



Wildlife Resources for 3rd & 4th Grades

2022

Testing Resources:

1. Wildlife Vocabulary (Page 2)
2. Five Characteristics of Mammals (Pages 3-4)
3. Wildlife Evidence (Pages 5-14)
4. How to Use a Dichotomous Key & Skull Dichotomous Key (Pages 15-16)
5. 2022 Study Species Factsheets (Pages 17-29)
6. PA Mammals Fun Facts & Supplemental Resource Links (Page 30)
7. *PA Wildlife Journal: Birds and Mammals* by Kim Young (Pages of study species listed on Page 17)

Focus:

- Students understand the basic features that distinguish mammals from other animals.
- Students use size, shape, toes, and claw marks to identify selected mammal tracks.
- Students can identify the scat of selected mammals.
- Students can distinguish skulls of omnivores, herbivores, and carnivores.
- Students can use a dichotomous key to identify mammal skulls.
- Students can determine the function of a mammal's pelt and explain their coloration and patterns.
- Students can identify the preferred habitat of a focus species.
- Students recognize the focus species by sight and can relate them to terms on the vocabulary list.

Study Species 2022:	Raccoon	Black Bear
Eastern Cottontail	Bobcat	Fisher
Beaver	Coyote	River Otter
Gray Squirrel	Red Fox	
Striped Skunk	White-tailed Deer	

Vocabulary List:	5. Crepuscular	10. Forest	15. Countershading
1. Vertebrate	6. Herbivore	11. Field	
2. Warm-blooded	7. Carnivore	12. Wetland	
3. Diurnal	8. Omnivore	13. Cryptic Coloration	
4. Nocturnal	9. Habitat	14. Warning Coloration	

Sample Questions:	2. Which animal shows a warning coloration?
1. A Beaver is an omnivore.	A. Raccoon B. Black Bear
True or False	C. Striped Skunk D. Bobcat

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Wildlife Vocabulary:

1. **Vertebrate-** an animal with a backbone or spine.
2. **Warm-blooded-** an animal with the ability to generate and conserve heat in order to maintain a stable, warm body temperature.
3. **Diurnal-** an animal active during the day.
4. **Nocturnal-** an animal active during the night.
5. **Crepuscular-** an animal active during dawn and dusk.
6. **Herbivore-** an animal that only eats plant material.
7. **Carnivore-** an animal that only eats other animals.
8. **Omnivore-** an animal that eats plant material and other animals.
9. **Habitat-** a place where a living thing lives and grows that contains food, water, shelter, and space.
10. **Forest-** an area of plants and animals made up mostly of trees.
11. **Field-** a habitat dominated by grasses.
12. **Wetland-** a habitat defined by having water with specific plants and types of soils. There are many types of wetland habitats including bogs, marshes, and swamps.
13. **Cryptic Coloration-** a coloration or pattern that blends in with the animals surroundings.
14. **Warning Coloration-** a coloration that warns predators that an animal is not desirable prey.



15. **Countershading-** when an animal displays a lighter coloration on their underside (to blend in with the sky) and a darker coloration on their upper side (to blend in with the ground).



Five Characteristics of Mammals

Warm-blooded

Mammals are endothermic or warm-blooded. They have the ability to generate and conserve

heat in order to maintain a stable, warm body temperature. They are not dependent on external factors such as temperature or warm surfaces to warm their bodies like a cold-blooded or ectothermic animal.



Raccoon fur

Hair/fur

Mammals have some sort of hair or fur. This hair or fur may not cover the entire body, but it is present in some quantity on every mammal. Hair or fur is used for protection,

insulation, and camouflage.

Birth Live Young and Produce Milk

Mammals give birth to live young as well as produce milk to feed their young. This method of reproduction is very energy costly so most mammals are fiercely protective of their young.

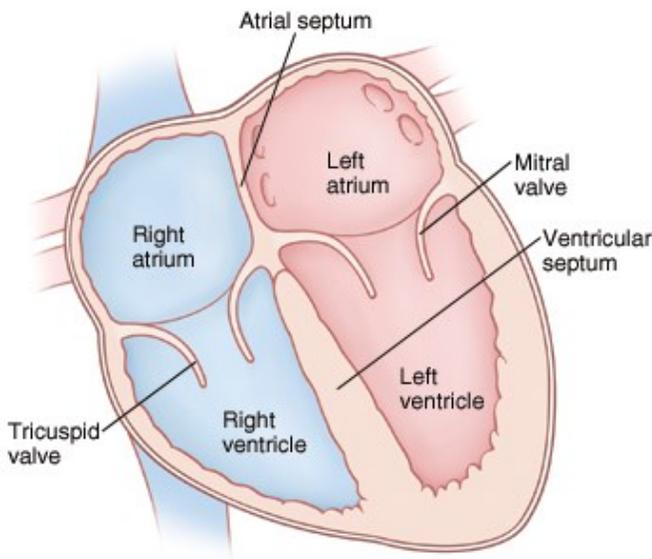


**White-tailed deer mother
nursing her fawn**

Five Characteristics of Mammals (Continued)

Four Chambered Heart

Mammals have a four chambered heart that contains a right and left atrium and a right and left ventricle. This allows the heart to be more efficient in pumping oxygen rich blood to the body and keeps oxygenated and deoxygenated blood separate.



Four chambered heart

Vertebrate

Mammals are vertebrates. They all have a backbone or spine. This gives the animal flexibility and the ability to move in many different kinds of ways.



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White-tailed deer skeleton



Wildlife Evidence

Bobcat



Tracks

Each animal creates its own unique track. Some may be similar in size and shape to each other, but every track has its unique characteristics that can help you tell them apart. Here is what to look for when studying mammal tracks.

Size:

How big or small is your track? Pennsylvania mammal tracks can differ greatly in size from the biggest black bear at seven inches long, to the smallest deer mouse at half of an inch long. Take a measurement of a track you find and compare it with average sizes of different mammal tracks.



Shape:

Observe the shape of the track. Mammal tracks come in a variety of different shapes. Most tracks will be circular, oval, or elongated in shape. Look at characteristics such as whether the track is wider than it is long (fisher), or if it has any protruding toes (opossum). These can all be defining characteristics for mammal tracks.

Opossum track



Fisher track



Tracks (Continued)

Toes:

Count the number of toes on the track. Most mammals will show two, four, or five toes on their track. Some species may even have a different number of toes on the hind and front feet such as the gray squirrel that has four toes on the front foot and five toes on the hind foot. Seeing the individual toe marks can be difficult depending on where the track is. Some toes may be pushed together and look like one toe, or one toe impression may be missing entirely. Do your best to distinguish all the toes that you can to get an accurate track identification.



Gray squirrel track with four toes on the front and five toes on the hind feet.

Claws:

Notice if the track has any claw marks. Many Pennsylvania mammals have claws on the ends of their toes. One toe usually contains one claw, however it is not always possible to see claw marks. Felines (animals in the cat family) such as the bobcat have claws, but they are retractable. The presence of claw marks is a great way to distinguish between a cat's and a dog's track. Cat's retract their claws when they are walking, therefore, a four-toed track without any claw marks, larger than a housecat, is almost always a bobcat. Dogs such as foxes and coyotes do not retract their claws so claw marks should be present on all of their toes.

Bobcat track



Coyote track

Fur

Mammal furs are all unique and serve a variety of different functions. These functions are determined by the habitat the mammal lives in and how it has evolved to survive. These are the main functions of a mammal's fur.

Insulation:

Many mammals live in areas where the temperature can be very cold. A mammal's coat helps to keep the animal insulated and warm during cold times. A thick layer of hair traps in warm air close to the animal's body keeping it warm.



Red fox staying warm in the snow.

Protection:

A mammal's fur can protect it from its habitat. Mammals like the white-tailed deer and black bear live in habitats that contain thorns, brambles, sticks, and rocks. A thick coat will protect their skin from being cut and damaged while traveling through these areas. Fur will also keep a mammal warm and dry. Semi-aquatic species such as beavers, river otters, and mink have waterproof fur to keep them warm and protected while swimming in cold water.



Plants stuck on a white-tailed deer.

Camouflage:

Camouflage is another important function of a mammal's fur. It is crucial for animals to be able to hide and blend in with their environment to avoid getting eaten by other animals. There are three different types of camouflage.

Fur (Continued)

Cryptic Coloration:

Cryptic coloration is the “classic” camouflage where an animal has a color and pattern that matches its surroundings. These colorations and patterns are all unique resulting from the different habitats mammals live in. An example of cryptic coloration is a white-tailed deer with a light brown pelt that blends in with the light brown trunks and branches of trees in a forest.



Camouflaged white-tailed deer.

**Darker to blend in with
ground**



Lighter to blend in with sky

Countershading:

An animal displaying countershading has a lighter coloration on the under side that will camouflage with the lighter colored sky when an animal looks up at them. They will also have a darker coloration on the upper side of their body to blend in with the darker ground when an animal looks down at them. This form of camouflage is seen in mammal species such as the eastern gray squirrel and flying squirrel.

Warning Coloration

A coloration that warns predators that an animal is not desirable prey. Striped skunks display a contrasting coloration on their back that serves as a warning to predators.



**Striped skunk with
warning stripes.**

Scat

Each animal's scat has unique identification features partly due to their unique diet. Here is what to look for when identifying scat.

Size:

Measure the scat and compare that to average scat sizes for different mammals. For example a black bear produces a much bigger scat than a gray squirrel.

Gray squirrel scat compared to a dime



Black bear scat with ruler

Shape:

Mammals produce different shaped scat. The most common shapes are:

- Pellets (white-tailed deer)
- Long strings (red fox)
- Tubular (bobcat)
- Spheres (beaver)
- Flattened piles (river Otter)



Look at what kind of shape the scat has to help narrow down which animal you've found evidence of.

Scat (Continued)

Diet Clues Found Within the Scat:

Mammals eat a variety of different foods. Not all of the food item may be digested by the animal. If it is not digested then it is excreted with the scat. As a result, you may be able to find recognizable objects in a mammal's scat such as:

- Seeds
- Hair
- Bones
- Sawdust
- Scales



Coyote scat with visible hair.



Raccoon scat with visible seeds.

Diet evidence can determine whether the animal is an herbivore or carnivore.

Location and Placement:

Look at the habitat the scat pile is located in and then determine a list of animals that live in that habitat. For example, white-tailed deer scat will often be found in forested and agricultural areas and river otter scat will often be left on the banks of a river or stream.

Mammals will also use their scat to mark their territory. This is a sign to other individuals to stay out of their territory. Often scat markings will be left in open sections such as trails and on top of rocks in order to display it to other animals. Species such as coyotes, bobcats, foxes, and raccoons will display their scat in this way.



Coyote scat on trail

Skulls

A mammal's skull can be used to identify the animal as well as determine the diet and behavior of the species. Here is what to look for when identifying a skull.

Size:

Sizes of mammal skulls have a very wide range from the smallest shrew (14mm) to the largest elk (18in). Measure the length of a skull to help narrow down the species you are observing.



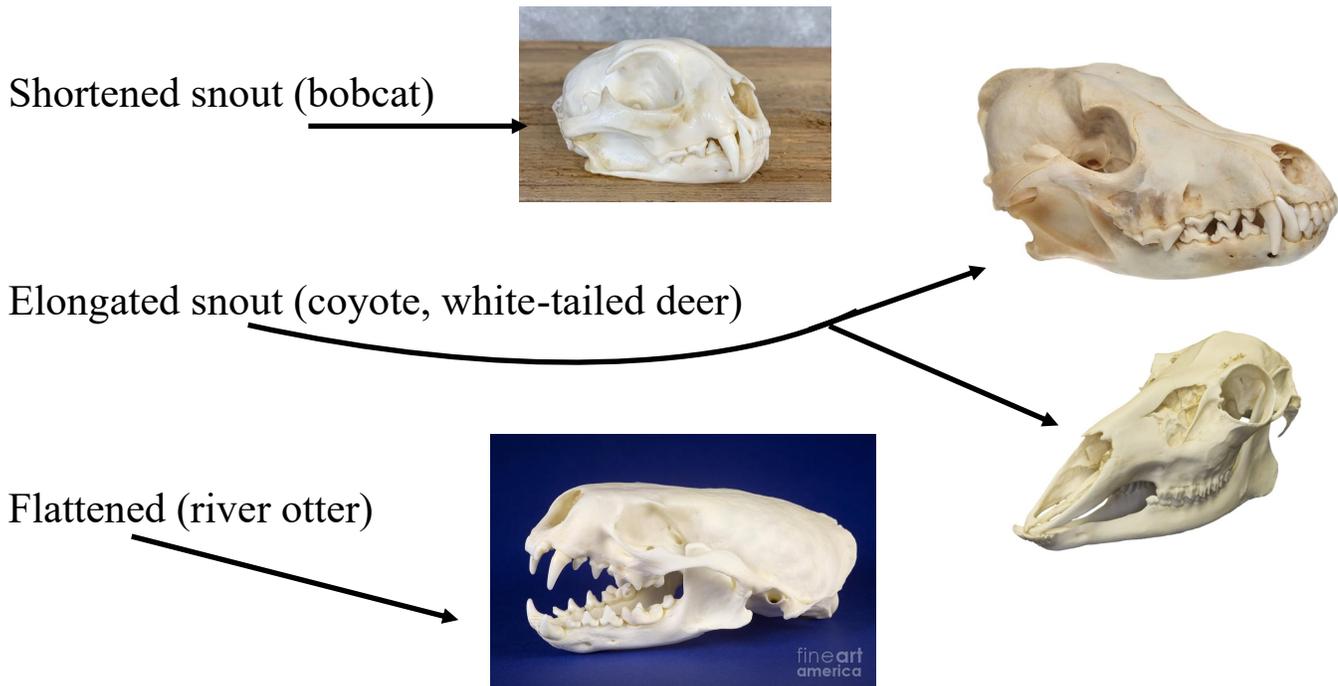
Pygmy shrew skull



Elk skull

Shape:

Mammal skulls have many diverse shapes. Common shapes include:



Skulls (Continued)

Teeth:

A skull's teeth provide significant insight into the species it belongs to as well as the diet of that animal. There are 3 main types of teeth:



**Beaver
Incisors**

Incisors– teeth in the very front used for biting and chopping



**Coyote
Canines**

Canines– pointy teeth on the sides used for cutting and shearing



**White-
tailed
deer
Molars**

Molars– flat teeth in the back used for chewing and grinding

Looking at the teeth can help to determine if an animal is more commonly a predator or a prey animal.

- Sharp teeth with pointy canines and molars are found in the mouth of a carnivore and predator.



Bobcat Skull



Gray Squirrel Skull

- Long incisors, flat molars, and no canines are found in the mouth of an herbivore and commonly preyed upon species.

- Pointy canines and flat molars are found in the mouth of an omnivore and predator.



Black Bear Skull

Skulls (Continued)

Eyes:

Mammals will have different eye placements on the skull if they are more commonly a predator or preyed upon species. There are three types of eye placement.

Eye Sockets Facing Forward – An animal with their eyes facing forward is most likely a predator species that looks forward with binocular vision while hunting for prey. Binocular vision with two eyes covering the same area provides depth perception.



Coyote skull with eyes facing forward.



White-tailed Deer skull
with eyes facing outward.

Eyes Facing

Outward – An animal commonly hunted as prey has their eyes facing outward to cover the most area around them. These animals need to be constantly aware all around them to watch for predators.

Eyes on top of skull - An animal commonly hunted as prey that lives in water has their eyes and nose on the top of their head so they can search for predators and breathe without exposing their whole head and body to danger.



Beaver skull with eyes on top.

Sagittal Crest:

Some mammals will have a structure called a sagittal crest on their skull. This is a ridge on the back of the skull that allows for greater muscle attachment giving the animal a stronger bite force. Herbivores do not have this feature on their skull.

Sagittal crest

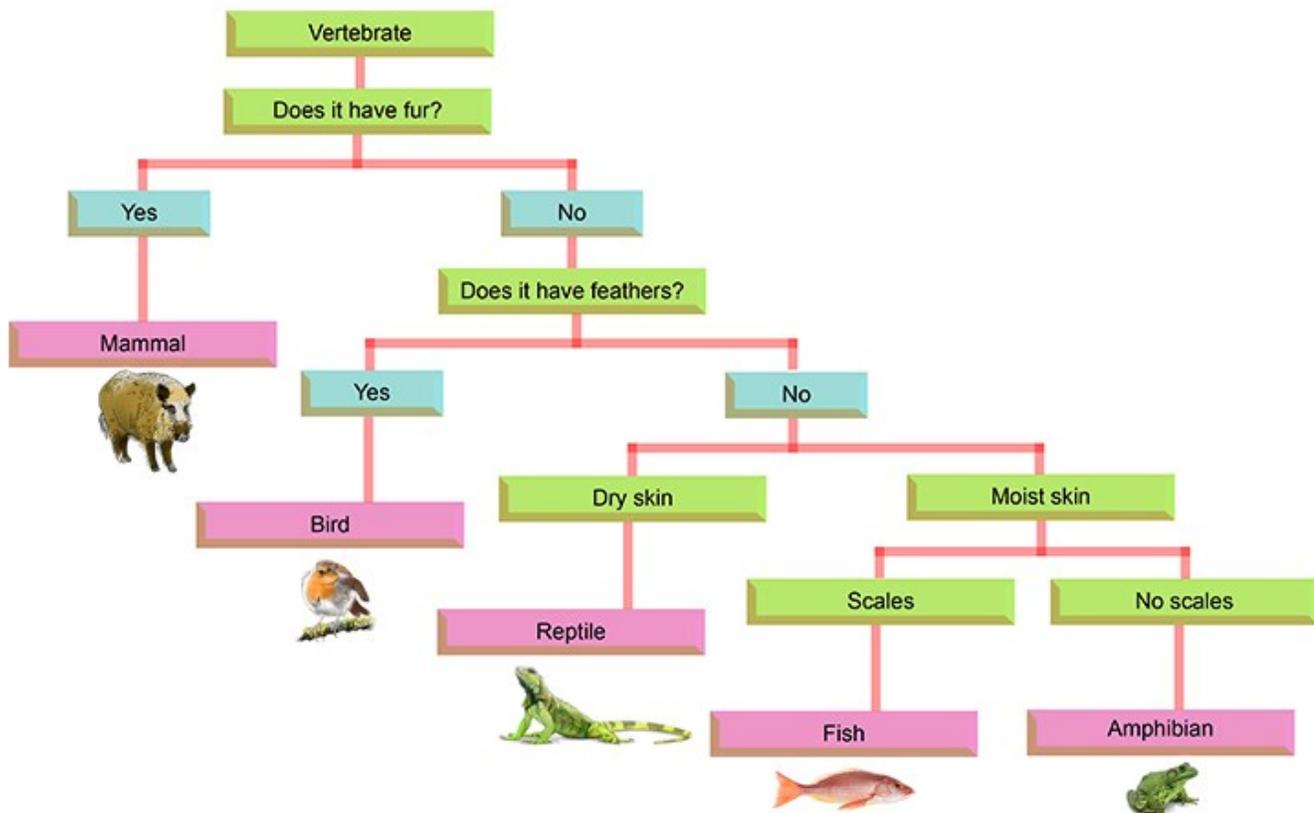


Fisher Skull

How to Use a Dichotomous Key

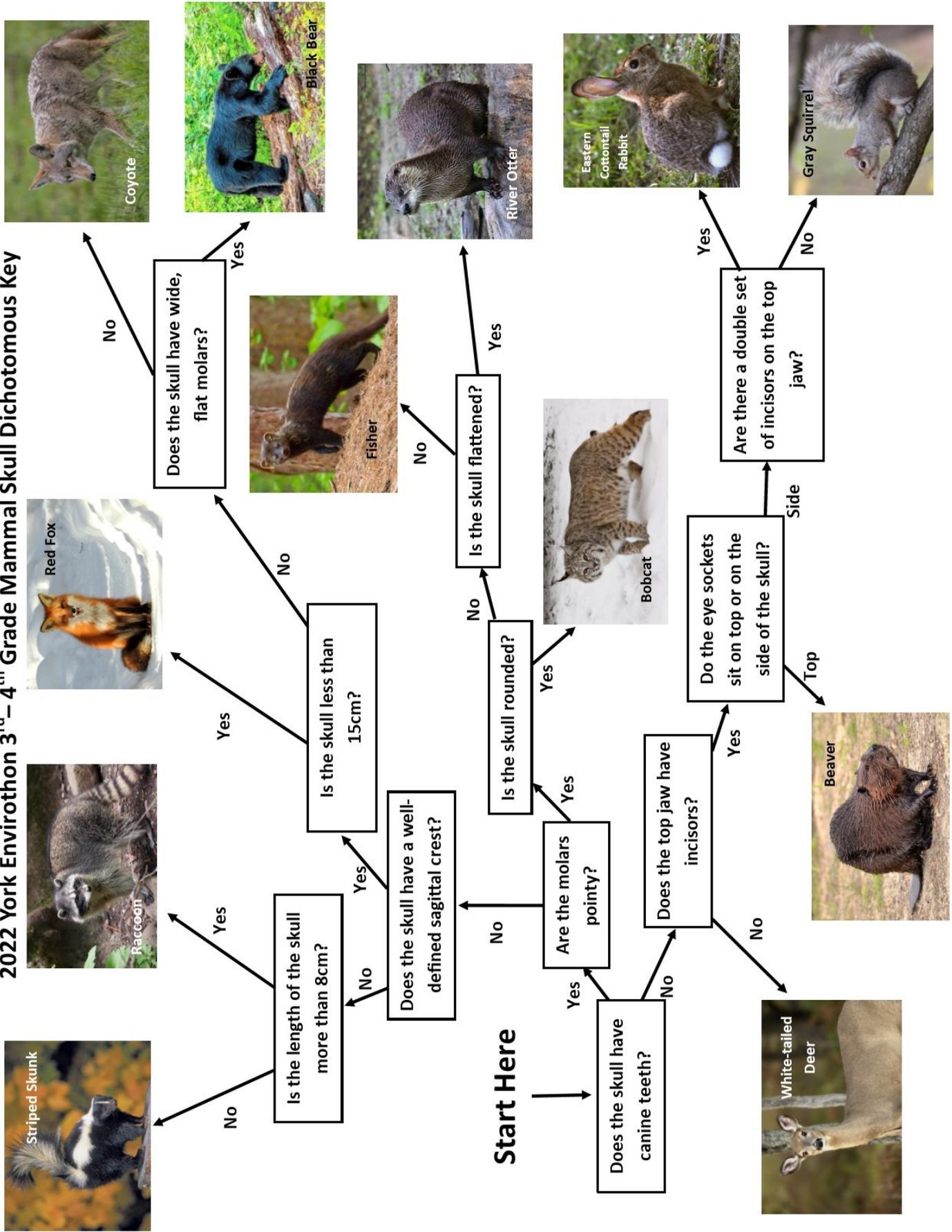
A dichotomous key is a tool for identifying plants or animals based on choices between alternative characteristics. A key consists of a series of statements or questions with two possible answers. Each answer leads users closer to the correct identification of an organism.

For example, the key below will identify the animal class an animal is grouped into in scientific classification.



The next page contains a dichotomous key for identifying the skulls of the twelve study species for the 2022 Envirothon. Familiarize yourself with this key and how to use it to identify skulls of these species.

2022 York Envirothon 3rd – 4th Grade Mammal Skull Dichotomous Key



2022 Study Species Factsheets

Below are the twelve study species that will be discussed in the next section. Next to each species are the page numbers to reference in the *PA Wildlife Journal: Birds and Mammals* by Kim Young.

- White-tailed Deer** (pgs. 98-103)
- Beaver** (pgs. 27-30)
- Eastern Cottontail Rabbit** (pgs. 21-22)
- Bobcat** (pgs. 83-86)
- River Otter** (pgs. 80-82)
- Fisher** (pgs. 65-66)
- Black Bear** (pgs. 59-64)
- Red Fox** (pgs. 93-95)
- Coyote** (pg. 92)
- Gray Squirrel** (pgs. 49-52)
- Raccoon** (pgs. 75-79)
- Striped Skunk** (pgs. 69-71)

Each of the next informational sheets has a track background of the species. Those background tracks are to scale and represent the actual size of the animals track.

White-tailed Deer

Habitat: Forest and agricultural areas



Fur: Mostly brown with white on the neck and belly underneath; white underneath tail; very coarse hair to protect against brambles, thorns, and branches in forest

Track: A heart-shaped track with two distinct toes; two to three and a half inches long



Scat: Small oval pellets resembling chocolate raisinets

Diet: An herbivore eating things such as grasses, leaves, buds, corn, soybeans, fruits, and nuts



Skull is about 11.5 in. long

Beaver

Habitat: Lakes, ponds, streams, and rivers



Fur: Brown over entire body; very soft fur that is waterproofed using an oil created by the animal

Track: All feet have five toes; hind foot is webbed and is six to seven inches long; front foot is not webbed and is two to three inches long



Scat: Pellets that are about an inch in diameter; looks like sawdust packed together

Diet: An herbivore eating inner bark of trees, twigs, buds, and leaves



Skull is about 5.5 in. long

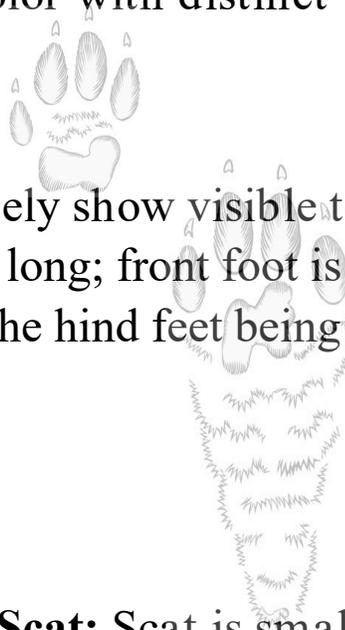
Eastern Cottontail Rabbit

Habitat: Fields, hedgerows, forest edges, young forests, and suburban areas



Fur: Light brown in color with distinct white puff of a tail; very thick and soft fur

Track: Oval tracks rarely show visible toe pads; hind foot is longer being up to three inches long; front foot is up to one inch long. You will usually see tracks with the hind feet being in front.



Scat: Scat is small circular pellets resembling cocoa puffs cereal

Diet: An herbivore eating grasses, forbs, and garden plants



Skull is about 3 in. long

Bobcat

Habitat: Forests, mountains, semi-deserts, and brush-land



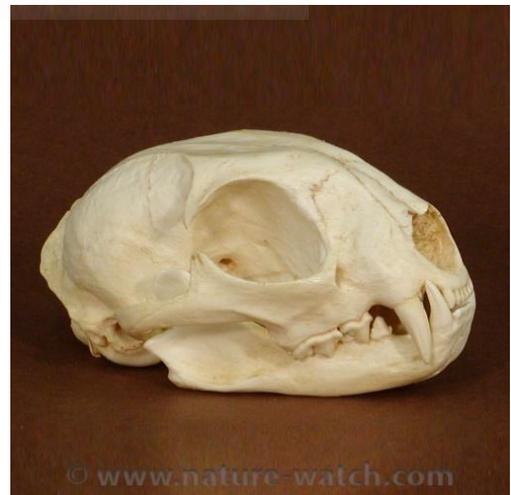
Fur: Light brown overall with light to dark stripe and spotted markings and a white underbelly; thick patches of fur on face and a short bobbed tail

Track: Four toed track with distinct toe pad; no claws because cats retract their claws when walking; one and a half to two and a half inches long



Scat: One to three strands about four inches long with distinct narrower tips; will notice fur and maybe small bones in the scat

Diet: A carnivore eating rabbits, squirrels, mice, small deer, and birds



Skull is about 5 in. long

© www.nature-watch.com

River Otter

Habitat: Rivers, streams, lakes, and ponds



Fur: Dark reddish brown fur that is very thick, but also streamlined; waterproofed fur for life in the water; long tail about one third of its body length

Track: Five webbed toes on all feet; a very wide track at three and a half inches wide and four inches long; webbing may be faint in track or may not be visible



Scat: Irregularly shaped and flattened pile often containing lighter colored fish scales and bones

Diet: A carnivore eating fish, crayfish, crabs, birds, frogs, and turtles



Skull is about 4.5 in. long

Fisher

Habitat: Coniferous and mixed-coniferous forests



Fur: Dark brown with black sections on its backside, tail, and legs; big bushy tail

Track: Five toes on all feet, hind foot is slightly larger; very distinct claw marks and very wide track



Scat: slender strand about two inches long and pointed tips; looks twisted; can see fur and maybe porcupine quills

Diet: A carnivore eating porcupines, hares, squirrels, fish, birds, and carrion (dead animals)



Skull is about 5 in. long

Black Bear

Habitat: Coniferous and deciduous forests



Fur: Black and even dark brown in color (most PA black bears are jet black); thick, coarse hair for roaming around in thickets, short stub of a tail

Track: Very large track; five toes on each foot each showing claw marks; hind foot is shaped like a humans foot



Scat: Very large scat piles that can weigh as much as a pound; usually tubular in shape and can see seeds or fur in the scat

Diet: An omnivore eating berries, roots, nuts, seeds, grasses, deer, fish, insects



Skull is about 12 in. long

Red Fox

Habitat: Meadows, agricultural fields, forests, wetlands



Fur: Orange-red in color with black legs, a white tip to the tail, and a white throat; thick and very soft fur with a big bushy tail

Track: Circular track with four toe pads and claw marks and one heel pad; tracks are about two inches long by two inches wide



Scat: Thin and elongated with pointed ends; contains bits of fur, bones, nuts, and seeds

Diet: An omnivore eating mice, voles, chipmunks, squirrels, rabbits, grasses, seeds, and berries



Skull is about 5.5 in. long

Coyote

Habitat: Meadows, forests, deserts, suburban areas



Fur: Gray and brown in color with some black streaking; white underbelly and a long bushy tail

Track: Oval shaped with four toe pads and claw marks, and one heel pad; two and a half inches long and two inches wide



Scat: Elongated and tubular in shape with pointed ends; can contain bits of hair, bones, and seeds

Diet: An omnivore eating mice, rats, squirrels, rabbits, small deer, grasses, berries, and seeds



Skull is about 7.5 in. long

Gray Squirrel

Habitat: Coniferous and deciduous forests, suburban areas



Fur: Light gray in color with a white underbelly; long and very bushy tail

Track: Small track; front foot has four toes with claws and is about one and a quarter inches long; hind track has five toes with claws and is about one and a half inches long; the hind foot is usually seen in the front



Scat: Small pellet shaped scat $\frac{3}{8}$ inch long

Diet: An omnivore eating nuts, acorns, seeds, fruits, flowers, insects, frogs, and bird eggs



Skull is about 2.5 in. long

Raccoon

Habitat: Forests, agricultural areas, suburban areas



Fur: Dark gray and black with black “mask” over the eyes; long bushy tail with black rings around it

Track: Five toes on each foot with small but distinct claw marks; hind foot is elongated at about three inches long; front foot is smaller at about two inches long



Scat: Flattened or tubular piles with blunt ends: contains many seeds and possibly some hair and bones

Diet: An omnivore eating berries, nuts, seeds, crayfish, fish, insects, and rodents



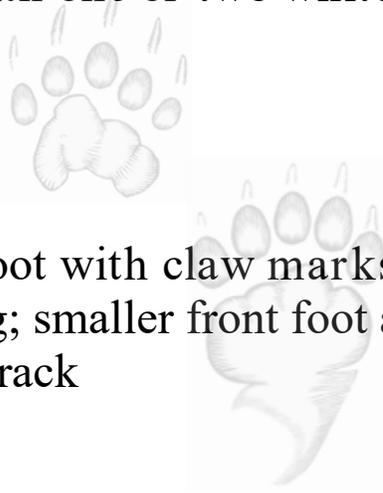
Skull is about 4.5 in. long

Striped Skunk

Habitat: Forests, meadows, suburban areas



Fur: Body mostly black with one or two white stripes going down its back and tail; long tail



Track: Five toes on each foot with claw marks; elongated hind foot at one and a half inches long; smaller front foot at one inch long; looks like a miniature black bear track



Scat: Tubular in shape with blunt ends; usually about one to two inches long; can contain seeds, insects, and fur

Diet: An omnivore eating berries, seeds, insects, rodents, fish, and carrion (dead animals)



Skull is about 3 in. long

PA Mammals Fun Facts

- Fishers are the only known predator of porcupines.
- A beaver uses its long flat tail as a fat storage container for winter.
- Beavers have one claw on each of their hind feet that is a double claw that they use to comb their fur.
- A white-tailed deer antler is the fastest growing bone in the world. A male deer will shed its antlers from February to March and grow new ones from May to September.
- The Pennsylvania state mammal is the white-tailed deer.

Supplemental Resource Links

The following links provide fun and interesting activities and videos, but specific test questions will not be pulled from these sources unless it is already covered in this packet.

Pennsylvania Game Commission Resources for Educators

<https://www.pgc.pa.gov/Education/ForEducators/Pages/default.aspx>

Pennsylvania Game Commission YouTube Page

<https://www.youtube.com/user/pagamecommission>