Adaptations, Skull Detectives, and Tracks

OVERVIEW: All animals need four essential things to survive: food, water, shelter and space (some choose to add in "air"). Animals develop physical and behavioural adaptations to help them meet these needs. Students will participate in activities that will demonstrate these adaptations.

PRINCIPLES:
- Animal characteristics are genetic and/or behavioural adaptations to environmental conditions. A habitat is where an animal gets its food, water, shelter, and space . A niche is the role an animal plays in its community.
- Mankind's impact can change the environment too quickly for the slow process of adaptation to adjust. As a result, species can become extinct.

VOCABULARY: adaptation. herbivore, carnivore, omnivore, predator, prey, habitat. camouflage, impact, community, nocturnal, diurnal
5th -6th grade add: niche, canine, premolar, warning colors, mimicry, incisor, and molar
7th -8th grade add: biodiversity, ecotothermy, endothermy, homeostasis

OUTLINE :
I. Introduction
Essential Question: "What is an adaptation?" Let the kids work together and construct a definition, adding information to each other's answers. This will give you an idea of how much experience the kids have with this subject. Ask each student to name a favourite animal, identify one of its adaptation, and explain whether the adaptation is physical or behavioural. *To help get the discussion started you might offer a couple examples – a deer's behavioural adaptation is stand sideways to threats – so they can gain greater vector distance if they needed to run. Possum's physical adaptation is a lower than normal average body temperature – as a result are almost impervious to rabies.*

Once it has been established that adaptations help any animal to survive in its habitat, discuss what is needed to survive -food, water, shelter, space, defence, etc. Usually, someone will mention camouflage. ..

II Instructional Introductory Games: Camouflage
All ages love this one. Instructor is a predator, kids are prey, have them decide what specific kinds of animals they are going to be. Predator (you) closes their eyes, yells out "Camouflage!!", and counts to ten. Prey all scatter to hiding places, they can go as far as they want as long as they can still see the predator form the hiding place. Also, since we should be in the wild, buildings are off limits. Predator then opens their and without leaving their spot, tries to identify the prey. If prey is caught, they come out and sit quietly near the predator, watching the game.
Once the predator has caught everyone in sight, they close their eyes again, yell out "Camouflage Come Closer!!", and counts to ten again. Prey must find a new hiding place, closer to the predator each time. Again the predator tries to spot as many prey as possible.
To finish a round, the predator may choose to hold up a number of fingers (from 1 to 5). They then drop their hand down and yell "Everyone in". The first prey to whisper the correct number in your ear wins. The Moral: the best prey can not only hide good, but can see that which hunts them.
Discussion is an important part of making this an educational game. Ask the kids what adaptations would have been helpful for them to have if they had been real prey. What about predator adaptations? With younger kids, simply 'help them understand how the senses are important, speed, sharp claws, etc. Older students should begin to realize more fine tuned details, i.e.: eyes in front of predator's head. on the sides of the prey's head, warning colors, mimicry, and human adaptations.

Some additional demonstrations to go with this discussion:
sharp hearing: deer ears Cupping hands around ears and listening
Opposable thumb adaptation: untie and tie a shoe as you normally would then do the same thing without using your thumbs
quiet walk: walking on the sides of your feet cupping sound away from those listening
prey face: put your face close to ground as if eating and what can you see?

III Skulls Detectives
I like to start the discussion with a deer skull. Most students know it's a deer – but stress that the important part is what you can learn from the skull.
Teeth. Examine the teeth and indentify what it likely eats – What might a herbivore's teeth look like? An Omnivore's? A Carnivore? What does this animal eat (the deer skull)? If available compare a younger deer skull with an older? By just looking at the teeth, which animal was older? For older students consider adding **diastema** (the space between incisors and molars in the herbivore's mouth for packing during clipping and knawing.

Eye Placement. Examine the eye placement and identify where the animal is looking. Why? What's the difference between where a prey and a predator might be looking?

Eye Size. Examine the eye casing size. While not 100% the concept is still valid – eye size suggest nocturnal or diurnal.

Brain size. Examine the area allotted for brains compared to the rest of the skull. Is it difficult to sneak of on grass? Is it difficult to sneak up on prey?

LASTLY – What animal do you think this is?

Break the students up in as many groups as you have skulls. Students are to become detectives and try to learn as much about their group's skull as they can **before** guessing what animal skull they have. Groups are to present their detecting to the whole before they can offer a guess as to their animal.

Tracks

Start by using the tracks just like the skulls. What can you find out about an animal by looking at its tracks? Consider ideas about dexterity, ability to manipulate, swim, run, attack, wear, etc

Making Tracks

Students each need a tray with dirt or sand in it. Students can choose a track and press it into their dirt/sand. They then press the retaining 2-liker plastic strip around the track and poor plaster into it.

Hints for speed and ease: prep the soil ahead of time: moist soil is good, too dry – bad. Sandy soil works good for coyote, and bobcat. Soil works better for beaver, armadillo, and raccoon. Boar is challenging in either soil. Use toothbrushes and water to clean them up after hardening. Students must either put their initials in the drying plaster or their names on the plates / bowls.

Extra Activities if time allows

Forest Ranger

One student is the forest ranger and stands facing a line of students (the rest of the class). The others in the class must think of an animal and keep that name a secret from the others. Make it an animal they know a lot about. The Forest Ranger says "I'm thinking of an animal that swims. " If your animal swims you have to run to the other side of the playing area without being tagged by the Forest Ranger. Those who are tagged are now Junior Rangers and help the Forest Ranger tag the others. The game continues by calling out another animal characteristic that has not been said before. The game is over when two or fewer animals inhabit the forest.

Discussion: What type of adaptitive characteristics do the animals you chose have? How do they make it easier to survive in the environments that they are found?