



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



3rd Grade:

3-LS2-1: Students will construct an argument that in different environments, animals form groups to aid in survival throughout the food web.

3-LS3-2: Students will identify that changes within the food chain and food web can be influenced by both their environment and human factors.

3-LS4-4: Students will make a claim about the merit of a solution to a problem caused by disruptions to the food chain and web, and how this will change the species within the environment.

- 1) Introduce the theme of the lesson to the class: Top of the Food Chain
 - a. Which species would be considered at the top of the food chain? Create a list of examples
 - b. Where do these animals live?
 - c. Out of the different species, which ones live in groups? What are these groups called?
 - i. How does this help them survive?
- 2) Which species are at the bottom of the food chain? Create a list and answer above questions.
- 3) Complete **worksheet pages 4-6** and answer questions below as a class
 - a. Out of the tertiary consumers (apex predators), which live in groups? How does it help them survive?
 - i. Answer: lions live in prides. The females work together to hunt and take care of cubs, and they also guard their pride's territory.
 - b. Out of the secondary consumers, which live in groups? How does it help them?
 - i. Hyenas live in groups called clans, and they live together for protection from other predators and to manage their territory. Hyenas are both scavengers and predators, and work together to bring down a kill.
 - ii. Jackals live in groups called packs, and they live together for protection from other predators, defending territory, and finding prey.
 - c. For the primary consumers, why do you think they would live in a group?
 - i. There is safety in numbers, and living in social groups helps them warn each other of danger.
- 4) Complete **worksheet pages 7-8**
 - a. What is the difference you see between the food chain and a food web?
- 5) **Predators vs. Prey game worksheet pages 9-13** students will be taken to a large area (indoor or outdoor) to play tag. Read over instructions and go over with the students beforehand.
- 6) Additional Lessons: Species research **worksheet page 14**, vocabulary quiz **worksheet page 15**
- 7) Class discussion
 - a. What happens when there is a disruption within the food chain?
 - b. Can species survival if there is an extreme imbalance? Why or why not?
 - c. How do humans influence the natural world?
 - d. Are there any ways that we can help protect the natural world? How?
 - e. Besides human impacts, what are other ways that species can decline?
 - f. What did you learn today?
 - g. Create a class lists of ways to help to protect wildlife and ecosystems.

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 (CO₂) 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

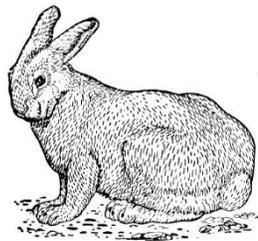
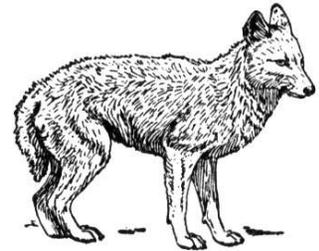
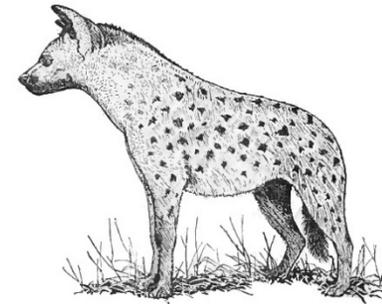
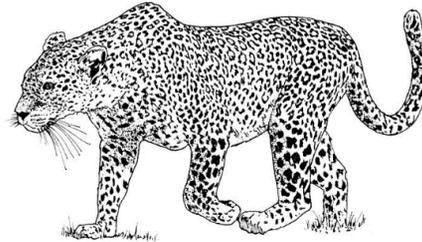
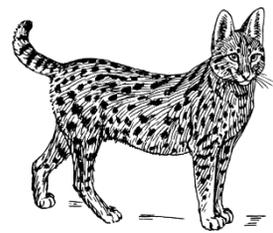
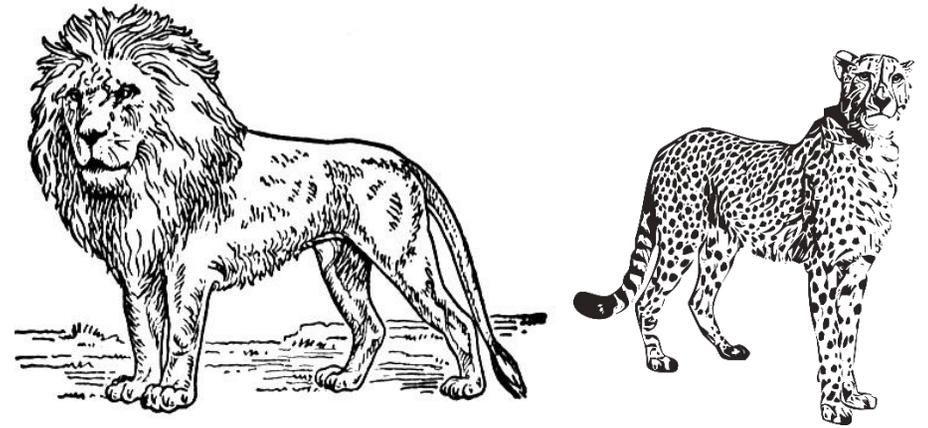


Now, draw a red circle around all of the predators. Draw a blue circle around all of the prey. Draw a green circle around all the producers. Draw a brown circle around the decomposers. There can be more than one for any type of animal.



African Savanna Food Chain Activity:

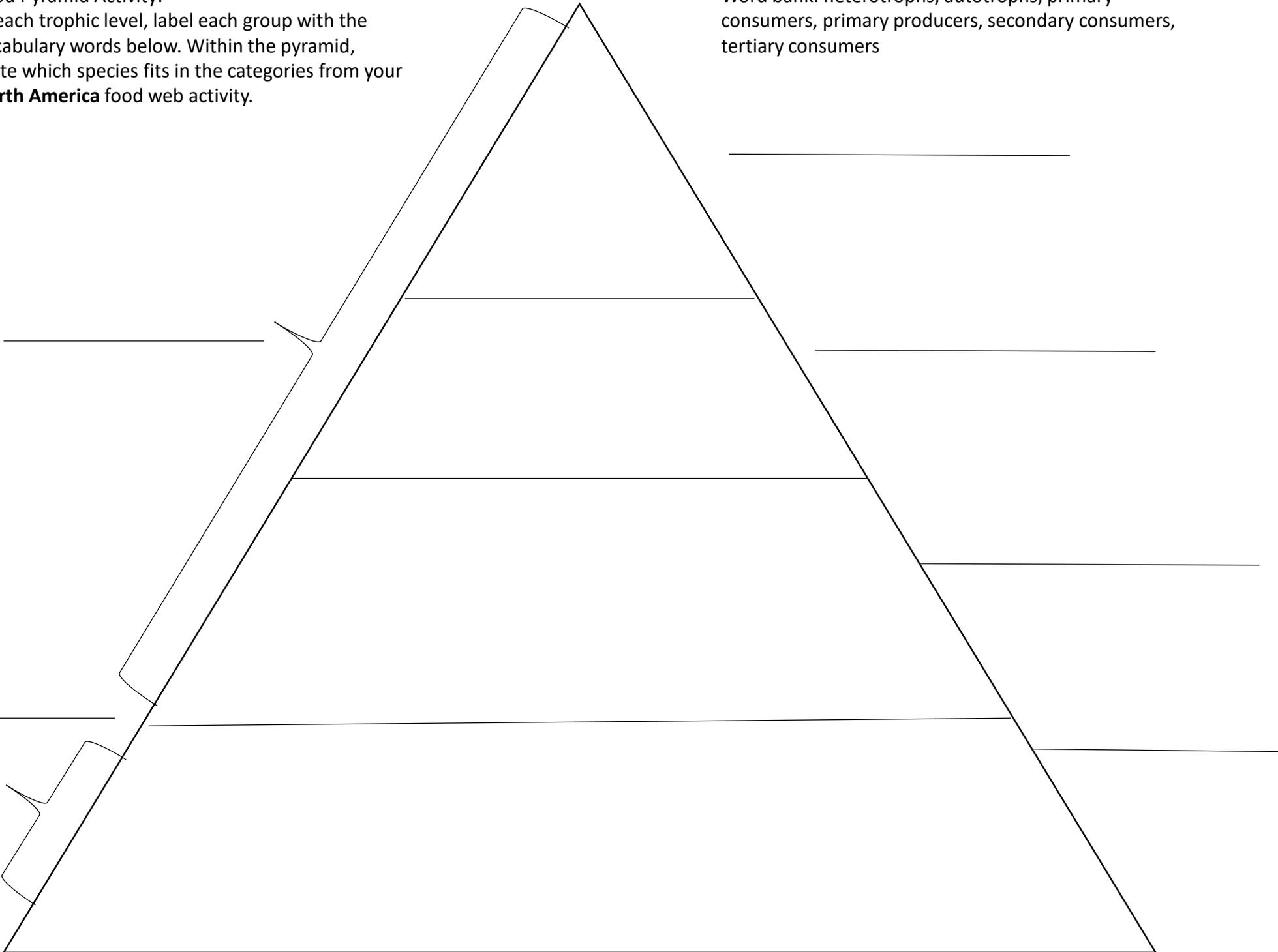
- Draw a line from each organism to what they eat. Then label the pictures using vocabulary words below:
Tertiary Consumer, Secondary Consumer, Primary Consumer, Primary Producer
- Circle which animals live in groups



Food Pyramid Activity:

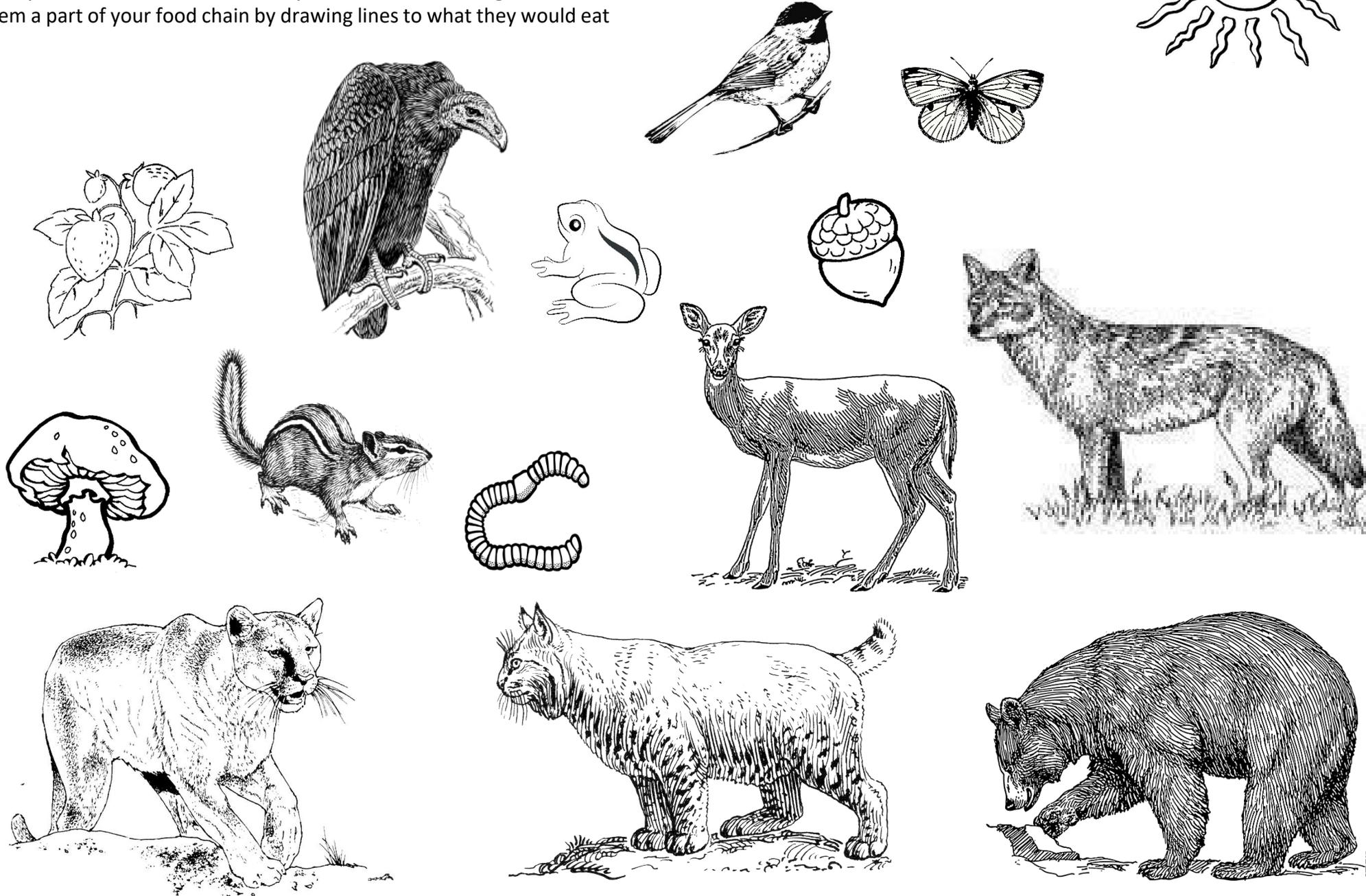
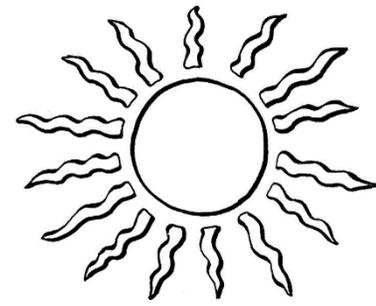
In each trophic level, label each group with the vocabulary words below. Within the pyramid, write which species fits in the categories from your **North America** food web activity.

Word bank: heterotrophs, autotrophs, primary consumers, primary producers, secondary consumers, tertiary consumers



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?

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

3) What about if all of the prey disappeared?

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

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

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

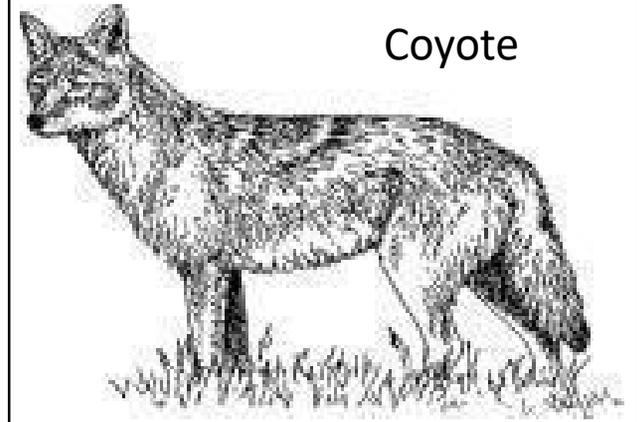




Vulture



Frog

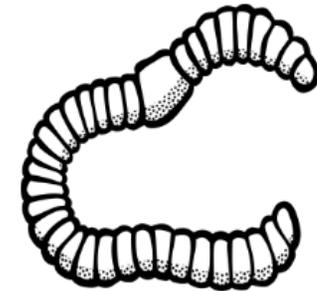


Coyote

Cougar

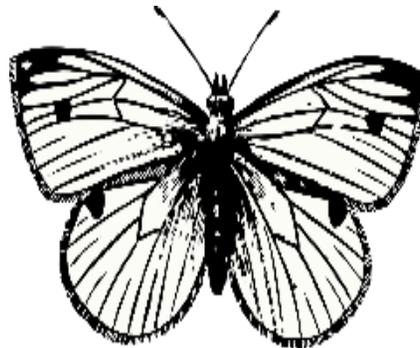


Chipmunk



Earth Worm

Berries

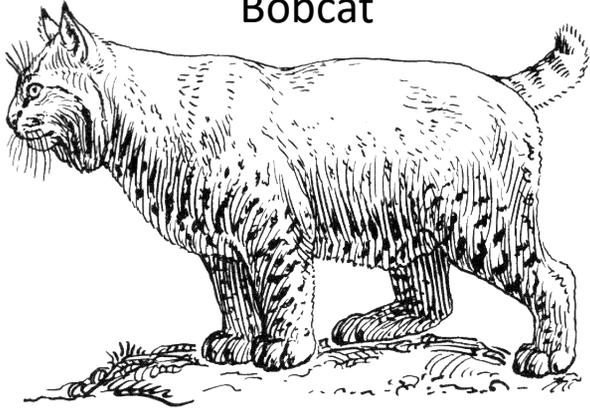


Butterfly

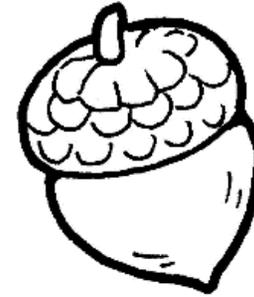
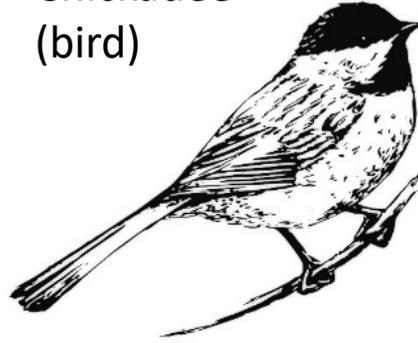


Deer

Bobcat

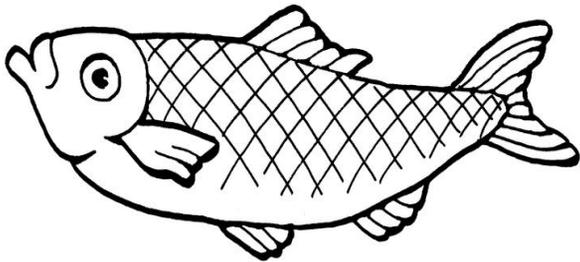


Chickadee
(bird)

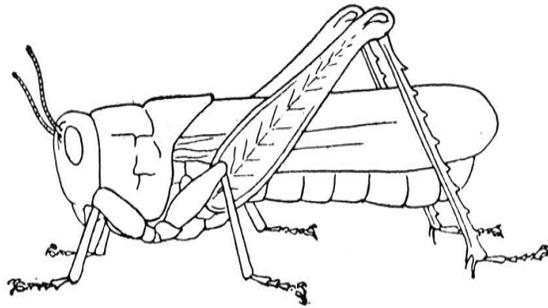


Acorn

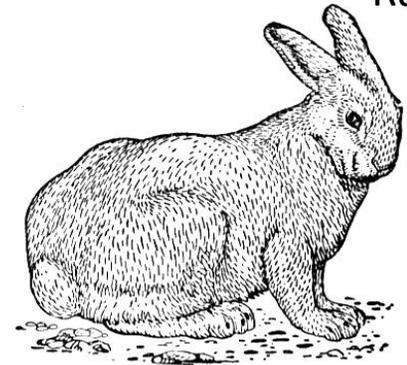
Fish



Grasshopper



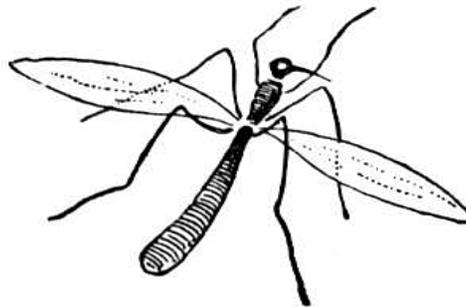
Rabbit



Mushroom



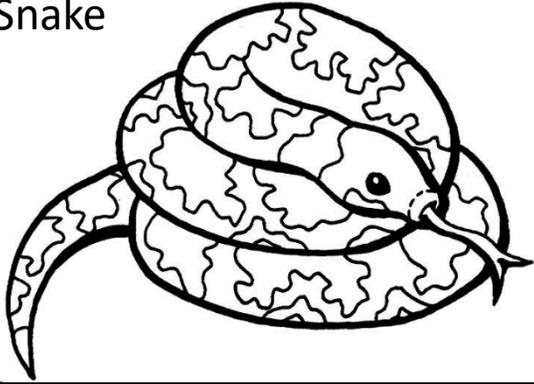
Mosquito



Bear



Snake



Owl



Leaf



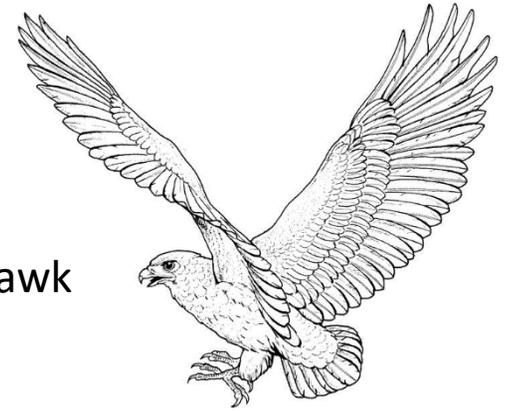
Grass



Squirrel



Hawk



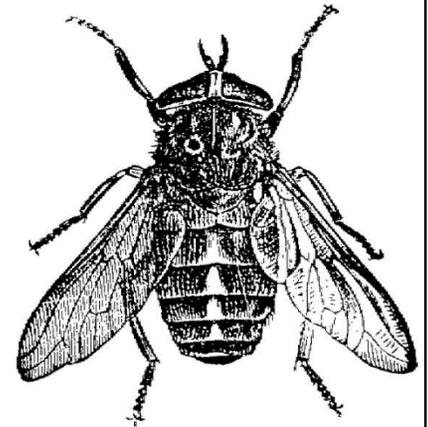
Mouse



Eagle



Fly





Top of the Food Chain: Research Activity

Species Name: _____

Location Species is found: _____

Trophic level: _____

Feeding style: _____

What does it eat?

How does it gain energy?

Does it get eaten? By which species?

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

How can we help protect your species?

Draw a picture of your species in its environment:

Vocabulary Quiz:

- What type of animal hunts for its food? _____, what do they eat?

- A _____ only eats meat, a _____ only eats plants, and an _____ eats both plants and meat.
- Which kind of organisms cannot manufacture their own food? _____
- Which trophic level is the foundation of an ecosystem? _____
- Which organisms produce energy through photosynthesis? _____
- Variability among living organisms from all sources is called _____
- _____ are hunted for food.
- _____ consumers are at the top of the food chain.
- A series of organisms that depend on the next source as food is called a _____
- What type of consumers only eat plants? _____
- An _____ helps to protect other species within the same ecological community.
- If you remove apex predators, a _____ is triggered, changing the ecosystem structure. Does it have a positive or negative effect? _____
- _____ can be omnivores or carnivores, and can also be preyed upon by _____.
- The unique interactions and relationships involving the transportation of energy between living organisms is called a _____.
- A _____ is a species in which all other species in an ecosystem depend on. If it were to disappear, the ecosystem would drastically change.
- Biological communities of interacting organisms and their physical environment is called an _____.



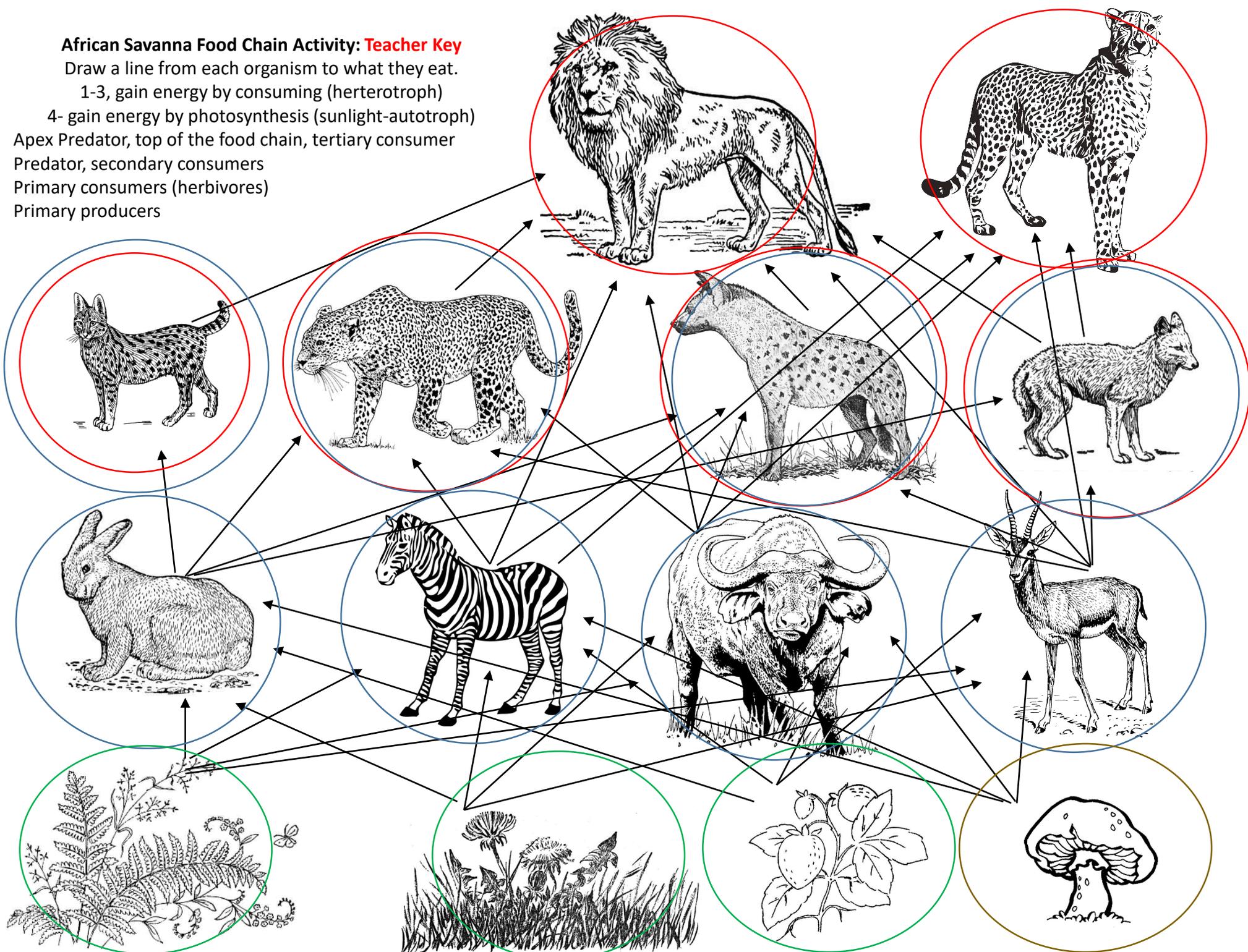
African Savanna Food Chain Activity: Teacher Key

Draw a line from each organism to what they eat.

1-3, gain energy by consuming (herterotroph)

4- gain energy by photosynthesis (sunlight-autotroph)

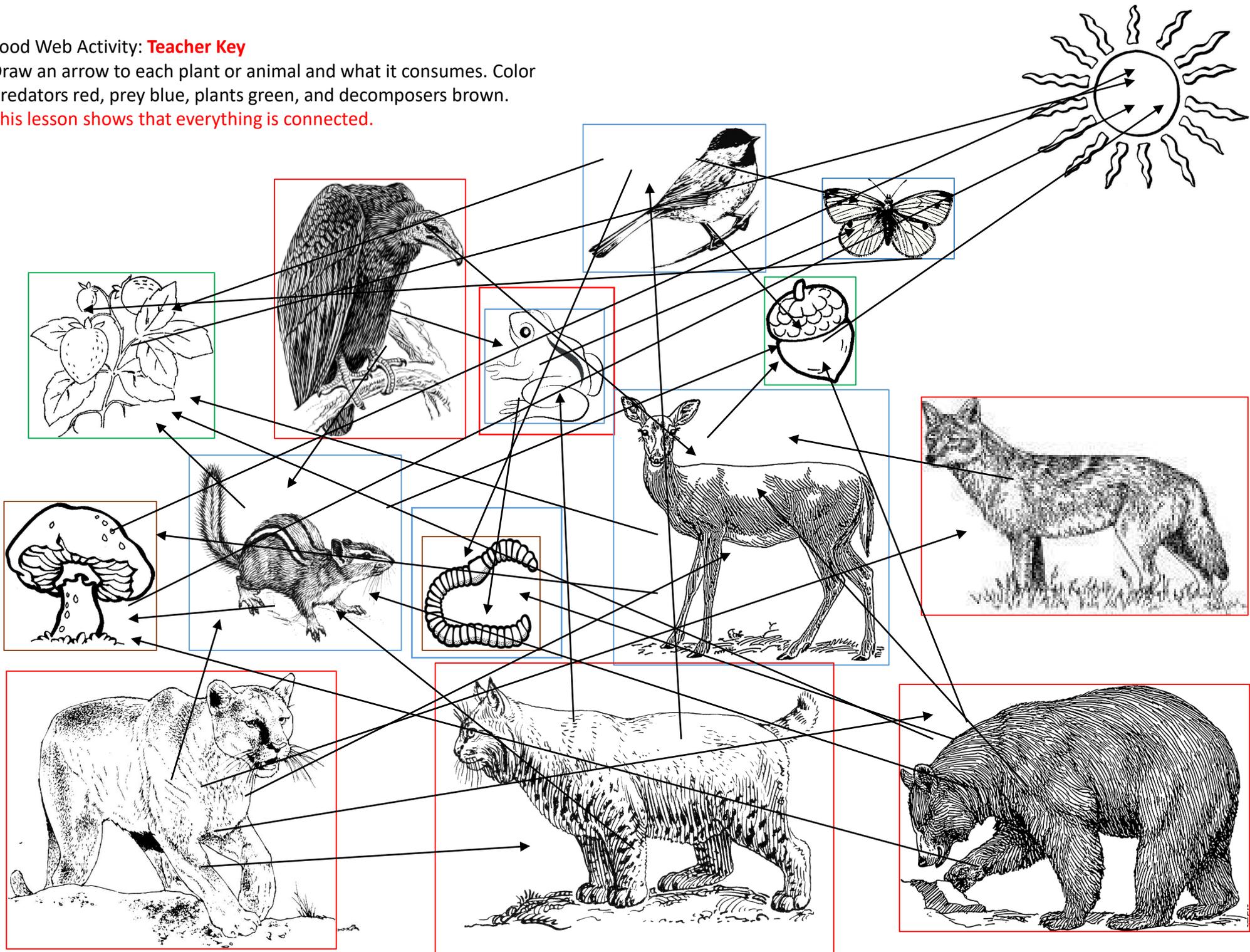
- 1) Apex Predator, top of the food chain, tertiary consumer
- 2) Predator, secondary consumers
- 3) Primary consumers (herbivores)
- 4) Primary producers



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.



Food Pyramid Activity: **Teacher Key**

In each trophic level, label each group with the vocabulary words below. Within the pyramid, write which species fits in the categories from your food web activity.

Word bank: heterotrophs, autotrophs, primary consumers, primary producers, secondary consumers, tertiary consumers

