Classification

Theme: To teach participants how to classify animals based on similarities they share.

Background

Learn the basics of the seven levels of calissifcation, Kingdom, Phylum, Class, Order Family, Genus and Species. (King Philip Come Out For Goodness Sake)

The two mail Kingdoms are plants and animals. Four other Kingdoms include bacteria, archaebacterial, fungi and protozoa.

Phylum is separated into 30 phyla for animals. Phylum Chordata is characterized as the animals with backbones (Vertebrates) (chordate looks like a cord). Phylum Arthropods (Invertebrates) contains insects, spiders or any other animal with segmented bodies. They also have an exoskeleton on the outside of their bodies.

Class is separated into more sections within the Phylum. Example, Phylum Chordata (animals with backbones) is then separated into birds, mammals and reptiles.

Order is smaller groups within the different classes. For example, Lepidoptera is the order of moths and butterflies. Lepidoptera is under the class insects. Carnivora is the order of Mammalia.

Family is often Speculated about as many different sources will disagree on the family of the animal. The family of dogs is Canidae (carnivorous mammals that include wolves, jackal, foxes, coyote and the domestic dog)

Genus may only have one or two animals in it. If the animals are from the same genus, they are closely related. They may even look alike. When the genus is written it is capitalized and italicized. The genus of dogs and wolves is *Canis*.

Species is when two animals can breed together successfully. When an animal is called by its scientific name then it is being identified by its genus and species. Scientific name of dogs is *Canis familiaris*. Scientific name of wolves is *Canis Lupus*.

Introduction (1-2 minutes)

Materials
- Bandanas or squares of fabric

Objective: To inform the participants of what the class will be about

1. Welcome to the park
2. Introduction of staff
3. Talk about the schedule of the class
4. Ask children questions: What is your favorite animal? What is a mammal? Fish? Reptile etc?

What is Classification? (20 minute PowerPoint)

Objective: To teach the participants about the seven levels of classification.

1.   What is classification?

2.   What are the seven levels of classification?

   a.   Brief description of each.

3.   Talk about how animals know where to go. Animals use environmental cues, instincts, and internal cues to help them navigate.

- Genetics—some scientists believe that migratory animals genetically inherit migratory routes from their parents.
- Mental maps—rather than a paper map, a mental map is carried in the mind and includes known landmarks, such as rivers, trees, and mountains. Simple migrations, such as altitudinal migrations (up and down a mountain) can be navigated with a mental map.
- Instinct—instinct also helps animals with simple migrations. For example, gray whales mostly follow the west coast of Canada and the United States as they migrate between Alaska and Baja, Mexico. Dolphins follow the topography of the ocean floor.
- Sun and Moon—some animals follow the sun as it crosses the sky from east to west. Starlings orient themselves using the path of the sun. Clouds, time of year, and moving at night can make it impractical to use the sun as the only cue for direction.
- Stars—hundreds of years ago, explorers used the stars to navigate their course as they traveled over land and sea. Animals use stars, such as Betelgeuse and the North Star, most likely because those stars are very bright and often visible. Using the stars, Mallard ducks can find north.
- Smell—over small distances, or at specific locations on a migratory path, scents can help animals find their way. For example, salmon use scents in rivers to find spawning areas

to lay their own eggs—in the same area where they were hatched. Scientists think wildebeest follow the scent of rain on the dry Serengeti soils to reach greener pastures.

- Magnetic field—the Earth has a magnetic field, and although humans usually cannot detect it without a compass, some animals have the ability to detect and use it for their migrations. It helps them know which way is north. Scientists are not sure exactly how animals use the magnetic field, but it's similar to humans using a compass to find magnetic north.
- Communication and signaling among individuals—some animals that migrate in groups communicate as they travel to help with navigation. For example, whales use sound to tell each other where they are and where they are headed.
- Ocean currents—some animals can use ocean currents to navigate to and from breeding or feeding grounds. Some eggs, larvae, and young fish drift passively with ocean currents. Some adult fish migrate to breeding grounds by deliberately moving against ocean currents.

4. Activity – Geese Troubles Migration

   a. Find an open area to lay out 15-20 squares of fabric or bandanas. These spaces will be wetlands that geese need to refuel and rest at during their migration trip. Keep the bandanas close together so students can easily step from square to square to move from one side of the room/space to the other.

   b. Line the students up in a row near the starting square. Have the students move "south" across the squares. Telling them as they move that they are stopping at wetland to rest.

   c. Once everyone has made it "south". Remove 4-5 squares, telling students that this wetland was removed to build a store, this one was taken out by a farmer etc. Then have the students migrate "north". They should start to see how much harder it is to migrate when they don't have a rest area.

   d. Once all students have made it "north", again remove 4-5 squares with different events (manmade or natural) that would remove or destroy wetlands. Then have the students migrate "south" again.

   e. Wrap up. Discuss events that impact animal migration and the need for wetlands for water fowl. Connect other migratory animals such as the monarch butterfly and lack of pollinator plants or sever weather.

Hibernation (Sleepers)

Objective: To teach the participants how animals hibernate to survive cold winter months.

1. Hibernation is a state of inactivity, in which an animal's heart rate, body temperature, and breathing rate are decreased in order to conserve energy through the cold

months of winter. A similar state, known as estivation, occurs in some desert animals during the dry months of summer. Hibernation is an important adaptation to harsh climates, because when food is scarce, an animal may use up more energy maintaining its body temperature and in foraging for food than it would receive from consuming the food. Hibernating animals use 70-100 times less energy than when active, allowing them to survive until food is once again plentiful.

2. South Dakota animals that hibernate are bats, ground squirrels, woodchucks, and even birds like the whippoorwill.

Activity:

Let's Hibernate (A Bit)!

1. First, lay on the ground. Set your timer for one minute. During that minute, count how many times you take a breath. Now

imagine that you are one of our hibernating friends and you only breathed a few times per minute. Could you do it?

2. Next, have an adult take your pulse for one minute. Your beats per minute should be between 80 to 130 beats. Can you believe that our hibernating friends' heartbeats are only five to ten times per minute? How many more beats per minute is your heartbeat?

3. Finally, think about how hungry you are when you first wake up in the morning. Imagine that you went all winter without eating any breakfast or any food at all! What kind of foods would you store up for yourself to prepare for the winter season?

- **Bat:** A bat's heart rate drops from 200-300 beats per minute to 10 beats per minute, and it may go minutes without taking a breath.
- **Brown Bear:** goes from 80 beats per minute to less than 20
- **Ground Squirrel:** 300 – 400 beats per minute to 3-10 beats per minute
- **Woodchuck:** 80 beats per minute to 5.

Brumation (ages 9 and up, 4th grade)

Objective: To teach the participants that about Brumation. a state or condition of sluggishness, inactivity, or torpor exhibited by reptiles (such as snakes or lizards) during winter or extended periods of low temperature This subterranean torpor is not a true hibernation

1. Discuss what brumation is.

2. Give examples of animals that bromate, reptiles.

3. Discuss why they need to bromate.

Activity

Objective: Determine the difference and similarities of Brumation and hibernation.

Using a Venn Diagram offer these phrases. Have students place them in the correct portion of the diagram.

	Hibernation (Mammals)	Brumation (Reptiles)
Caused by shortening day length and temperature changes	YES	YES
Animal may feed heavily before entering dormancy	YES	YES
Buildup of fat reserve and lipids before entering dormancy?	YES	YES
Feeding and eating stop during dormancy	YES	YES
Drinking Water Stops	YES	No
Decreased heart rate, body temperature, and metabolism slow or decrease	YES	YES
Use stored fat for energy during dormancy	YES	YES/NO (glycogen)
Anoxia Tolerant (low oxygen)	NO	YES
True Sleep	YES	No

Active because of Adaptations (Tough Guys)

Objective: To teach the participants that about specialized adaptations allow animals to survive in a cold winter environment.

- Deer – Finding shelter, minimize the amount of movement by staying close to a food source.

  - Grouse – Burrow into the snow to roost and stay warm, grow tiny fringes on the sides of their toes every fall that function as snowshoes.

- Pheasant – Stay close to a food source, biggest threat is deep snow covering food.

Materials
- Ermine pelt
- Bison Hump bone
- Bison fur piece
- Deer pelt

SOUTH DAKOTA
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- Bison – Use their large heads to move snow to find food, Grow thicker woolly underfur to keep warmer.

- Ermine – Changes its fur to white to camouflage with the snow.

- Eagles – Can hunt food, as well as will eat carrion (dead animals).

- Squirrels – Build warm nests, use their tails to help keep warm. Store food for winter months.

Squirrels Activity

Intro: In expectation of winter each animal has their own way of getting ready. For those animals planning to try to tough out the winter these preparations can be pretty involved. What types of things do you think that they will do to prepare?

-Collect food and store food, insulate their nests, Animals such as squirrels will bury caches of food to be eaten later. Let the students know that they will have the opportunity to be squirrels today

- Divide the students into two groups; grey and red squirrels.
- Explain that these two species live in South Dakota
- They look similar but prepare for winter in two different ways.
- Red Squirrels hide all of their food in one place
- Grey Squirrels hide their food in many different places.
- Give them 5 minutes to hide their food.
  - Once they have hidden their food call them back together and let them know that we are going to play a game of winter survival. They will be going through three rounds of winter months. December, January, and February.
  - In each round the students must collect 3 pieces of food from ANY cache, if they don't find enough food then they have not survived. Allow 30 seconds/1 minute to find food.
  - There is no "defending" any cache of food as well as no stealing from any food held by a person.

Wrap Up (5-10 minutes)

Objective: To review what the participants have learned.

Group Activity:

Hand out small plastic animals one to each student.

Explain that everyone who has an animal will share what the animal eats, and wither it is a mover, sleeper or a tough guy.

Students can also share anything else they may have learned about that animal.

Wrap up questions to ask:

What is it called when an animal sleeps during the winter? What are examples of these animals? (Hibernation, woodchuck, bats, reptiles, bear)

What is it called when an animal leaves its area for the winter? What are examples of these animals? (birds, butterflies)

Why do animals leave? (Food)

What is are some animals that are active during winter? (bison, coyote, beaver, squirrels, eagle)

Backup Activities

Interesting facts about animals' adaptations for winter.

Other information:

Estivation

Estivation - also called aestivation - is another strategy used by animals to survive extreme temperatures and weather conditions. But unlike hibernation and torpor - which are used to survive shortened days and colder temperatures, estivation is used by some animals to survive the hottest and driest months of summer.

Similar to hibernation and torpor, estivation is characterized by a period of inactivity and a lowered metabolic rate. Many animals - both invertebrates and vertebrates - use this tactic to stay cool and prevent desiccation when the temperatures are high and water levels are low.

Animals that estivate include mollusks, crabs, crocodiles, some salamanders, mosquitos, desert tortoises, the dwarf lemur, and some hedgehogs.

REFERENCES

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