Winter Adaptation

Question 1: There are already workshops that explore the concepts of Migration and Hibernation, so what do you think is the strategy of Winter Adaptation? Give your definition below.

A physical change to the animal and/or a change in the physical activities of the animal that allows them to overcome the hardships of the Winter season.

Question 2: What are some animals that adapt to meet the hardships of the Winter season?

Fox, Coyotes, Squirrels, resident waterfowl, Deer, Beaver, Rabbits.

What are some of the things that the do to meet the challenges of Winter?

Grow a thicker fur coat, Change their fur color, Use additional shelters, create a winter food supply.

Question 3: In the previous questions, you were asked to explain Winter Adaption. Your definition probably referred to two different ways of coping with Winter. The first method we are going to explore is "Structural Adaptation." These are physical changes made by an animal that physically alter the animal. Which examples did you give in Question 2 that meet this type of change and how do these changes help the animal?

A thicker fur coat traps more air under the fur and creates a thicker and tighter layer of insulation around the body to preserve its body heat.

Changing the color of its fur allow for one of two states. By becoming a darker color, the body can actually collect more solar heat into their body. By becoming white, the animal can camouflage within the snow of the Winter season to hunt or avoid being hunted.

Question 4: There are other physical changes that have occurred in the animals adapted for the winter regions but are not as obvious unless one compares them with their cousin from other parts of the world. Below are two sets of animal cousins. List the physical differences between them and indicate which features benefit the colder environment.

Polar Bear vs Sun Bear

The Polar Bear is larger than the Sun Bear, therefore it mass to surface area allow it to generate and hold more of its body heat.

Pika vs Cottontail

The Pika has smaller ears. When the features such as ears, tails, snout are shorter and closer to the body, they stay warm and resist frostbite compared to features that are larger and longer which would be points of heat loss.

Question 5: There are also physical changes that cannot be seen by an observer, but do take place. One is called "countercurrent heat exchange." What is this exchange and what does it allow an animal to do?

Blood flowing from the body core to the legs & feet carries heat that can be readily be lost through the skin. However, the veins returning blood to the body core lies alongside the arteries taking blood to the feet. Heat moves from the warmer arterial blood to the cooler venous blood. Therefore the animal has adapted so that its legs and feet can be at a lower temperature then its core body. This is why waterfowl are able to stand on the ice. The temperature of their feet is only slightly above the freezing point and comparable to the temperature of the ice.

Question 6: Along with structural adaptation, the other adaptation animals can apply is "Habitat Adaptation." These are alterations that the animal makes to its lifestyle in order to deal with the Winter changes to the area. Again, which examples did you give in Question 2 that meet this type of change and how do these changes help the animal?

An animal creates a winter food to supply to maintain its existence during the harsher season and the return of its normal food supply.

The animal builds a shelter or starts using an existing location to seek shelter to preserve its body temperature and remove itself from the elements that would lower its body temperature.

Question 7: There are other changes that take place in animal populations that you may not have thought of. Think about our wintering bird populations and deer populations. What are they doing during this time period.

It is safer for bird to form mix flock than to travel alone. Searching for food in the wild takes focus, and it is hard to look for seeds or berries and watch for danger at the same time. With more birds in the flock, there's a better chance that a hawk, fox, or other predator will be spotted giving time to sound an alarm and make a getaway.

Deer will herd up during times of severe cold and decreasing food source availability. Food is scarce, so deer flock to what little is left. This behavior of spending time in a more confined area allows the deer to consume available resources while conserving energy.

Question 8: The above question gives a response to how prey animals alter their lifestyle. How might a predator alter its lifestyle in the harsher winter climate?

They can alter their diet and hunting strategies by eating different kinds of food as the seasons change. The Red Fox eats fruit and insects in the spring, summer and fall. In the winter, it can not find these things, so it starts hunting small rodents more frequently. It also may alter how it hunts by focusing on different senses through the season such as relying more on its nose to find fruit and insects verse using its hearing to find rodents in the winter.

Question 9: Hibernation and Migration are adaptations that the animals have made. Together they are referred to as Behavioral Adaptations. What are the text-book" definitions of both terms?

Hibernation: The period of time in which an animal spends in a dormant state during the winter season.

Migration is seasonal movement of animals from one region to another to take advantage of resources along their route and at their destination site.