



## 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.

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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 and 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



2<sup>nd</sup> Grade:

2-LS4-1: Students will make observations during provided activities of plants, animals, and the ecosystem to compare the diversity of life in different habitats. They will also identify problems and solutions to protect the natural world.

- 1) Introduce lesson plan activity: Top of the Food Chain
  - a. What does it mean to be at the top of the food chain? Which species would this consist of? Create a class list.
  - b. How do these animals survive?
  - c. Which habitats do they live in? What other kinds of life live there?
- 2) What does it mean to be at the bottom of the food chain?
  - a. Which species are they?
  - b. How do they survive?
  - c. Are they plants, animals, or both?
- 3) Introduce trophic classification: Primary producers, primary consumers, secondary consumers, and tertiary consumers. **Worksheet Pages 4-5**
  - a. Use the predators vs. prey animal sheets (one sheet per student) **Worksheet Pages 10-12**
  - b. Have students write on the back of the photo which trophic level these animals belong to.
  - c. Have students arrange the photos with producers at the bottom, primary consumers, secondary consumers, and tertiary consumers at the top. (Students can work together as a class poster, or work in groups/individually).
    - i. This is called a food chain, everything gains energy from the bottom up. **(Worksheet Page 5)**
  - d. With the same pictures, have students arrange them randomly and glue them to a piece of paper. Draw an arrow from each living species of what it eats.
    - i. What happens when you take one of these species away?
    - ii. This is called a food web, everything is connected and energy flows through each species in different habitats. **Worksheet page 6**
- 4) Print out a class set of predator vs. prey sheets, and follow instructions for the game. **Worksheet Pages 8-12**
  - i. Take students to an area where they can play tag (indoor or outdoor).
  - ii. Follow instructions for the game, going over rules beforehand.
- 5) Research- Students can individually or as a group choose a species from their activities to complete **worksheet page 13**
- 6) Class Discussion
  - a. Why is it important to have a variety of species within different ecosystems?
  - b. What happens when you remove a part of the food chain?
  - c. How does losing species affect humans?
  - d. What can we do to protect the environment?
  - e. Is there anything that you learned today that is important to share with others?
  - f. Share with the class some ways that you can help protect the balance of the natural world.

## 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<sub>2</sub>) 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 plants



Omnivores- eat plants and animals



Carnivores- only eat animals



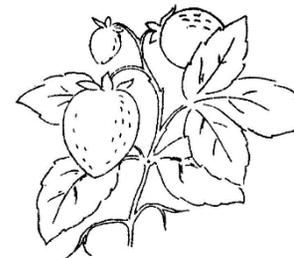
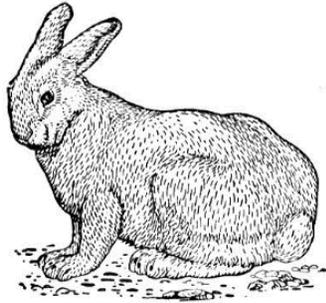
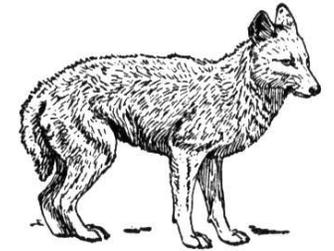
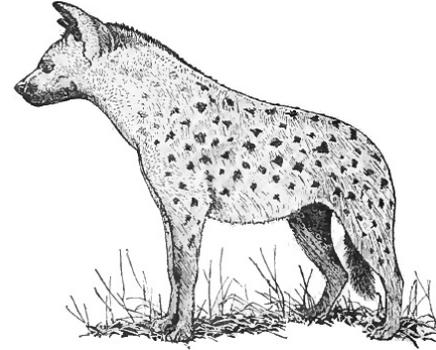
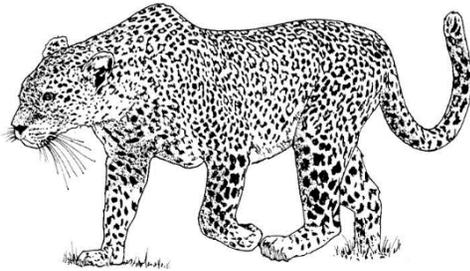
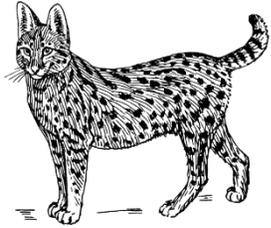
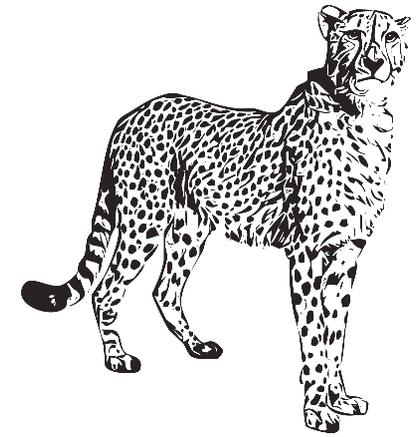
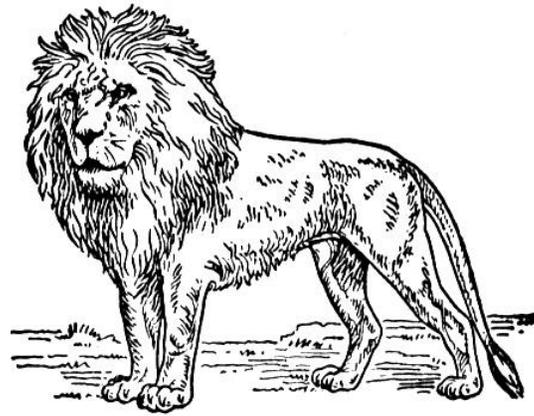
Now, draw a red circle around all of the predators. Draw a blue circle around all of the prey. Draw a green circle around all the producers. Draw a brown circle around the decomposers. There can be more than one for any type of animal.





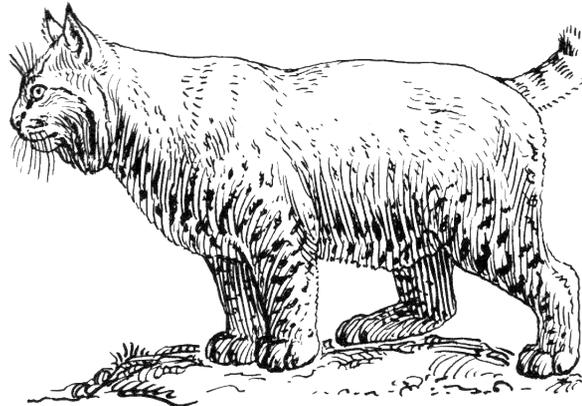
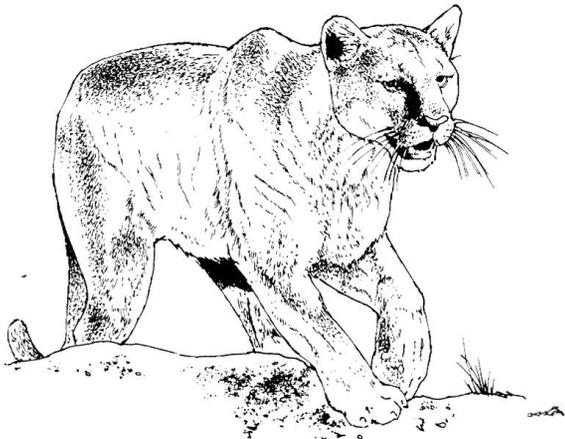
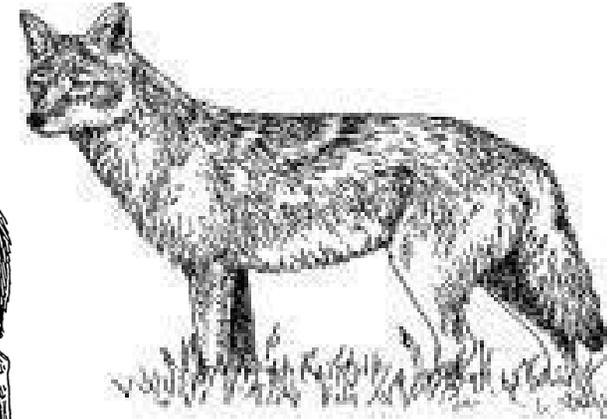
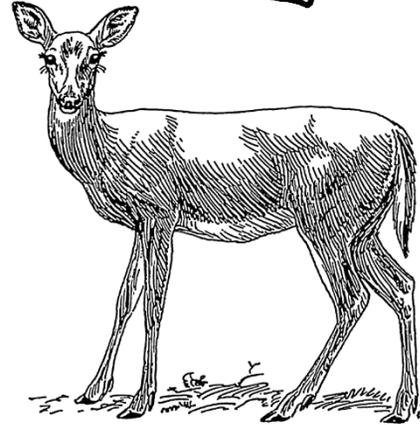
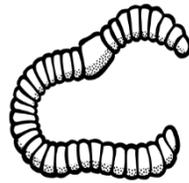
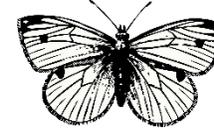
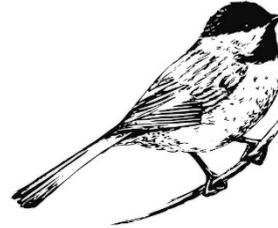
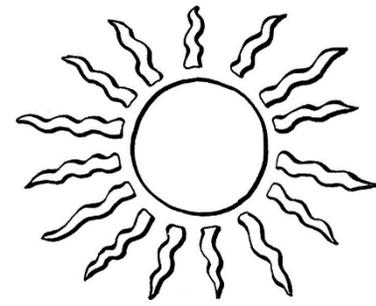
K-2nd Grade

**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





### Food Web Discussion Questions Sheet:

1) Can a predator also become prey? What are some examples from your worksheet?

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2) What do you think would happen if all the predators disappeared from the food web?

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3) What about if all of the prey disappeared?

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4) Do pollinators like bees, flies, and butterflies play an important role in the food web?

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5) How would losing parts of the food web impact you?

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6) Brainstorm 3 different ways that a food web can be disturbed:

- a. 1) \_\_\_\_\_
- b. 2) \_\_\_\_\_
- c. 3) \_\_\_\_\_

7) Brainstorm 3 different ways that you can help protect the ecosystem balance:

- a. 1) \_\_\_\_\_
- b. 2) \_\_\_\_\_
- c. 3) \_\_\_\_\_

Everything on the Earth is connected both living and non-living. It is important that we make good choices that keep a healthy ecosystem, and provide balance for the planet. If a food web is broken, it can cause animals to go extinct, but also threatened the survival of humans. Share with your class ways that you can help protect the environment for the future.



### **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

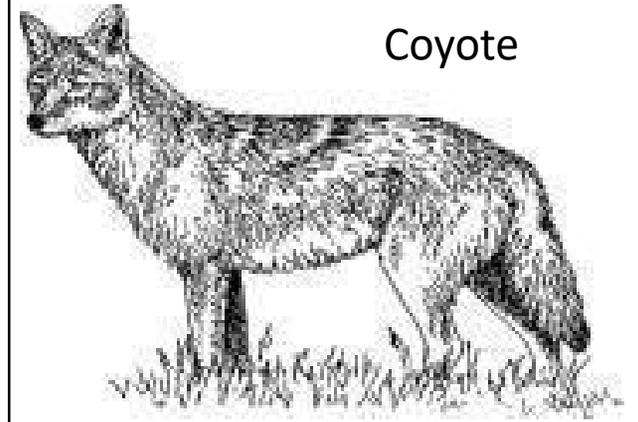




Vulture



Frog

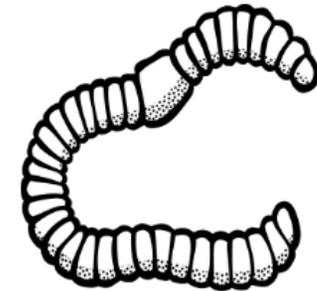


Coyote

Cougar

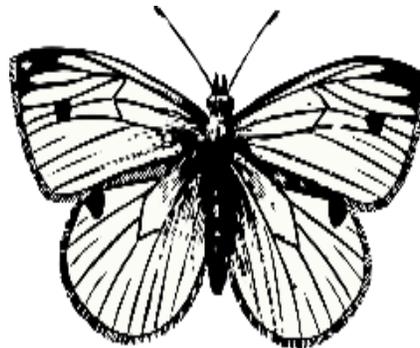


Chipmunk



Earth Worm

Berries

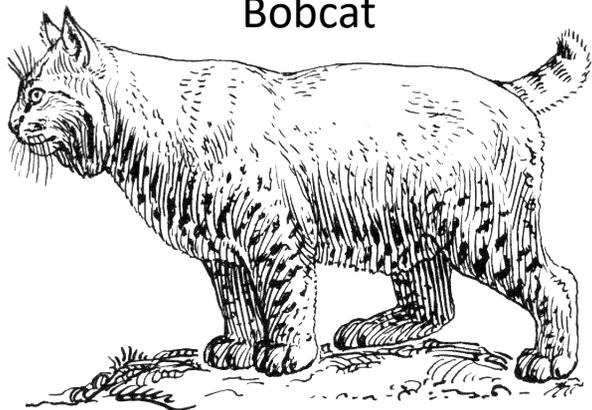


Butterfly

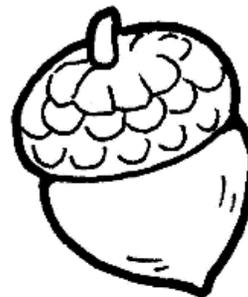
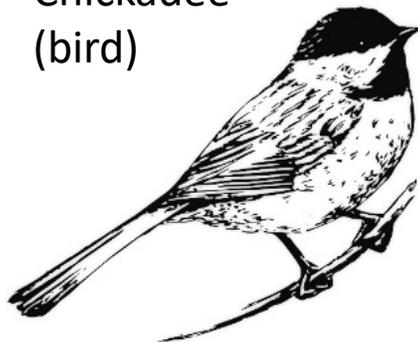


Deer

Bobcat

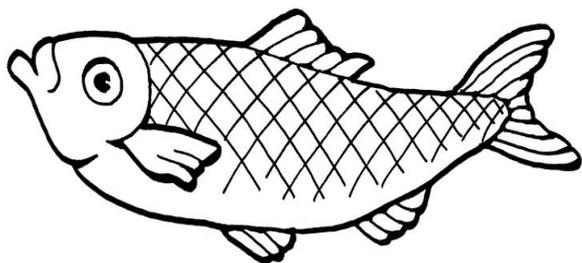


Chickadee  
(bird)

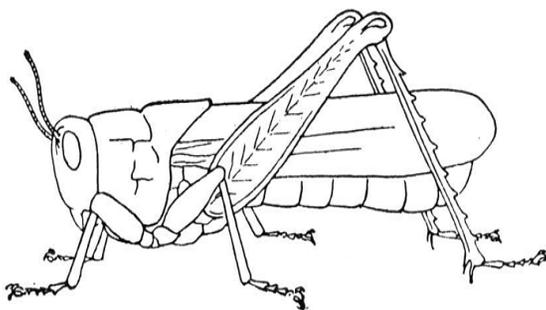


Acorn

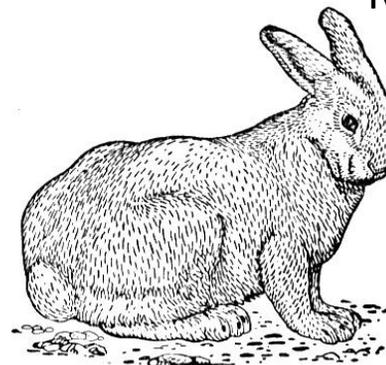
Fish



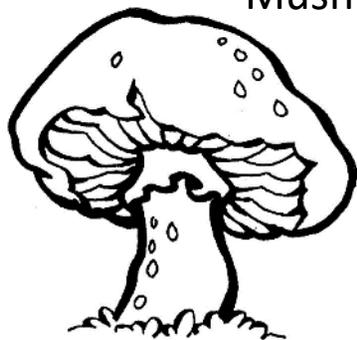
Grasshopper



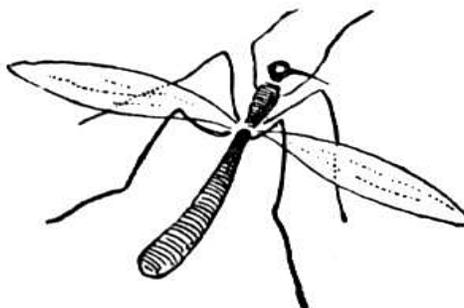
Rabbit



Mushroom



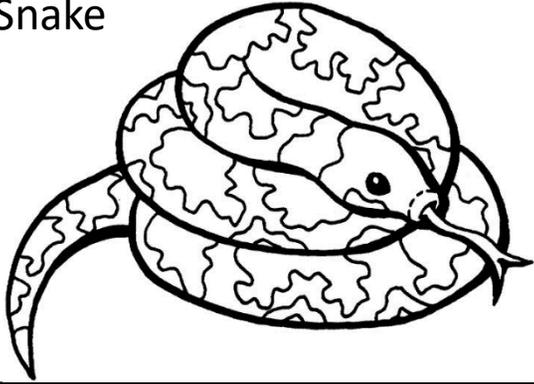
Mosquito



Bear



Snake



Owl



Leaf



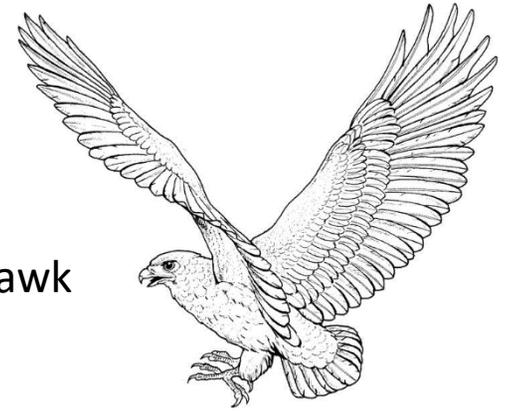
Grass



Squirrel



Hawk



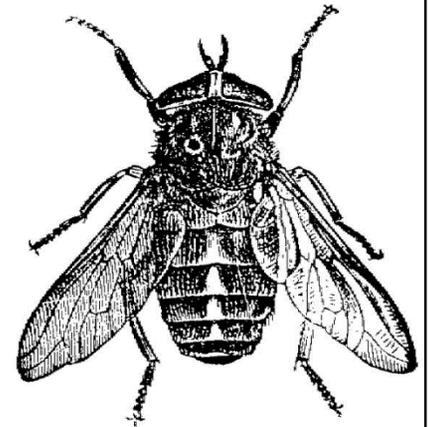
Mouse



Eagle



Fly



Top of the Food Chain: Research Activity



Species Name: \_\_\_\_\_

Location Species is found: \_\_\_\_\_

Trophic level: \_\_\_\_\_

Feeding style: \_\_\_\_\_

What does it eat?

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How does it gain energy?

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Does it get eaten? By which species?

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What do you think would happen if it was removed from the ecosystem?

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How can we help protect your species?

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Draw a picture of your species in its environment:

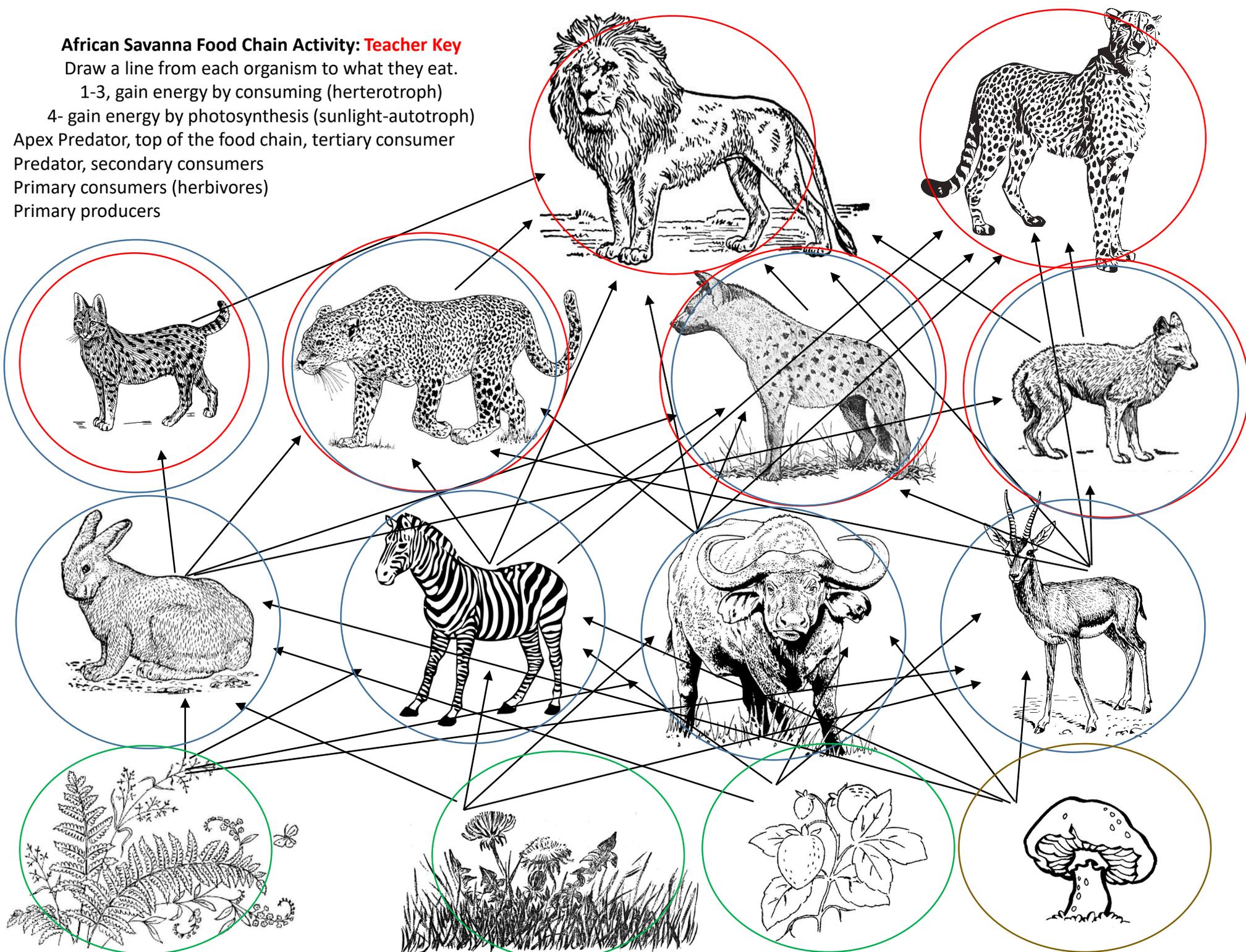
**African Savanna Food Chain Activity: Teacher Key**

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.**

