

## Materials

- Animal pictures from Creature Classification, in materials bin
- Animal Adaptation game cards
- A white board
- Dry erase markers and eraser

## Background information

While the topic of climate change is controversial in some circles-- including whether the planet is actually heating up -- a growing number of documented shifts in traits and behaviors in wild animals are being seen.

Climate change can occur naturally, but what worries many scientists the most, and the reason why they don't think this is part of a natural cycle, is the rapid rate at which the current changes are happening – changes that are being reflected in the life cycles of wildlife. Scientists have documented that the planet is warming, and humans are playing a role in the temperature rise. Unfortunately, the other animals and plants we share the planet with have to go to dramatic lengths to cope. Here are a few examples:

### **On land**

- Reindeer are expected to disappear from large portions of their current range by the end of the century.

- Marmots are ending their hibernations about three weeks earlier than they did 30 years ago.
- Canadian red squirrels are breeding about 18 days earlier.
- Red foxes are spreading northward, encroaching on territory normally occupied by their Arctic cousins.
- North American Fowler's toads are breeding six days later than they did a decade ago.
- Polar bears today are thinner and less healthy than those of 20 years ago.

## Sea life

- Coral reefs around the world are predicted to increase by up to a third in size.
- Elephant seal pups are leaner because their prey is migrating to cooler waters.
- Loggerhead sea turtles are laying their eggs about 10 days earlier than they did 15 years ago.
- Rising temperatures are influencing the sex of Hawksbill turtle hatchlings, with more females than males being born.
- Tidal organisms like rock barnacles, mollusks, and tidal snails commonly found in warm southern waters are moving northward.
- Many fish species are moving northward in search of cooler waters.

## Birds

- The diet of some songbirds are changing, with some avoiding insects that consume leaves exposed to high levels of carbon dioxide.
- North American tree swallows are laying their eggs about nine days earlier than they did 40 years ago.
- Common murrelets are breeding 24 days earlier than they did a decade ago.

## Plants

- Some plants are thriving in areas where their growth was limited before, thanks to temperature changes that provide more water, heat and sunlight.
- American flowering plants like columbines and wild geraniums are blooming earlier than before.

## Insects

- Edith's checkerspot butterflies are moving northward in search of cooler temperatures.
- A gene in the fruit fly *Drosophila* normally associated with hot, dry conditions has spread to populations living in traditionally cooler southern regions.

## Activity

1. Ask your students to create a list of human adaptations (body parts or behaviors that help an animal or plant survive). Examples might include feet, nose or ear hair, eyes, eyelashes, skin, speech, touch, etc.
2. As a group, describe the usefulness of each adaptation to their survival.
3. Hand each student an animal picture. Explain that they will be playing a game based on the adaptations of these animals. Review each of the animals and one of their adaptations with the class.
4. Divide the class into two teams.
5. Have one person from the first team draw one of the Adaptation Game Cards.
6. Send the student to the board to draw the animal and its adaptation (one-minute drawing limit). The first team then guesses what the animal is and its adaptation. If they get the answer wrong, team two gets a minute and a chance to draw from the same card.
7. When the answer is guessed correctly, have the student share how the adaptation helps the animal survive. For older students, ask them if they think this adaptation will help the animal deal with climate change or will it prevent it from surviving? Will the animal be able to stay where it lives today or will it need to migrate to a new area? What are some of the challenges it might face either way?
8. Have your students research the adaptations of the animal in their picture. Then have them create their own adaptation cards regarding the animal in their picture.

## Conclusion & Climate Change Connections

1. Ask your students to think of some adaptations that might cause animals to become extinct? (Specialized adaptations to small, isolated habitats, to a specific food, or places where people like to live are all examples) For example, polar bears eat the blubber of seals and are adapted to live in cold icy conditions. If the ice continues to melt in the Arctic and their food source disappears, are they likely to survive?
2. How might climate change affect human survival?



## Win, Lose, Draw, Adapt or Disappear Lesson

Adapted from Canyon Country Outdoor Education.



Cut apart and laminate the following cards.

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| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Sharp talons for grasping prey.</b></p> <p style="text-align: center;">Strong feet and large hooked talons help me to catch and kill fish like salmon.</p> <p style="text-align: center;"><b>Bald Eagle</b></p>     | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Sharp teeth for stripping blubber from a seal.</b></p> <p style="text-align: center;">Sharp canine teeth and claws help me grab and kill a seal. The sharp edges of my molars and my rough tongue help me to eat the blubber like you lick an Oreo's middle.</p> <p style="text-align: center;"><b>Polar Bear</b></p> |
| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Warm waterproof fur.</b></p> <p style="text-align: center;">Two layers of thick fur and an oil gland help keep me warm and dry both on land and in cold water.</p> <p style="text-align: center;"><b>Beaver</b></p> | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Strong sharp claws on the toes of each foot.</b></p> <p style="text-align: center;">These help me dig burrows into the ground during dry times.</p> <p style="text-align: center;"><b>Desert Tortoise</b></p>                                                                                                         |

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| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>A thick blubber layer to stay warm.</b></p> <p>My blubber layer keeps me warm and provides me with extra energy when food is scarce.</p> <p style="text-align: center;"><b>Ringed Seal</b></p>                                                                                                      | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Whiskers</b></p> <p>These act as feelers when I am going through bushes or trying to pass through small spaces.</p> <p style="text-align: center;"><b>Bobcat</b></p> |
| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Large ears and big feet.</b></p> <p>My ears help me to hear predators and work like a solar panel to absorb heat. My big feet work like snow shoes so I can stay on top of the snow and jump long distances to get away from predators.</p> <p style="text-align: center;"><b>Snowshoe Hare</b></p> | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Eyespots</b></p> <p>Predators think I am something bigger and are scared away.</p> <p style="text-align: center;"><b>Four Spot Skimmer Dragonfly</b></p>             |

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| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>A special chemical in my blood that keeps it from freezing during cold winter.</b></p> <p>During the winter I stop breathing, my heart stops beating, and ice crystals form within my body. A special antifreeze inside my cells keeps me from freezing to death.</p> <p style="text-align: center;"><b>Wood Frog</b></p> | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Paws with claws</b></p> <p>I use my paws and claws to dig after my prey and to hold on when I catch it.</p> <p style="text-align: center;"><b>Black Footed Ferret</b></p> |
| <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>A noisy tail</b></p> <p>I rattle my tail to warn potential predators to stay away. If that doesn't work, I may bite and my venom may prove deadly.</p> <p style="text-align: center;"><b>Rattlesnake</b></p>                                                                                                              | <p style="text-align: center;"><b>Adaptation</b></p> <p style="text-align: center;"><b>Gills</b></p> <p>I open my mouth and pull cold clean water across my gills to take the oxygen out of the water.</p> <p style="text-align: center;"><b>Coho Salmon</b></p> |

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| <p style="text-align: center;"><b>Adaptation</b></p> <p><b>Hairs on my abdomen help me collect pollen.</b></p> <p>As I collect nectar from the flowers, I pick up pollen and fertilize the flowers as I go. This helps make sure that the plants go to seed and grow again next year.</p> <p style="text-align: center;"><b>Alfalfa Leafcutter Bee</b></p> | <p style="text-align: center;"><b>Adaptation</b></p> <p><b>Webbed back feet and suction cup toes on my front feet.</b></p> <p>These help me to swim and climb.</p> <p style="text-align: center;"><b>Northern Chorus Frog</b></p> |
| <p style="text-align: center;"><b>Adaptation</b></p> <p><b>Scales all over my body.</b></p> <p>Thick scales cover my body to protect me and help me move over rough surfaces.</p> <p style="text-align: center;"><b>Garter Snake</b></p>                                                                                                                   | <p style="text-align: center;"><b>Adaptation</b></p> <p><b>Short, pointed beak.</b></p> <p>My beak is strong enough to pick up and crack open seeds.</p> <p style="text-align: center;"><b>Chickadee</b></p>                      |



# Win, Lose, Draw, Adapt or Disappear Lesson

