Top of the Food Chain (Apex Predators)

Teacher Lesson Plan

Lesson Time: 45 minutes – 1 hour

Game: 30-45 minutes

Introduction: Apex predators play a vital role in any ecosystem. What would happen if they were taken away? This lesson plan helps students discover the important balance of predators and prey. We will focus on the apex predators that are here at Turpentine Creek Wildlife Refuge, and what would happen to their ecosystem if they were to disappear.

Background: Turpentine Creek Wildlife Refuge's mission is to provide lifetime refuge for abandoned, abused, and neglected big cats with an emphasis on tigers, lions, leopards, and cougars. Being born into captivity, these animals can never be released back into the wild. They not been taught to survive in the wild by their mothers, and also cannot manage to find territory, mates, or food due to human interference. By learning about the importance of the food chain, we can protect predators and the balance of the entire ecosystem in the natural world.

Theme: Apex predators are at the top at the food chain, so they affect everything below them. This is called a top-down regulating force. Without predators, this regulating force disappears on the environment and the trophic cascade and systematic food chain collapses. Herbivores increase, overconsuming primary producers. When these producers decline, it leads to a decline of producers and all other species that depend on them. Without apex predators, a mesopredator release can also occur, where predators in the middle of the food chain (secondary consumers) become overabundant, causing an ecological imbalance.

Objective: Students will identify the different parts of the food chain, and the importance of predators in an ecosystem. They will use their vocabulary list and associate words with the lesson plan, and identify characteristics of a predator, as well as the role they play in the food chain.

Resources: Lesson plan for appropriate grade level, printed activities, string/rope, dry erase board and marker, pictures of animals, crayons or markers, pencil.

Vocabulary List:

Apex Predator: top of the food chain. Top predator, no other creatures prey upon them.

Autotroph: produces food through photosynthesis (energy from sunlight)

Biological Diversity: variability among living organisms from all sources

Carnivore: only consumes meat, hunts or scavenges for prey

Ecosystem: biological community of interacting organisms and their physical environment

Food Chain: a series of organisms each dependent on the next as a source of food

Food Web: Unique interactions and relationships involved in the transportation of energy between living organisms

Herbivore: only consumes plants

Heterotroph: organism that cannot manufacture their own food, obtains food an energy from plants and animals

Keystone Species: a species on which other species in an ecosystem largely depend, such that if it were to disappear the ecosystem would drastically change

Mesopredator: middle of the food chain example: foxes and coyotes

Omnivore: eats both plants and meat

Primary Producer: the foundation of an ecosystem, creating food through photosynthesis or chemosynthesis

Predator: hunts and naturally preys on other animals

Prey: what predators eat, hunted and killed for food

Primary Consumers: animals that eat primary producers (herbivores)

Secondary Consumers: carnivores or omnivores, can be preyed upon by tertiary consumers

Tertiary Consumers: apex predators, at the top of the food chain, feeds upon secondary and primary consumers

Trophic cascade: triggered by the removal of apex predators, changes the ecosystem structure and nutrient cycling (negative effect).

Umbrella Species: protecting these species indirectly protects the any other species within the same ecological community

1st Grade:

1-LS1-1: Students will use the activities to design a solution to a human problem (impacts to an ecosystem), by mimicking how species are an important part of the food web, and need to be protected them survive, grow, and meet their needs.

1) Introduce the lesson with the class: Top of the Food Chain. Ask students to brainstorm which species are at the top, and form a class list.
    a. Why is this animal at the top of the food chain?
    b. How do they obtain their energy?
    c. What kind of eating style do they have? Ie. Producer, herbivore, omnivore, carnivore
    d. How do they survive? What are the things it needs in an ecosystem to live?
2) Which animals are at the bottom of the food chain?
    a. How do they obtain their energy?
    b. What kind of eating style do they have?
    c. How do they survive?
3) What about plants and decomposers?
    a. How do they obtain their energy?
    b. How do they survive?
4) What are some threats to the ecosystem?
    a. How do humans impact the natural world?
5) Food Chain Activity: with a large piece of string or rope, provide each of your students a species from the "predator vs. prey" game. Have them line up from the top of the food chain to the bottom, holding onto the rope. **Worksheet Pages 9-11**
    a. All living beings gain energy from the bottom (sunlight-primary producers, primary consumers, secondary consumers, and tertiary consumers). A food chain is a linear line, that shows how energy moves through an ecosystem. **Worksheet Pages 4-5**
6) Food Web Activity: Using the same string, have students grab onto what they would consume to survive. **Worksheet Page 6**
    a. Everything within an ecosystem is connected, and depend on each other to survive. This is what a food web looks like.
7) Predator vs. Prey game
    a. Take students to an open area where they can play tag (indoors or outdoors)
    b. Follow procedures for the lesson **(worksheet pages 7-11)**
    c. Go over rules of the game beforehand.
8) Class Discussion
    a. Why is it important to have a variety of species within an ecosystem?
    b. What happens when it is thrown off balance?
    c. How does losing species affect the environment?
    d. Are there ways that we can help protect the balance of nature? How?
    e. Share with the class some ways that you can make a difference for the natural world.
    f. What did you learn today?

Food Chain Activity Worksheet

There are 6 different types of consumers in the animal kingdom. Read the descriptions below to learn more about feeding styles in the wild. Plants and animals have evolved to have many different survival skills to adapt to their surroundings. Plants and animals can have more than one feeding type.

Decomposer- an organism that decomposes organic material (dead things) and help recycle them back into their environment for plants to use.

Producer- plants make their own food, and use energy from the sun, carbon dioxide (CO_2) from the air, and water to make glucose (sugar) and produce oxygen.

Consumer- Animals are called consumers because they cannot create their own energy, and they must eat something to survive. There are 3 different types:

Herbivores- only eat pants

Omnivores- eat plants and animals

Carnivores- only eat animals

Now, draw a red circle around all of the predators. Draw a blue circle around all of the prey. Draw a green circle around all the producers. Draw a brown circle around the decomposers. There can be more than one for any type of animal.

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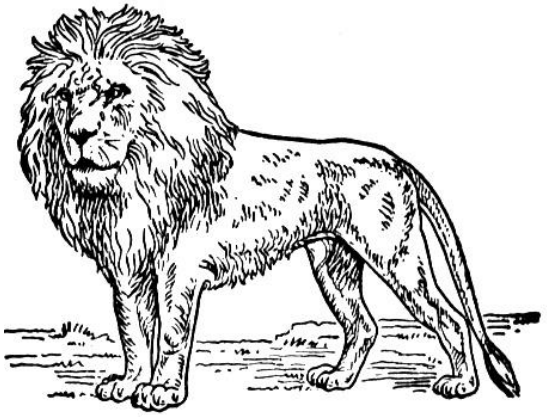
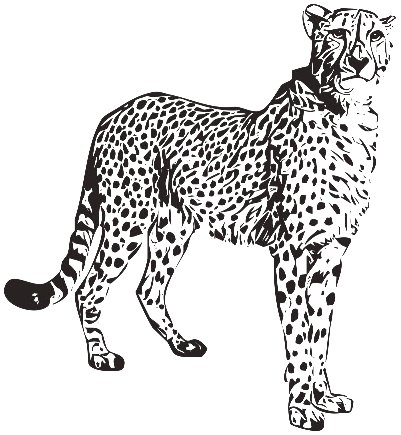
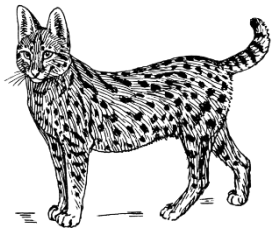
Rescuing Exotic Cats Nationwide

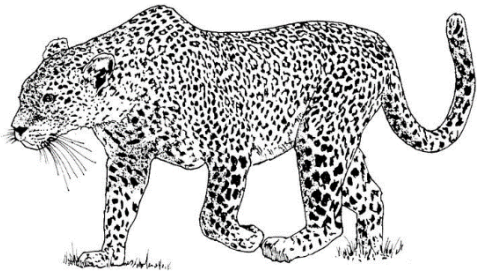
African Savanna Food Chain Activity:

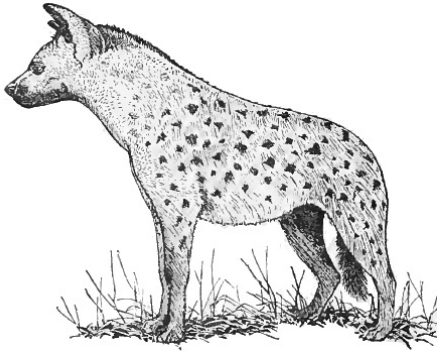
Draw a line from each organism to what they eat.

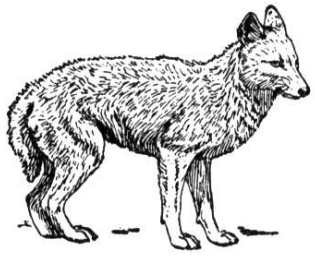


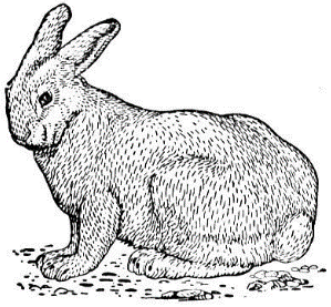


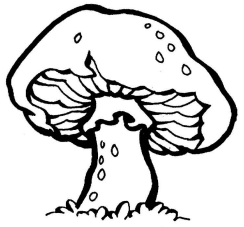








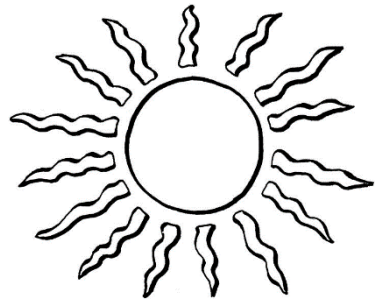


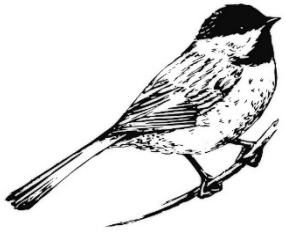


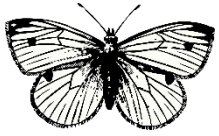
North America Food Web Activity:

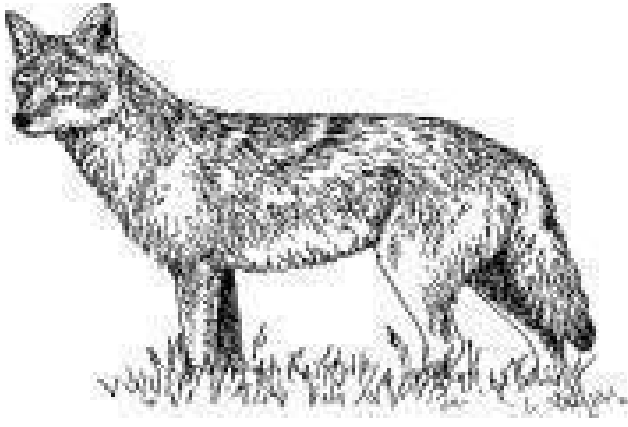
1) Draw an arrow to each plant or animal and what it consumes. Color predators red, prey blue, plants green, and decomposers brown.

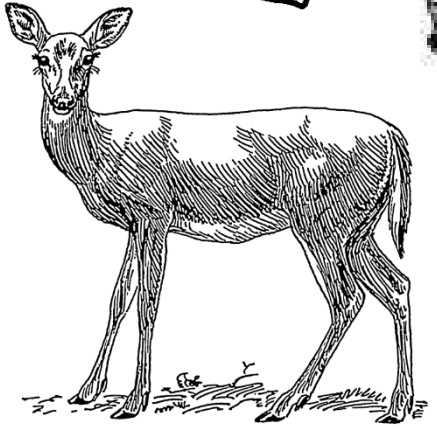
2) After you have labeled and circled all of your feeding types, draw a smiley face on the food web where you think humans will go, and make them a part of your food chain by drawing lines to what they would eat

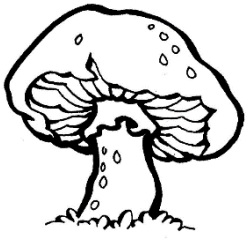


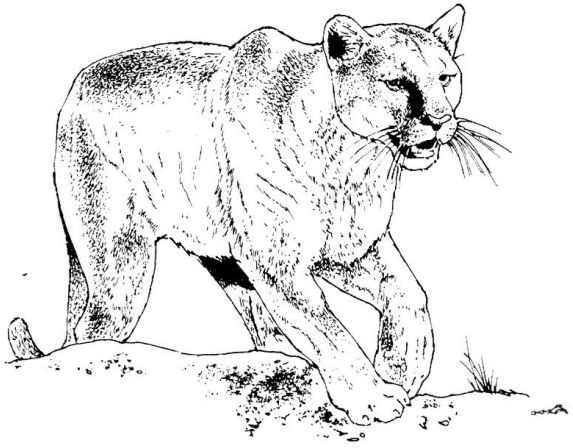


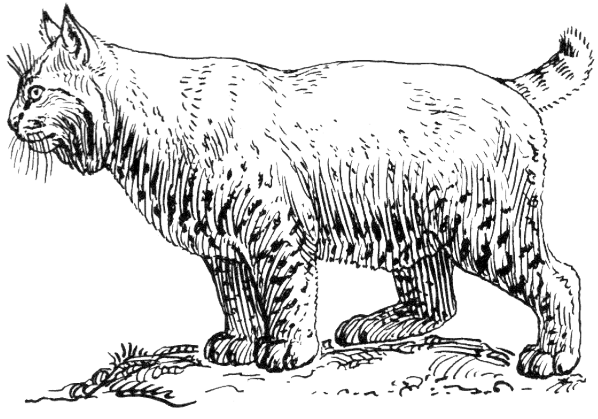


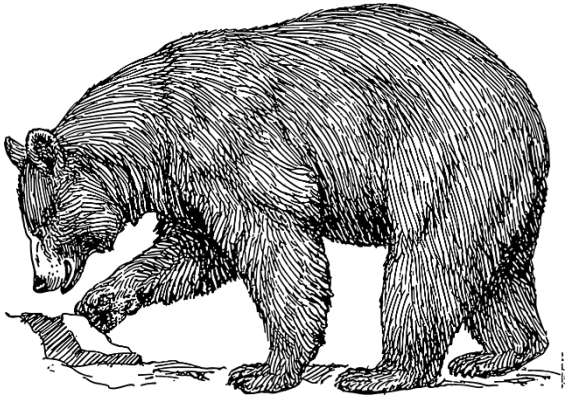












Predator vs. Prey Game (K-5)

This program allows students to understand the importance of the food web, and the species within them. It is also a great way to get students outside and active.

Getting Ready:

- Use tags of animal species and cut them out. Print two pages of each species page, so there is a variety for the game.
- You may laminate them to use them multiple times, or allow the students to color them and make a food chain afterwards.
- Making necklaces out of the animal cards makes it easier to play the game, hands free, or they can be taped on.

Procedure:

1) Assign each student an animal from the pictures, and ask them to identify what that animal eats, or how it gets its energy (if a plant). They can draw their animal and try and guess what they eat before the game.
2) Take the students to an open field or gym to play the game. Have them stand in a circle and state what kind of animal or plant they are, and what they would eat?
3) How to play: Students can chase their prey and what they eat in a game of tag. When they catch their prey, have them say "I ATE YOU". Emphasize that there is no shoving or pushing, that it is a friendly game of tag.
4) Students should keep track of how many times they tagged someone, they do not need to keep track of them being tagged.
5) After 10 minutes, have the students go back into a circle, and say how many times they got to eat. If they were only something that were eaten, would they have survived?
6) You may repeat the game multiple times, switching up which animals the students are. You can also add more prey items and less predators, or all predators and no prey. Change up the balance of the species in different rounds. The last round, students have fun choosing which species they would like to be.

Discussion Questions:

1) Why is it important that there is a variety between predators and prey?
2) What happens when you take away predators?
3) What happens if there are too many predators?
4) What happens when there is not enough prey?
5) How does the food web affect humans?
6) What if we took away your animal from the food web, how would it affect the other species?
7) Can we help protect wildlife? How?
8) What did you learn from this activity?

What Will I Eat?

Vulture- carnivore- small prey items, large freshly dead animals, insects, fish, amphibians, birds, mammals, reptiles

Frog- carnivore- insects, worms, small prey, reptiles, mammals

Coyote- omnivore, small and large prey, mammals, berries, nuts, insects, bird eggs

Cougar- carnivore- main diet is deer, but will go after medium sized prey, rabbits, coyotes

Chipmunk- herbivore- nuts, berries, mushrooms

Earthworm- decomposers- breaks down grasses, plants, dead leaves, mushrooms

Butterfly- herbivore- feeds on nectar from plants, berries, grasses

Deer-herbivore- grasses, acorns, leaves, nuts

Bobcat-carnivore- small prey, rabbits, amphibians, birds, chipmunks, mice, squirrels

Chickadee (bird)-omnivore, insects, seeds, berries, worms, nuts

Fish- herbivores, omnivores, or carnivores- insects, worms, berries, plants, nuts

Grasshopper-herbivore- plants (leaves and grasses)

Rabbit-herbivore- plants, nuts, mushrooms, berries

Mosquito-parasite/carnivore- feeds off of animal blood

Bear-omnivore- plants, mushrooms, fish, rabbits, deer, insects, worms, berries, nuts (fun fact: bears are 90% vegetarian, and forage for most of their food).

Snake-carnivore-small prey, squirrels, rabbits, mice, insects, worms, birds

Owl-carnivore- small prey, mice, squirrels, snakes, fish, frogs, chipmunks, worms, insects

Squirrel-herbivore- nuts, berries, plants

Hawk-carnivore- small prey, birds, mammals, amphibians, reptiles, fish

Mouse- herbivore or omnivore, opportunistic feeders- plants, nuts, mushrooms, berries, insects, worms

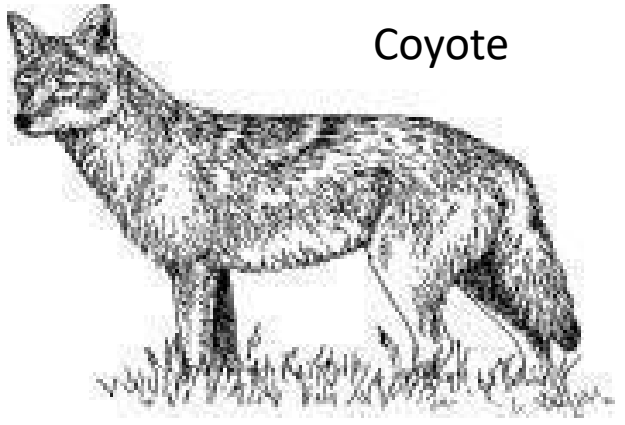
Eagle-carnivore- small prey, birds, mammals, amphibians, reptiles, fish

Fly-omnivore- decaying matter (anything that has died), plants and animals

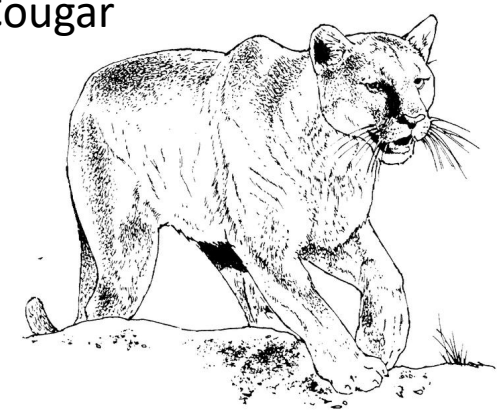
Vulture

Frog

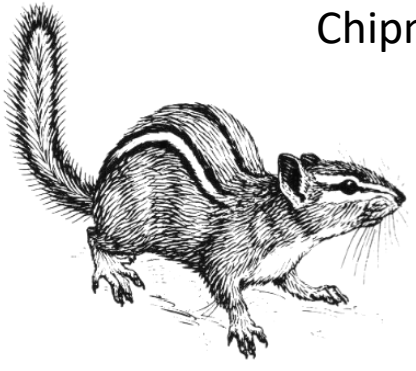
Coyote

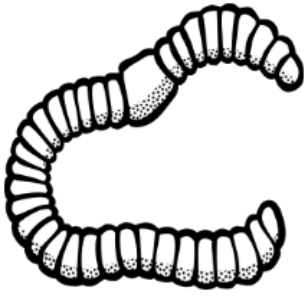


Cougar

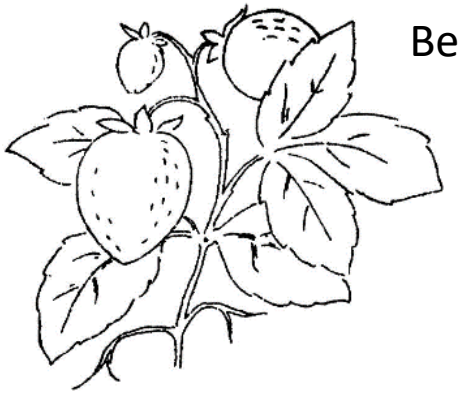


Chipmunk

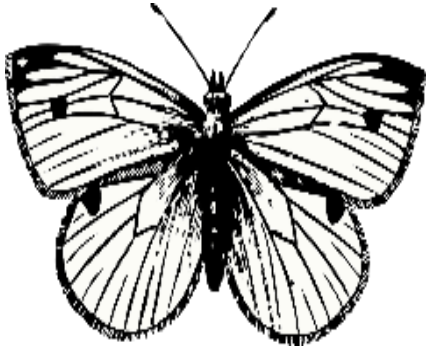




Earth Worm

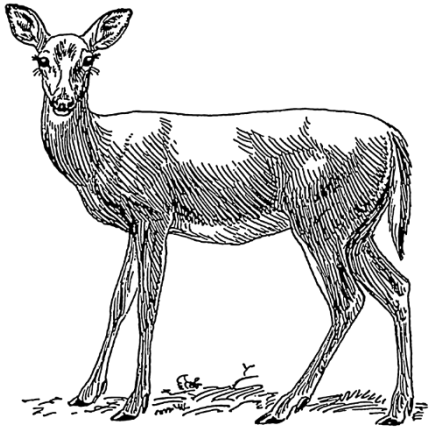


Berries

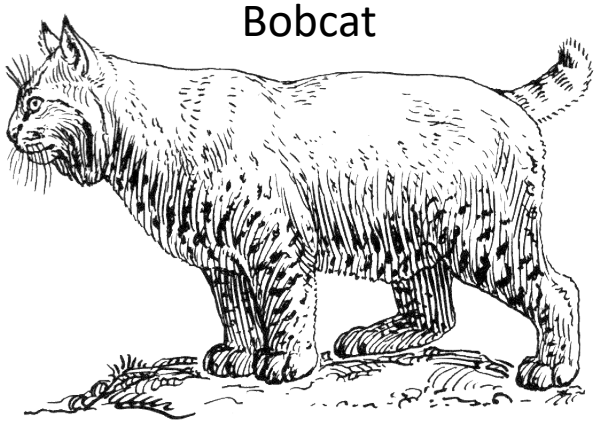


Butterfly

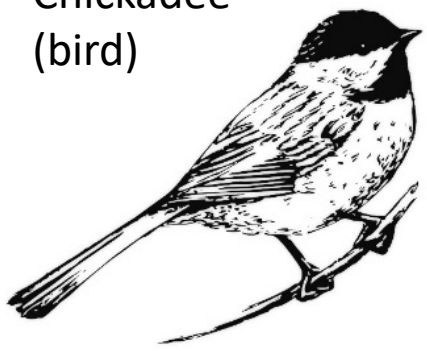
Deer



Bobcat

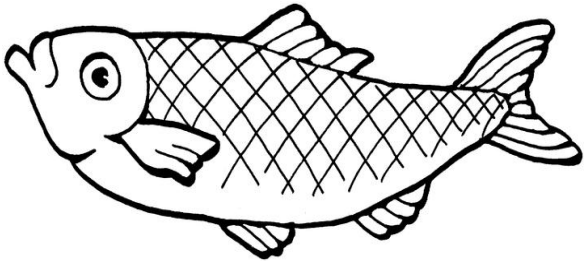


Chickadee
(bird)

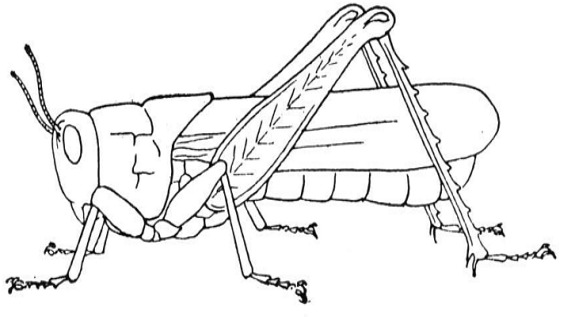


Acorn

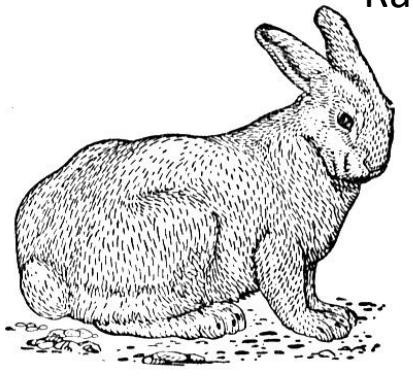
Fish



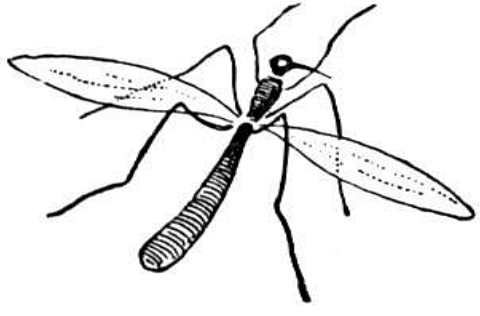
Grasshopper



Rabbit

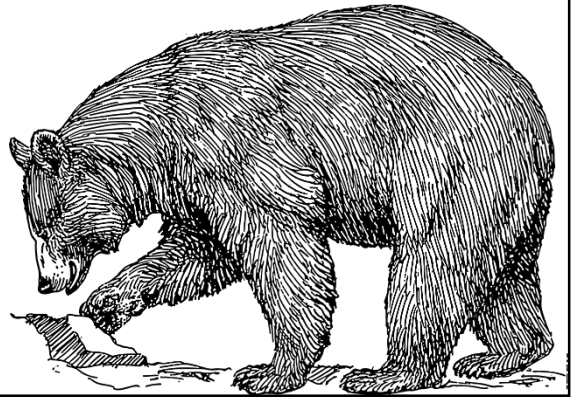


Mushroom

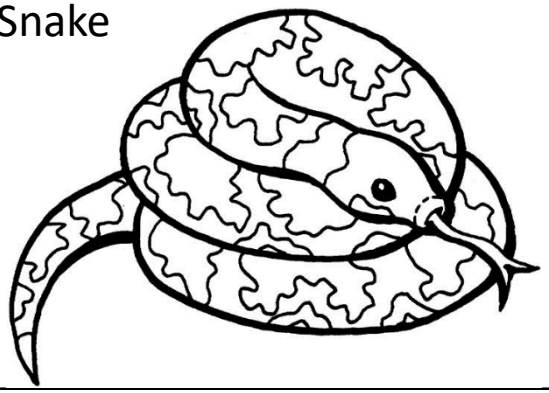


Mosquito

Bear



Snake



Owl

Leaf

Grass

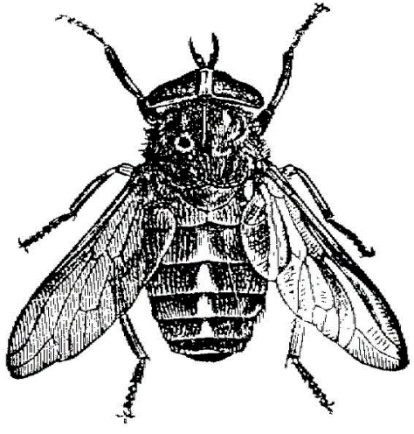
Squirrel

Hawk

Mouse

Eagle

Fly



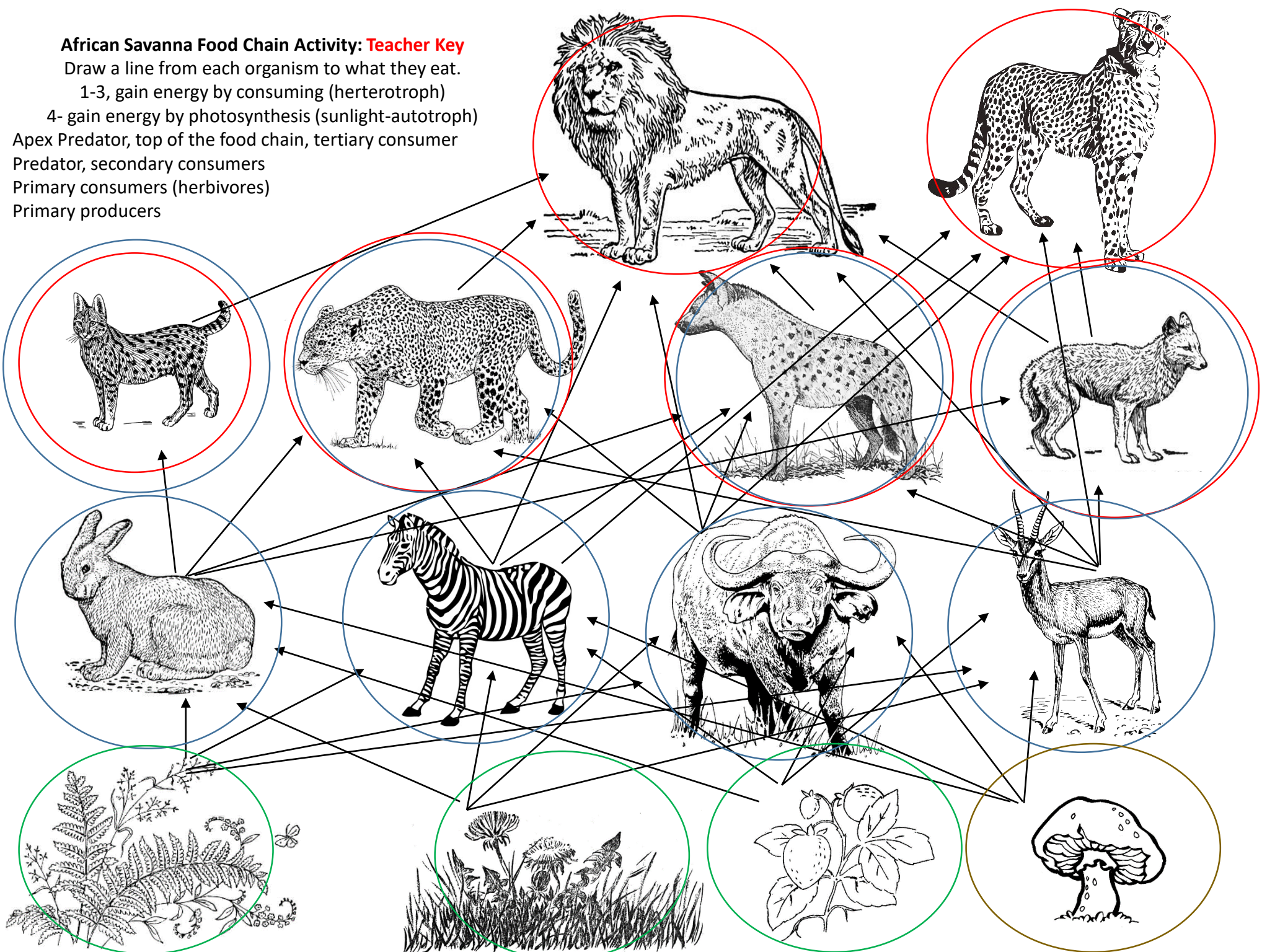
African Savanna Food Chain Activity: Teacher Key

Draw a line from each organism to what they eat.

1-3, gain energy by consuming (herterotroph)

4- gain energy by photosynthesis (sunlight-autotroph)

1) Apex Predator, top of the food chain, tertiary consumer
2) Predator, secondary consumers
3) Primary consumers (herbivores)
4) Primary producers



Food Web Activity: **Teacher Key**

Draw an arrow to each plant or animal and what it consumes. Color predators red, prey blue, plants green, and decomposers brown.

This lesson shows that everything is connected.