WILD at Schools: Eat Like A Bear

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Loosely based on Lunch for a Bear from the <u>Growing Up WILD</u> curriculum

Target Audience: K through 2nd Grade
Time: 45 minutes to 1 hour
Location: classroom / area with space to spread cards / school yard

Pre-material:
Ensure students understand that different animals eat different types of food and that animals' teeth are adapted to the food they eat.

- <u>Animals Mouths</u> by Mary Holland. Arbordale Publishing (May 10, 2015).

Background Information

Black bears are considered a wildlife success story. Their numbers in Maryland have expanded from around a dozen in the 1950s to over 2000 by 2017 due to improving habitat and hunting regulations. Black bears currently breed in the four westernmost Maryland counties. In the spring, young males looking for new territory can travel up to 150 miles and have been seen in most Maryland counties.

Black bears are extremely adaptable, living wherever sufficient food is available. They are found primarily in forested habitats preferring dense cover where they can avoid people. Female black bears (sows) tend to have home ranges of about ten square miles compared to 25 miles for males.

Many people believe fish and meat to be a large part of an eastern black bear's diet but, in fact, their diet is predominantly plant based. Insects are usually more important than larger animals especially insects that can be found in large concentrations such as ants, wasp larvae, beetle larvae in logs and bee hives that black bears will break into. Black bears are opportunistic feeders and rarely chase their prey. They occasionally eat fawns, will scavenge on dead deer and other carcasses and will consume rodents and frogs. The diet of black bears changes through the seasons with food availability. In the spring, black bears consume more leaves and grasses, while they often favor berries in early summer and fatten up on acorns and nuts in the fall. In the fall, black bears enter **hyperphagia** to prepare for hibernation, eating up to 20,000 calories per day. Bears are particularly attracted to human food due to its high caloric value but conflicts can be reduced when people adjust their behavior to prevent food from being accessible.

Black bears in Maryland generally hibernate from December to March. In the southern United States, where there is a consistent food supply and warmer weather throughout the winter, bears may not hibernate at all or do so for a very brief time. Females give birth in January and nurse while continuing hibernation. **Hibernation** used to be defined solely in terms of temperature reduction, so bears were not considered true hibernators as they only slightly lower their body temperature. However, biologists have since discovered that bears vastly reduce their metabolic rate and slow their breathing and heart rate. These changes allow black bears to hibernate without eating, drinking, urinating or defecating.

Mammalian hibernation has since been redefined as a specialized, seasonal reduction in metabolism concurrent with scarce food and cold weather. Black bears are now considered highly efficient hibernators.

Sows can give birth to between one and six cubs although two to three cubs are most common. The cubs are extremely small at birth weighing only about 10 oz. The cubs are weaned at six to eight months of age but remain with their mother for a year and a half or more. They hibernate together for their first winter. Females only reproduce every other year or less often depending on food availability.

In this lesson, students will learn about the habitat requirements of black bears. Students will become 'bears' to look for food during two different seasons. They will then use this knowledge to examine an area as a potential bear habitat.

Learning Objectives

As a result of this program students will be able to:
- Analyze the evidence of teeth shape to develop an explanation of diet.
- Understand food preferences and habitat requirements.
- Understand that diets change seasonally.
- Grade 1 & 2 Students: explain some of the causes of human conflicts with black bears and how to avoid them.
- Determine if an area provides a suitable habitat for bears (optional habitat extension).

Curriculum Standards & Science and Engineering Practices Addressed

Grade	Standard	Detail	Program Element
K	K.MD.B.3 K-LS1-1 K-ESS3-1 K-ESS3-3	Classify objects into categories; count the number in each category and sort the categories by count. Use observations to describe patterns of what animals need to survive. Use a model to represent relationships in the natural world. Communicate solutions that will reduce the impact of humans on other living things in the local environment.	Food collection and sorting activity students count and categorize food. Explore a schoolyard to see if it provides the elements of a bear's habitat. Observe adaptations of bears that allow them to survive. Students model how food collection changes through seasons. Children suggest changes in behavior to prevent conflicts with bears.
1st	1 LS1.A: Structure and Function LS3.B: Variation of Traits MP.4	Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Individuals of the same kind of animal are recognizable as similar but can also vary in many ways. Model with mathematics.	Adaptation of bears such as sense of smell, and teeth to find and eat food. Color and size variations between different black bears. Food collection activity.

2nd	LS2.A: Interdependent Relationships in Ecosystems MP.4	Plants depend on animals to move their seeds around.	Students learn about the Black bears' role in seed dispersal
		Model with mathematics	Food collection activity
Engineering and Science Practices		Make firsthand observations to construct an evidence based account for natural phenomena. Use a model that represents a concrete event Conduct simple investigation to describe relationships in the natural world to answer scientific questions.	Examine teeth from herbivores and carnivores and use evidence to draw conclusions about bear diet. Model Food collections. Investigate school yard for habitat components to determine if it would provide suitable habitat for a bear. (Optional)

Key Program Vocabulary:

Adaptation: a change or the process of change by which a species becomes better suited to survive in its environment.

Camouflage: an animal's natural coloring or form that enables it to blend in with its surroundings.

Canine tooth: a pointed tooth between the incisors and premolars of a mammal, often greatly enlarged in carnivores.

Carnivore: an animal that feeds on other animals.

Cub: a young bear.

Habitat: the natural home of an animal/plant made up of 4 elements: food, water, shelter or cover and space.

Herbivore: an animal that feeds on plants.

Hibernation: spending the winter in a dormant state. The definition used to include significantly lowering body temperature and bears weren't considered true hibernators. Recent studies have shown considerable variation in hibernation responses. Scientists redefined mammalian hibernation as 'a specialized, seasonal reduction in metabolism concurrent with scarce food and cold weather' to include animals like bears.

Incisors: a narrow-edged tooth at the front of the mouth, adapted for cutting.

Molars: a grinding tooth at the back of a mammal's mouth.

Metabolism: physical and mechanical processes occurring to sustain life.

Omnivore: animals that eat food of both plant and animal origin.

Population: the total number of inhabitants of a particular species in a defined area.

Seed Dispersal: the movement or transport of seeds away from the parent plant.

Equipment / Materials:

- 1 pound of acorns (optional; be sure they are dried)
- Black bear skull, fur and scat (found in Black Bear Trunk)
- Cards for food activity – spring and fall set (including people food cards in envelopes)* (download)
- Clip boards for habitat hunt (optional extension)
- Deer skull and coyote jaw (optional or use pictures)

- Flip chart and markers (or white board and white board markers)
- Picture pack (download)
- Schoolyard habitat hunt hand out (optional extension).
- Student assessment sheet (download)

Prior to program, determine location to run food collection activity. An ideal location would be outdoors in a flat, grassy area or concrete pad. An alternative could be a gym or cafeteria, or the activity could be run in the classroom with cards spread around by the teacher while the students are gathered at front of classroom for the first part of the program.

With kindergarten classes, run a single food collection activity where students collect 5 cards (using a mix of spring and fall food cards). Students learn about the many different types of foods that black bears eat. The different food types will require more explanation with these younger students.

*Spring set: 5 cards x number students + extra 10 in case some students take too many
*Fall set: 10 x number of students. The extra 3 or 5 envelopes of human food provide the equivalent of 30-50 lbs of food. Subtract this number from the total card number so some students are forced to collect the envelopes.

INTRODUCTION: 5 minutes

1. Tell students that they are going to learn about black bears today. Show black bear picture 1 in the Picture Pack.
2. Draw three columns on the board, label the 1st **KNOW**, the 2nd **WHAT** and the 3rd **LEARNED**.
3. Ask students what they already know about black bears and record in the **KNOW** (1st) column, even if incorrect. If needed, provide prompts such as: *what kind of bear lives in Maryland? Where do bears live? How do they look (color, size)? What do they eat? How do they spend the winter?*
4. Explain to students that 70 years ago, in the 1950s, there were only about 10 black bears living in Maryland. However, unlike panda bears and most other bears in the world, the number of black bears in Maryland is growing. Today, there are over 2,000 black bears in our state. It is now much more common to see or find evidence of black bears even in areas close to where people live.
5. Ask students what they would like to know about black bears and write down their questions in the **WHAT** column. Explain that they are going to learn about bears and their habitat needs. They also will get a chance to eat like a bear!

BEAR HABITAT AND ADAPTATIONS: 10 minutes

6. Ask students if they can list the four basic parts or elements of **HABITAT** (what an animal needs to survive). These components are: food, water, shelter and space.
   a. **FOOD**: Bears are big animals and need a lot of food to survive.
   b. **WATER**: Bears, like us, also need water to survive.
   c. **SPACE**: Bears live in their own territory and don't live together as adults. To find all the food they need, bears need a lot of space. Compare to children traveling from home to

the store to get food. Explain as the number of bears has increased, they have spread into more places in Maryland.

> **Grade 2 extension**: *Explain that black bears are now found in western Maryland and are spreading towards central Maryland, but occasional bears are seen even on the eastern shore*. *Show a range map for black bears in Maryland (#2 in Picture Pack).*

    d. **SHELTER**: Bears are shy and like to stay hidden from people, so they use their habitat as shelter. They also use rock crevices, brush piles or fallen trees to provide shelter to hibernate in the winter.

7. Ask students where black bears live. Explain that their habitat is a forest which provides their food, water and shelter. Explain that we have more bears today in Maryland than in the past because the forests have grown back after being cut down by early settlers. Bears have more space available as habitat.

8. Explain that in forests, there are lots of shady, dark spots especially at dawn and dusk when bears often move around. The species of bear that we have in Maryland are colored black for **camouflage**, and they are called black bears.

> **K extension**: *Explain in North America, there are three different types of bear. There are bears that are white because they live in cold, snowy places (ask students what they are called). There are brown bears, also called grizzly bears that live in the west and spend most of their time in open sunny meadows. These bears are colored brown. Then, there are black bears. Show students forest picture (picture #3) in picture pack and ask if they can spot the bear hiding in the shadows.*
> **Grade 1 extension**: *Black bear is a confusing name though because although they are usually colored black in Maryland they are not always black. Black bears that live in other parts of North America can be cinnamon colored and even blond.*

9. Ask students what black bears eat. Explain that to learn more about what black bears eat, we can look at their teeth because an animal's teeth are **adapted** to the kind of food that they eat.
> **K classes**: *Look at the skull and have students compare the bear's teeth to their own teeth. How are they alike and different? Point out features such as how large the nose is and the eye placement in front of skull.*
> **1st and 2nd grade**: *Use herbivore and carnivore skull and pictures to compare and contrast teeth.*
> **2nd grade**: *Give students time to look at the two pictures and skulls and come to their own conclusions about what a black bear eats.*

1st and 2nd grade only:
    a. **Herbivore** (Deer jaw and skull pictures #4 & #5, explain picture shows a deer's lower jaw): Tell students this animal, a deer, eats plants – it is an herbivore. Leaves are tough and require a lot of chewing like celery, so deer and other herbivores have wide flat back teeth to grind their food called **molars.** They have straight front teeth (**incisors**) to grip and tear

leaves off plants. Explain that we also have this type of incisors to bite crunchy foods like raw carrots and flat molars to chew them into small pieces. Deer, like many herbivores, also have a large space between the front and back teeth which lets then strip leaves from a branch and provides extra room in their mouth to chew lots of leaves.

   b. **Carnivore** (Coyote skull pictures #6 & #7): Tell students this animal, a coyote, eats meat - it is mainly a carnivore. Ask students what they notice most about the carnivore teeth. It has big **canine teeth** for catching animals like rabbits and mice. Coyotes also have pointy **incisors** (the front teeth) for grabbing these look like small versions of the canine teeth. All their other teeth are also sharp for cutting meat, with no flat back molars. If you ever watch a dog eat, they don't really chew, they bite their food and swallow.

   c. **Bear Skull**: Show students the bear skull (or picture #8) and ask students to look at the teeth to see if they can determine what bears eat. Ask if the teeth are more like a deer or more like a coyote? Why or why not? Have 2nd grade students vote on which they think the bear is more like.

      i. <u>Incisors</u> – are straight like a deer.

      ii. <u>Canines</u> – are pointy like a coyote.

      iii. <u>Molars</u> – are flat like deer and there is a gap like deer but it is smaller.

      iv. Explain that bears have a mix of the two teeth types because they eat both meat and plants. Animals that eat both meat and plants are known as **omnivores**. Black bears eat mostly plants because their teeth are more like a deer's teeth than a coyote's teeth. To compare: for your lunch, you might have a sandwich and an apple and a cookie – everything comes from plants apart from the meat in the sandwich, but it is a mostly plant based meal. About 70-80% of their diet is food that comes from plants.

10. Explain to students that the skull also shows other black bear adaptations:

   a. Black bears have very long noses which gives them an excellent sense of smell, in fact, it is their strongest sense. It is even more sensitive than a dog's nose. A bear can smell things up to 1 mile away - that is like you being able to smell a peanut butter sandwich you left outside your house!

   b. In comparison to their nose, black bears have small eyes and ears, but they can see as well as we do and can hear sounds better as their ears can move to detect the direction of sounds (demonstrate with hands).

BEAR DIET, SEASONAL CHANGES AND ROLE IN ECOSYSTEM: 30 minutes

Spring/Summer Food Collection

11. Prior to starting food collection, spread out 1st set of cards (spring/summer pack) for collection in delimited area.

12. Ask students if they are now ready to act like hungry black bears and learn about the food that bears eat.

13. Explain that cards (aka 'food') have been spread out within the marked area. Although bears can run fast (up to 25 mph), most of the time they amble around slowly so students can only WALK to collect the food. Explain that although bears can stand on their two back legs, they

walk around on all four. Kindergarten students may like to practice their bear walk before they start the collection and pretend to sniff for their food.

14. Explain that the students are to act like bears and wander around eating food. Each student needs to collect 5 cards. To stay healthy, bears need to eat a variety of food, so ask students to try to collect different food cards. Remind students that bears eat more plants and things that come from plants like berries than they do meat. Remind students that they can only collect 5 cards so there is enough food left for the other bears. They need to be good friends and share the food. Once they have collected their 5 cards, they should return to the start area.

15. Once all the cards have been collected, have students come back together to examine the 'food' they ate and to assess their diet. Ask if everyone was able to get 5 cards. For those that did not get 5 cards, ask what would happen to bears that didn't find enough food. What might they do? Explain that they might travel to new areas to look for food.

16. Have students examine their cards. Ask students to name one of the foods that they found. Ask if any of the foods that bears eat surprised them. Did anyone find fish? Bears that live in other places do eat fish like salmon. In western Maryland, where black bears live, there aren't many rivers with large fish so Maryland bears rarely eat fish. Ask students if they think a big bear would eat one ant (as shown on the card). Explain that bears hunt for ant nests and eat all the ant eggs and larvae also. Ask students what carrion is. Explain that carrion means animals that are already dead. Show picture of bear in a tree eating cherries and picture of claw marks on a tree (pictures #9 & 10). Explain this is a sign bears are around.

2nd grade only: Explain that black bears search for fruit as it is sweet and contains lots of calories. After they have eaten the fruit, bears help to spread seeds around woods. Black bears are especially important for plants that have fruits with big seeds like cherries because bears eat the whole fruit (birds will just peck off the fruit part) and sometime later do what bears do in the woods. The cherry stones pass through the bear's stomach and are pooped in the woods. Black bears are an important animal for **DISPERSING** seeds because they travel long distances as they hunt for food, so the cherry seeds will be spread far from the original tree.

Fall Food Collection

1. If possible, have a helper spread 2nd set of food cards (fall pack which includes orange envelopes, 2 for 1st grade students, 4 for 2nd grade) while class is sorting and discussing their cards from the previous activity.

2. Collect spring food cards from students.

3. Explain to students that the type of food they just collected represented what bears would eat in spring and summer, but now we are going to pretend it is fall so there won't be any berries or cherries to eat. However, there will be new types of food for them to find.

4. Explain that in the fall, bears eat more food each day so they put on fat to help them survive the winter. Tell students that this time they need 10 food cards. Explain that there are also some new cards in orange envelopes (show students). These are each worth 5 cards, so they only need to find 5 additional food cards. Encourage students to collect the envelopes too but to bring them back without opening them. Remind students again about only collecting 10 cards so there will be enough food for all the bears.

5. Have students run through the collection activity again with the new set of cards. Once all cards have been picked up, collect students together and have them assess their 'stomach' contents.

6. Ask if everyone was able to get 10 cards so they can survive the winter. Ask students to sort their cards into 2 piles of red edged and green edged cards.   Ask who remembers what percentage of a black bear's diet comes from plants.   As about 75% or ¾ of black bear's food is made up of plants, that means that each of them should have 7 to 8 cards with a green edge that represents plant based foods. Ask who got the right balance of food.

7. Have students examine their cards but not the orange envelopes just yet. What foods are new for the fall? (Acorns, nuts and seeds). Explain these foods fall in large amounts from the trees they grow on in fall, so there is often a lot of food in one place for bears to find. Ask students if they have seen big piles of acorns under an oak tree.

8. Explain to students that in the fall, bears need to eat a lot of food – up to 20,000 calories a day which would be like a person eating 50 cheeseburgers every day. A bear might eat 20 lbs. of acorns a day which is over 1000 acorns (show 1lb bag of acorns).

Grade 1 and 2 extensions: Ask which students found the orange envelopes. Tell them that they can open the envelopes and then tell the other students what is shown on the card inside: trash can picture and dog food bowl for all students, a beehive and bird feeder with bird food added for 2ⁿᵈ grade students.

Explain it can be hard for a bear to find all the food they need in the fall, so if people leave food around that is easy for bears to find, they often will eat it. Explain that the bears are not trying to do something bad but are simply hungry and are taking advantage of food that is easy to find. Explain that black bears are smart and can often figure out ways to get into places or things where people don't want them. Sometimes, bears get used to people food and become a nuisance or aggressive. Ask students what could they do to stop this from happening. Prompt students towards a possible solution to each of these situations:

    a. Pet food? *Don't leave pet food outside*.

    b. Trash Can? *Use a specially designed secure trash can* (show *picture of bears testing a trash can – this is a wildlife center that charges trash can manufacturers to test their cans to see if they are bear proof*). Leaving trash places is never a good idea but you have to especially careful of how your store food and trash if you are on vacation in places where bears live. Show picture #11).

    c. **2ⁿᵈ grade only:** Bird feeders*? Don't have bird feeders except in the winter (when bears are hibernating).*

    d. **2ⁿᵈ grade only:** Bee hive*? In bear country, put electric fencing around the hives*. Bears are actually more interested in eating the baby bees that are full of protein than the honey.

Hibernation

1. Have students think about the different types of food that bears eat. Ask if these foods are available in the winter when plants and insects die.
2. Explain that there is not enough food available in the winter which is why bears need to hibernate. Ask students what hibernation means. Tell students that bears don't eat or go to the bathroom during this time and just live off of their body fat. It is also when bear cubs are born.
3. Ask students where black bears hibernate. Bears hibernate in a sheltered location such as under a large rock or under a fallen tree.
4. Show students bear pelt (in black bear trunk) and tell students that bears grow a really thick coat of fur that helps to insulate them from the cold.

WRAP-UP: 5 Minutes

1. Ask students if they learned some new things about black bears today. Ask students to name some of the foods that bears eat.
2. See if there is anything that needs correcting from the **KNOW** section of the KWL chart
3. Answer any questions in the **WHAT** section
4. Ask children what they would like to add to the What we **LEARNED** section.

Optional Walk like a Bear activity (K & 1st grade students): 10 minutes

If weather does not allow the Schoolyard habitat assessment, students may practice walking like a bear.

1. Demonstrate bear alternating walk pattern moving right hand and leg then left hand and leg or show a video of a black bear walking.
2. Have a student volunteer demonstrate a bear walk.
3. Have all students try to walk like a bear.
4. Consider creating a bear trackway on a large sheet of paper with cutouts of black bear paws from Assessment sheet or on a roll of drawer liner with tracks stenciled on it. Have students walk like a bear along the bear trackway. Instruct students to first place feet in large hind paw tracks. Then, they should put hands on smaller front paw tracks. Finally, they should bear walk along the trackway trying to keep hands and feet on track marks.

Optional Schoolyard Habitat Assessment (weather dependent): 10-15 minutes

Students apply their knowledge of a bear's habitat requirements to evaluate the schoolyard as a potential habitat. This activity can be left with the teacher if time or weather does not permit.
Materials: Use schoolyard assessment sheet, pencils and clipboards.

1. Tell students now that they know about black bear habitat, including what food they like to eat, they are going to pretend to be young black bears searching for a new place to live.
2. Hand out clip boards and habitat assessment sheets.

3. Go outside with students and evaluate habitat. Students need to assess what foods are available and may need help identifying oak and nut trees. Encourage them to look under trees for evidence of acorns or nut shells.
4. Once sheets are complete, come back inside and talk about the student's findings. What kinds of foods did they find? Were there any good places for shelter? For water? What kind of hazards are in the schoolyard? Would this be a good place for a bear to live? How could the schoolyard be improved for black bears (or other wildlife)?

Follow-up Activities

Download and print the following activities to use after the lesson:

- 'How do I compare to a bear?' sheet and teacher guide.
- Habitat Hunt sheet if time / weather did not allow.

Extra Information
Answers to common questions with bear program:

How big are bears? Female bears which we call sows weigh on average about 200lbs (that would be 4 students) but the male bears called boars weigh up to 500lb in the fall (that is equivalent to 10 students). When black bears stand up they can be 5ft to 7ft tall (as tall as a basketball player).

Do bears get stung by bees or wasps when trying to eat honey?
Yes. Their fur protects them on most of their body but bees and wasps will sting the bear's nose and ears to drive them away. However, bees or wasp larvae contain so much fat and protein that bears consider them worth a few stings.

What do you do if you see a black bear?
First, you are really lucky because a bear will usually hear you and disappear before you get a chance to see them. However, stand tall and slowly back away keeping your eyes on the bear and leave an escape route for the bear.

Do black bears attack people?
Attacks by black bears on people are very rare, most have occurred in wilderness areas in the west of the United States. There has been only one known attack in Maryland in 80 years. Most black bear 'attacks' are in fact defensive reactions to a person who is very close, a situation that could usually be avoided. Injuries from these defensive reactions are usually minor and often dogs are a catalyst. Black bears are comparatively timid, partly because they evolved alongside powerful predators as saber-toothed cats, American lions and wolves. Bears have retained their fear of wolves and can be more aggressive when dogs (which appear to be small wolves) are present.

Do bears share food with other bears / live together?
No, apart from raising their young cubs, bears live alone and do not share food.

How long do bears live?
Black bears can live up to 20 years in the wild and up to 30 years in captivity. The only predator to adult black bears in Maryland are humans. Maryland has a managed hunt (131 bears were harvested in 2017) that is aimed at slowing the bear population increase. Usually 50-60 bears a year are killed by cars.

Why are bears hunted?
Maryland's conservative black bear hunting season is only one aspect of a multi-faceted bear management program that also includes teaching people how to live with bears and a rigorous population monitoring program. Maryland implemented its first black bear hunting season in 2004 with a goal of slowing the growth of the bear population. We are now entering our 15th year utilizing this approach, and the bear population has continued to grow and expand its range in western Maryland throughout that time. Maryland will continue to monitor this valued resource closely and adjust hunting goals and opportunities appropriately.