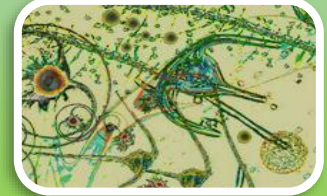
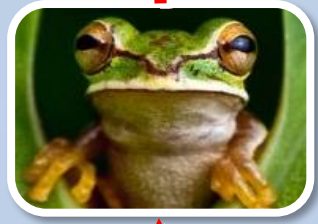
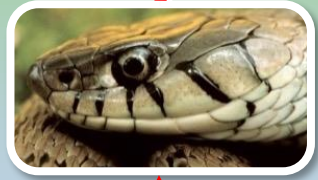


FOOD CHAINS

TROPHIC LEVELS

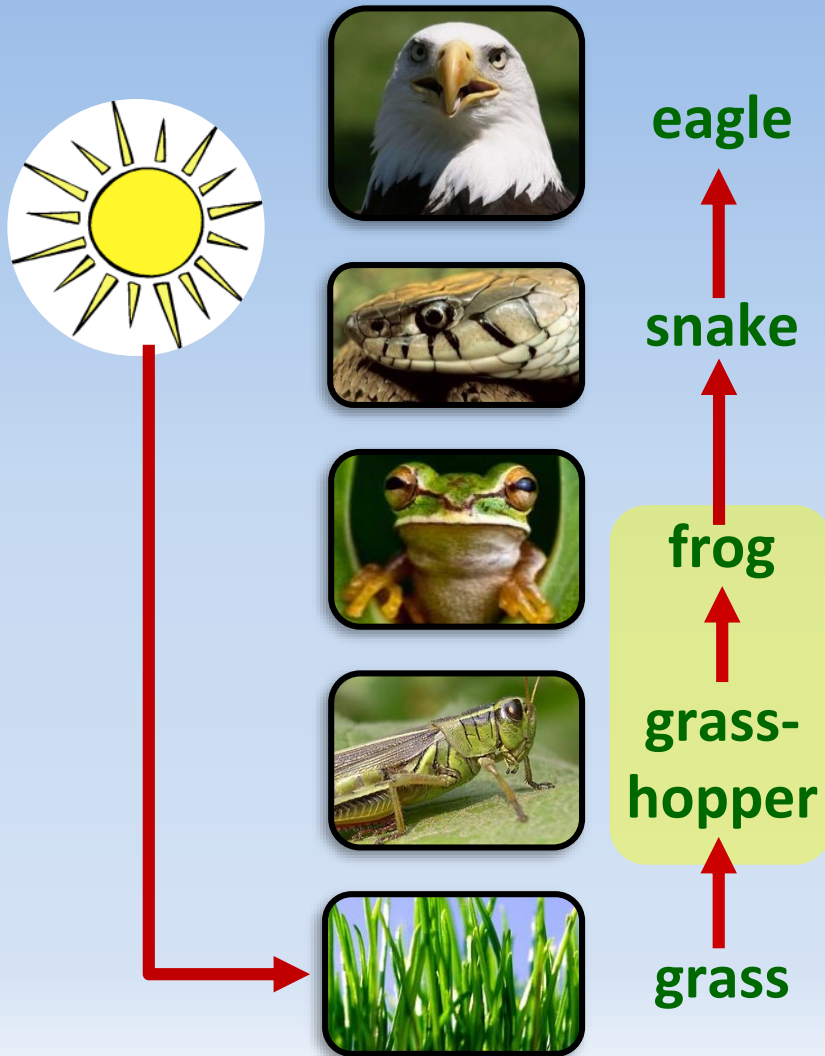
ECOLOGICAL PYRAMIDS



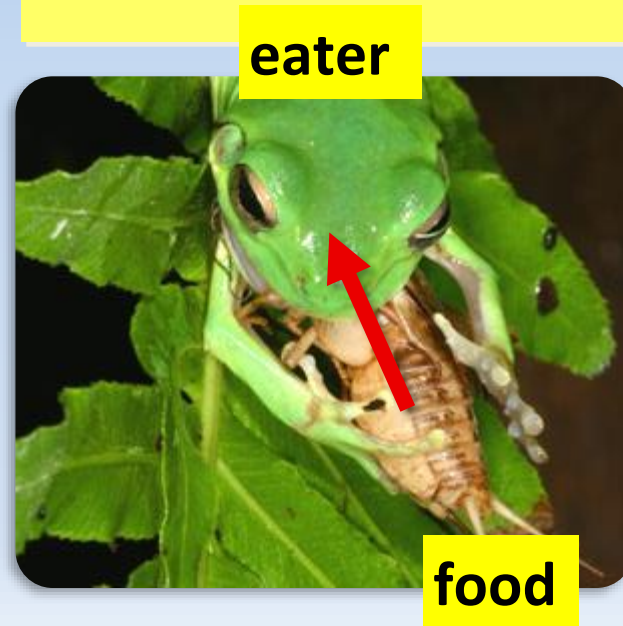
FOOD CHAINS

Food Chain: is a sequence of feeding relationships describing which organism eats another.

The Sun is the source of energy for food chains.



Keep in mind that the arrow **tip** always points towards the “**eater**”.



FOOD CHAINS

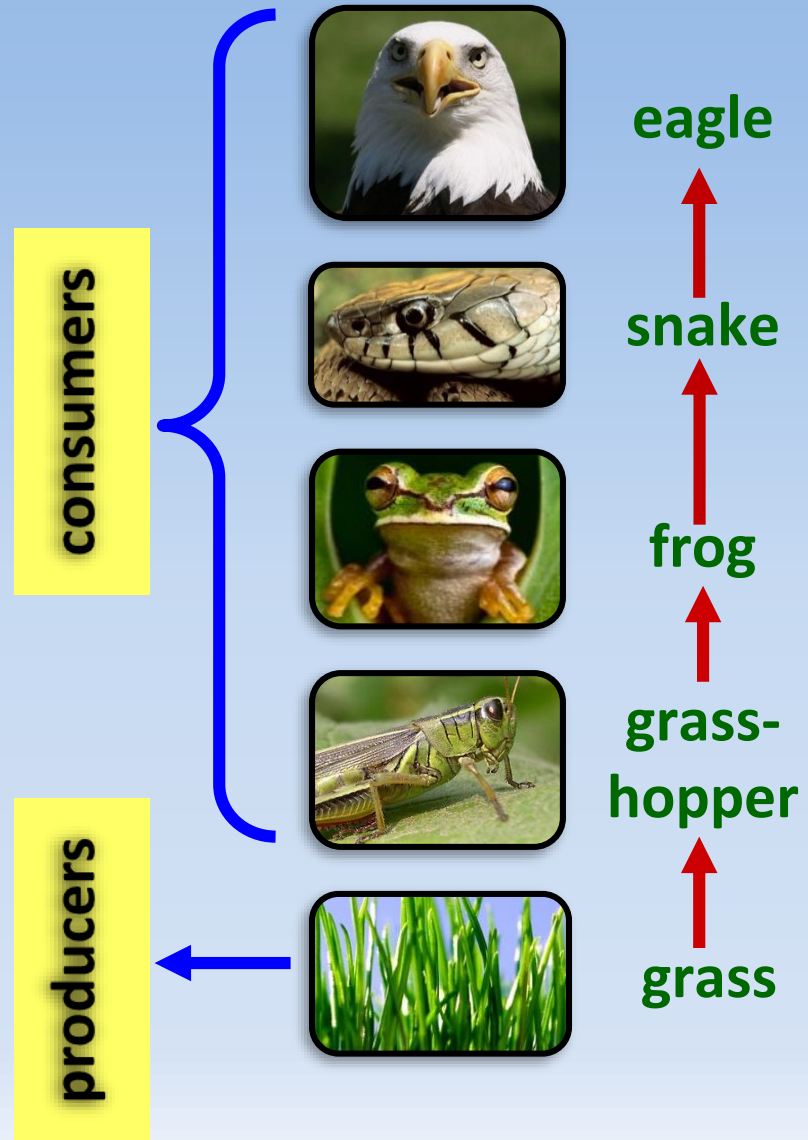
Label and write descriptions on your food chain diagram.

There are different levels of consumers.....

Since they **cannot** make their own food, they must eat or "**consume**" other organisms.

They form the **basis** of all **terrestrial** food chains.

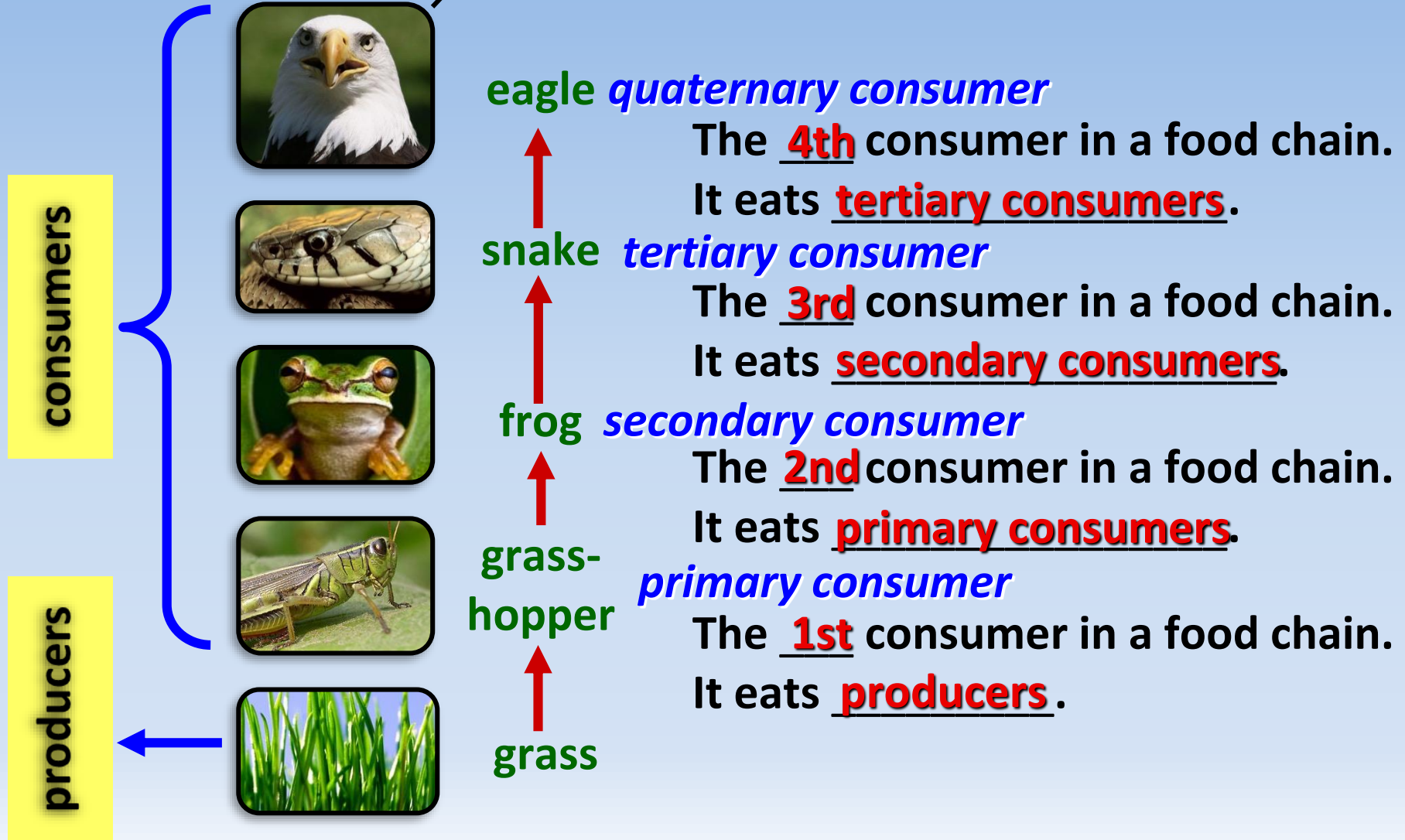
They use the energy in **sunlight** to make their own food through a process called **photosynthesis**.



FOOD CHAINS

There are different levels of consumers.....

Top carnivore: any organism that is not hunted by any other. It's at the top of its food chain.



Let's THINK

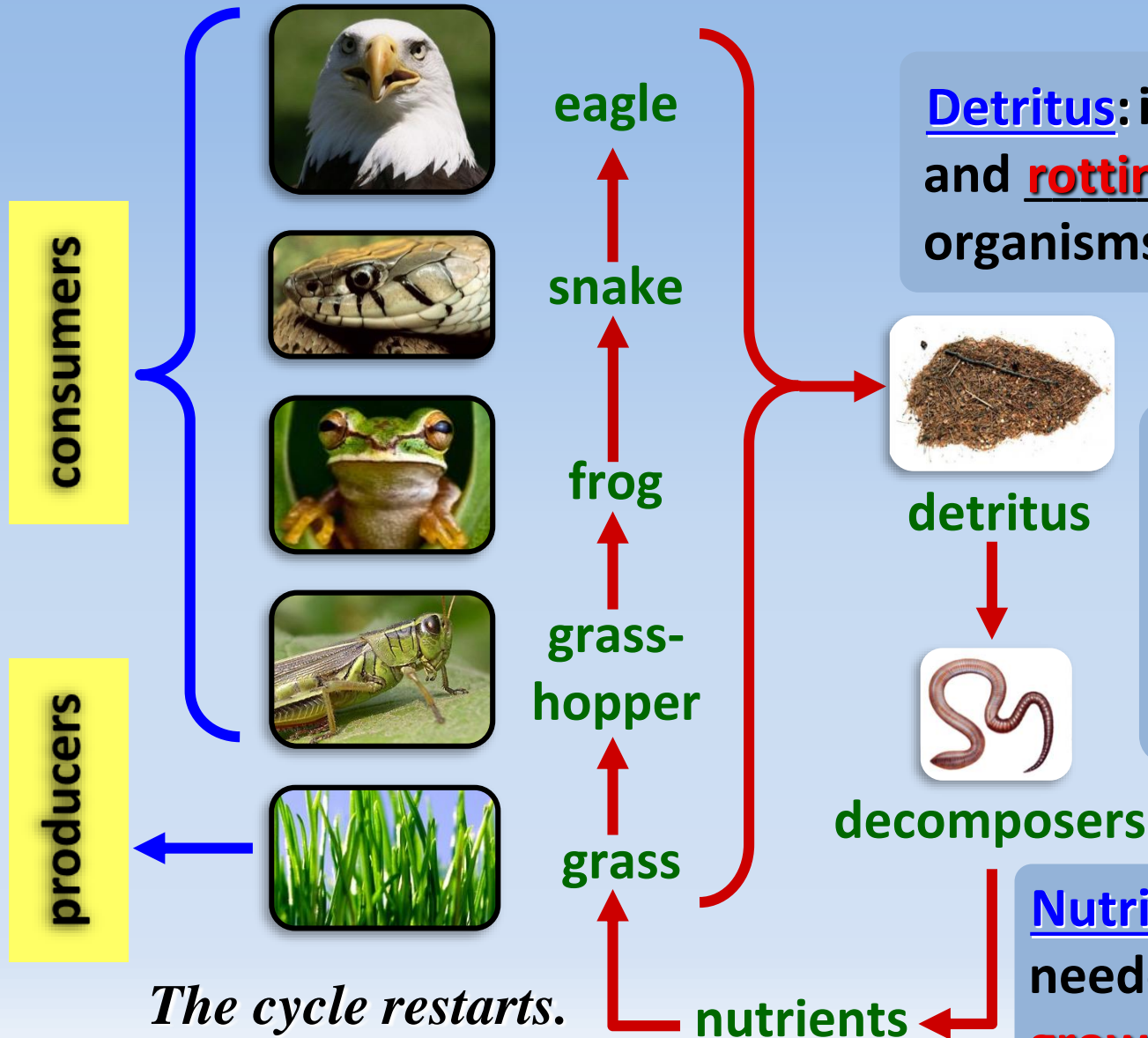
- a) **THINK** What is the main difference between a producer and a consumer?

- b) **THINK** What is the main difference between a primary consumer and a secondary consumer?

- c) **THINK** Name two other organisms you think are top carnivores in other food chains.

FOOD CHAINS

All organisms eventually die and decompose.



Detritus: is the **waste matter** and **rotting remains** of dead organisms.

Decomposers: are organisms that **eat detritus** and break it down into **nutrients**.

Nutrients: are substances needed for an organism's **growth** and **repair**.

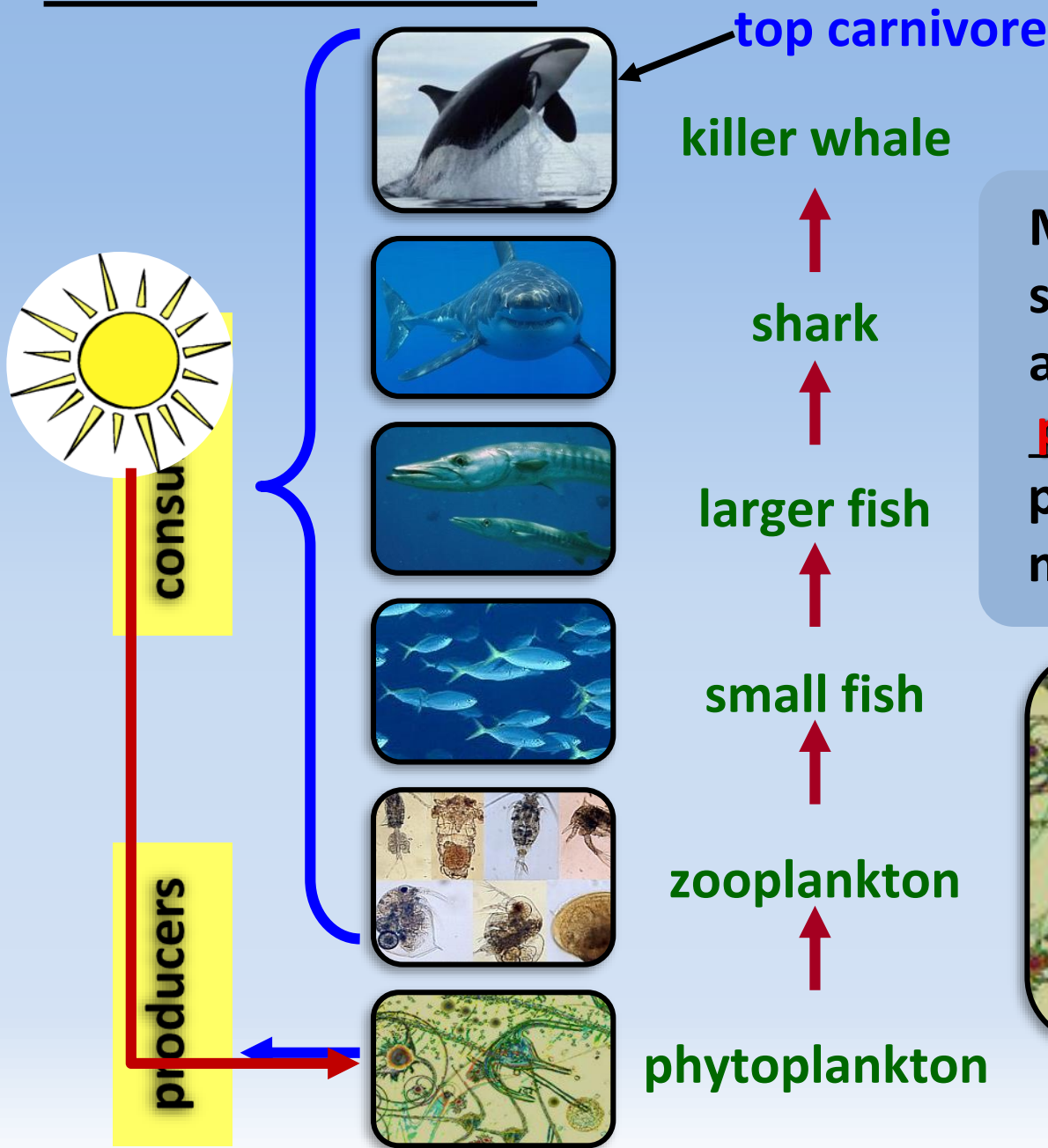
The cycle restarts.

Let's THINK

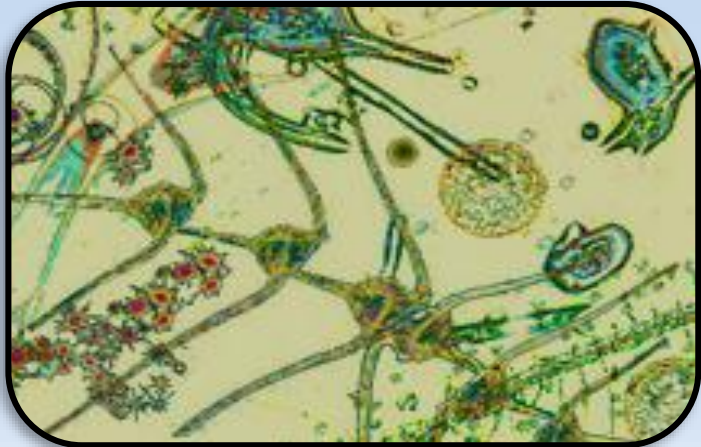
- a) **THINK** What would happen if there were no decomposers?

FOOD CHAINS

Food chains can occur in aquatic ecosystems.



Marine food chains start with microscopic aquatic organisms called phytoplankton that can perform photosynthesis to make their own food.



FOOD CHAINS

Food chains can occur in aquatic ecosystems.



Hydrothermal Vent

How could a food chain start without sunlight and photosynthesis?

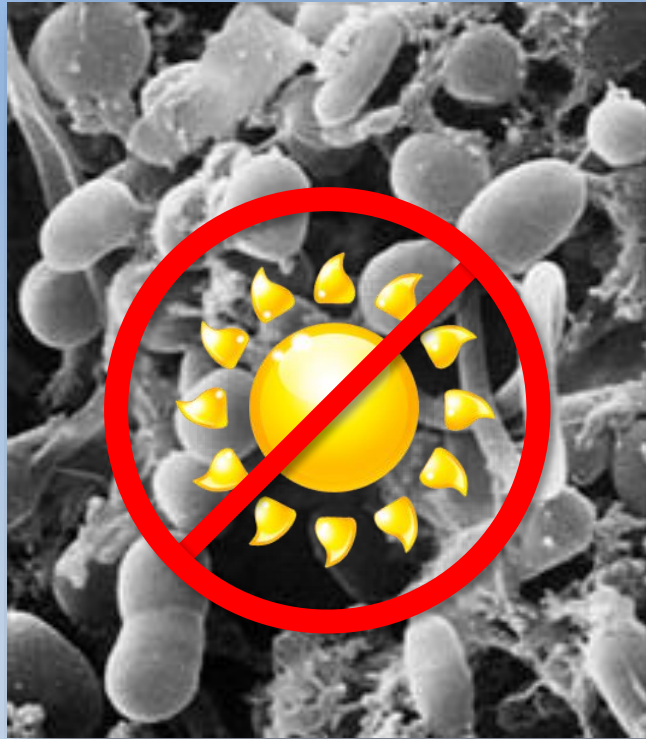
Though most aquatic food chains start off with **photosynthetic phytoplankton** that get their energy from the **sun**, there are exceptions.

In the 1970s, scientists discovered deep sea hydrothermal vents in the ocean which were too deep for sunlight to reach.

Here they found new types of bacteria that could generate energy using the sulfides found in the vents.

FOOD CHAINS

Food chains can occur in aquatic ecosystems.



*Chemoautotrophic Bacteria
in Hydrothermal Vents*

*How could a food
chain start without sunlight
and photosynthesis?*

Though most aquatic food chains start off with **photosynthetic phytoplankton** that get their energy from the **sun**, there are exceptions.

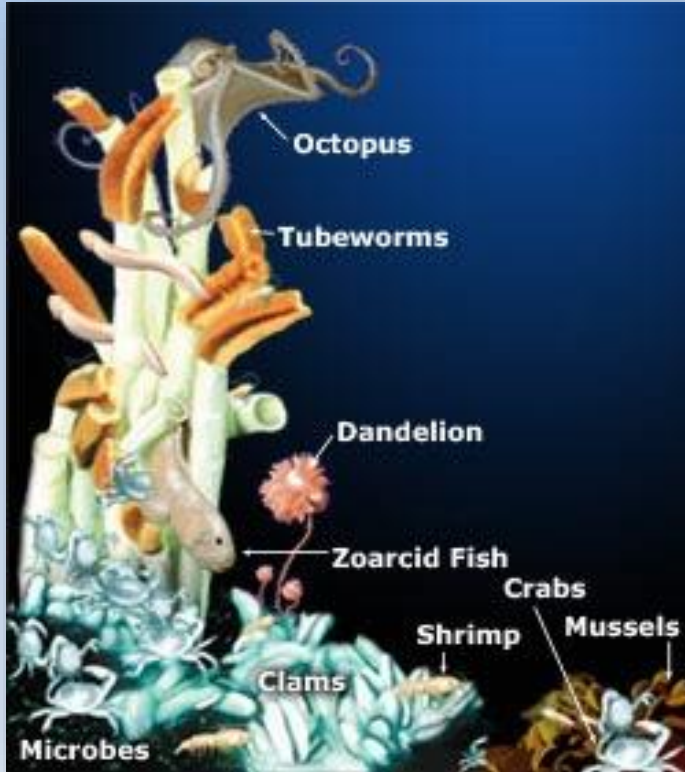
In the 1970s, scientists discovered deep sea hydrothermal vents in the ocean which were too deep for sunlight to reach.

Here they found new types of bacteria that could generate energy using the sulfides found in the vents. They didn't need the sun for energy.

FOOD CHAINS

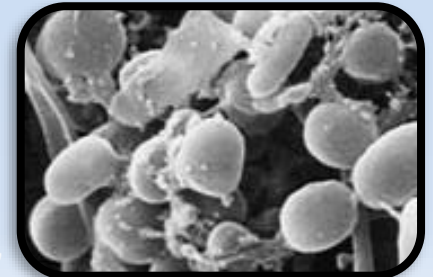
Food chains can occur in aquatic ecosystems.

Bacteria in these vents form the basis of vent food chains in the same way as **phytoplankton** and **plants** do in other ecosystems.



Hydrothermal Vent Organisms

chemo-
autotrophic
bacteria
producer



crab
*primary
consumer*



octopus
*secondary
consumer*



Let's THINK

a) **THINK** What is the difference between the term *terrestrial* and *aquatic*?

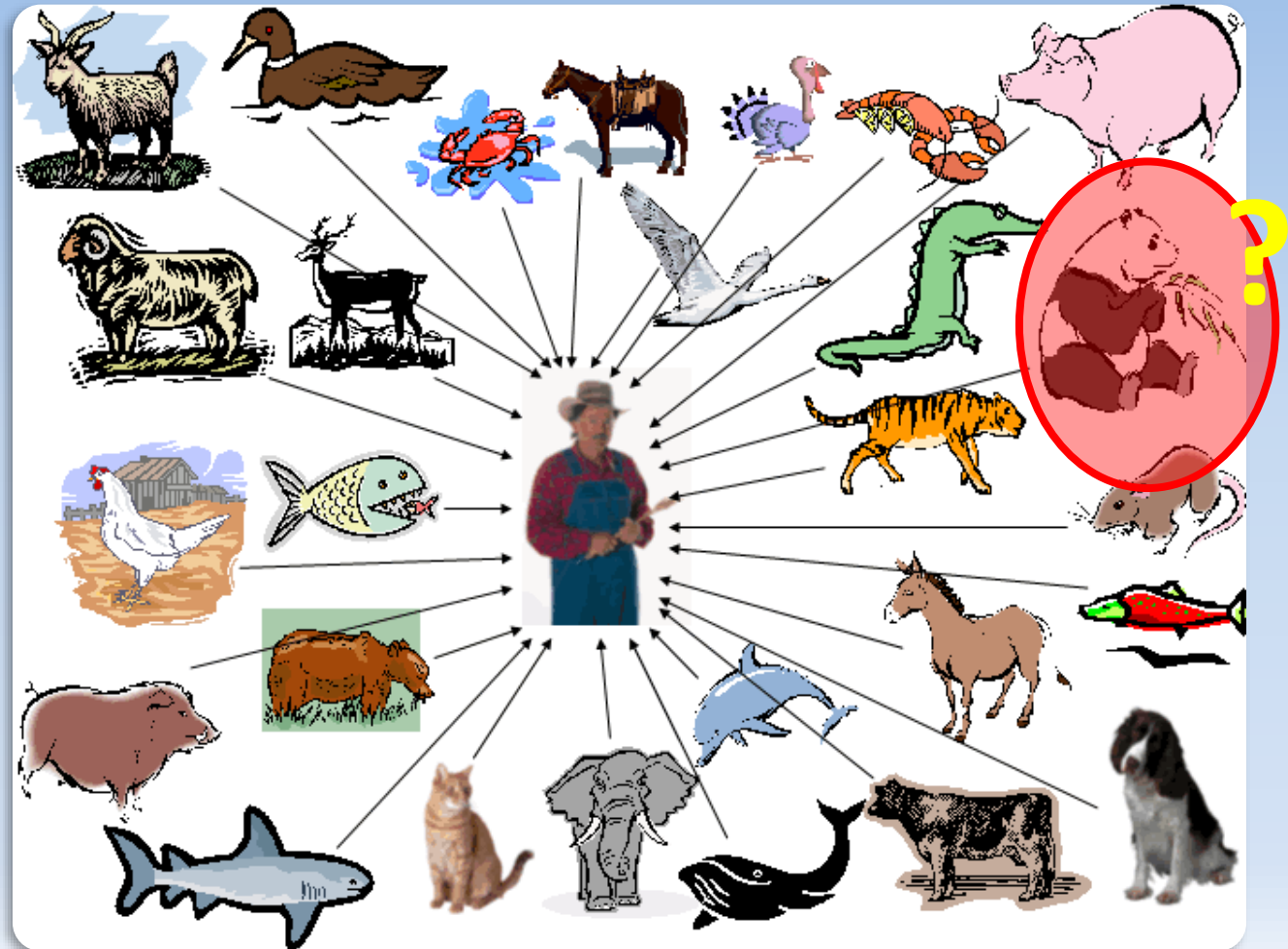
b) **THINK** What differences are there between *terrestrial producers* and *aquatic producers*?

HUMANS AND FOOD CHAINS

Since humans are not hunted for food by any other animal, and since humans eat almost anything, (well maybe not this) this makes us **top carnivores**.

Where are humans on any food chain?

Count how many of these animals you've eaten in your life.



HUMANS AND FOOD CHAINS

Have you ever eaten one of these?

What is it made of?

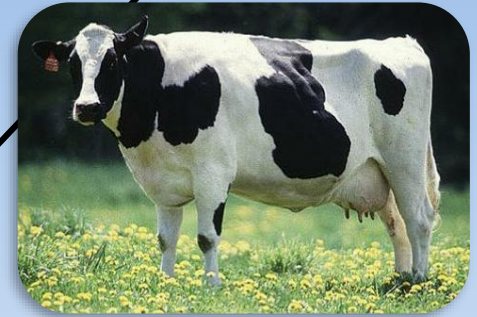
What food chains did you participate in when you ate this?

wheat

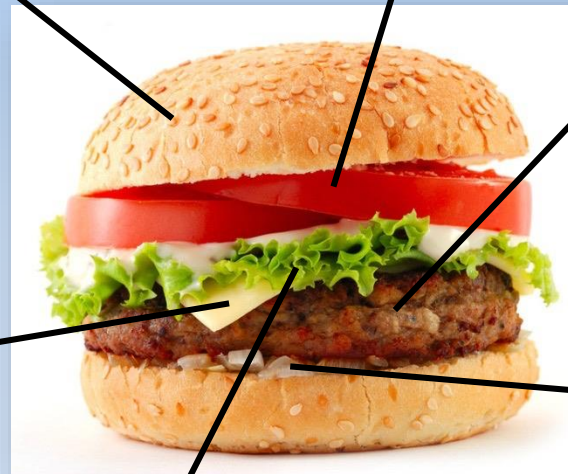
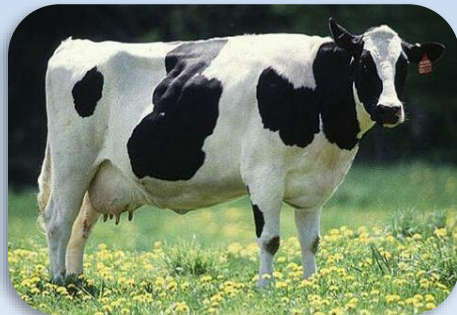


tomato

beef



cheese



onion



lettuce



HUMANS AND FOOD CHAINS



human



human



human



human



human

Humans are mainly **primary** consumers because we eat a lot of **plants**. When we eat animals, they are usually **herbivores**, so this makes us also **secondary** consumers.



cow



wheat



lettuce



onion



tomato



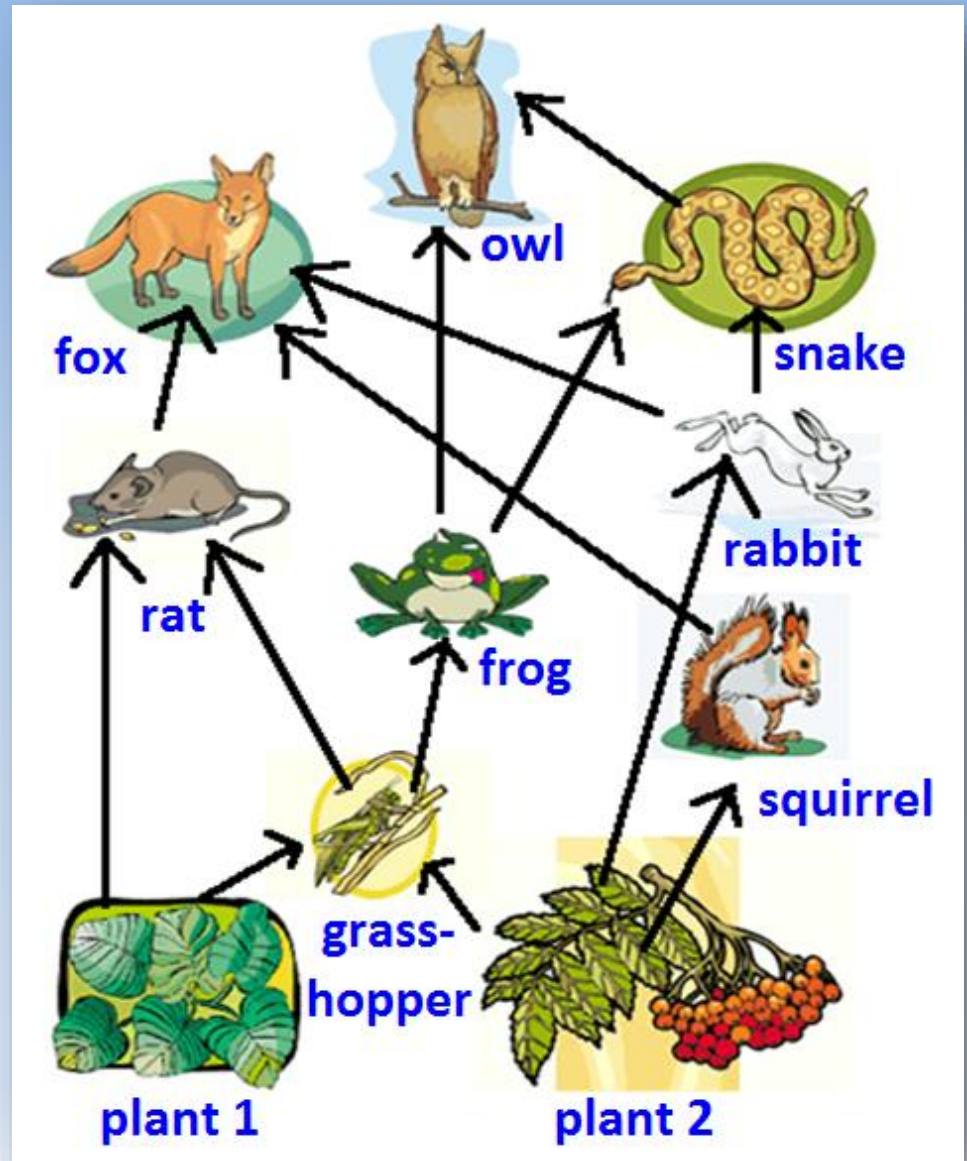
grass

FOOD WEBS

No ecosystem is only made up of only one food chain.

Members of one food chain usually also belong to another.

When you put all the **interconnecting** food chains in an ecosystem together, you form a **food web**.



TROPHIC LEVELS

Trophic Level: It is the **position** an organism occupies in a food chain.

Each **link** in the chain represents one trophic level.



eagle



snake



frog



grass-hopper



grass

On land, the first trophic level begins with **plants**.

In the water, the first trophic level begins with **phytoplankton**.

shark



larger fish



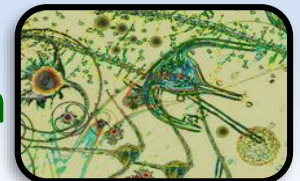
small fish



zooplankton



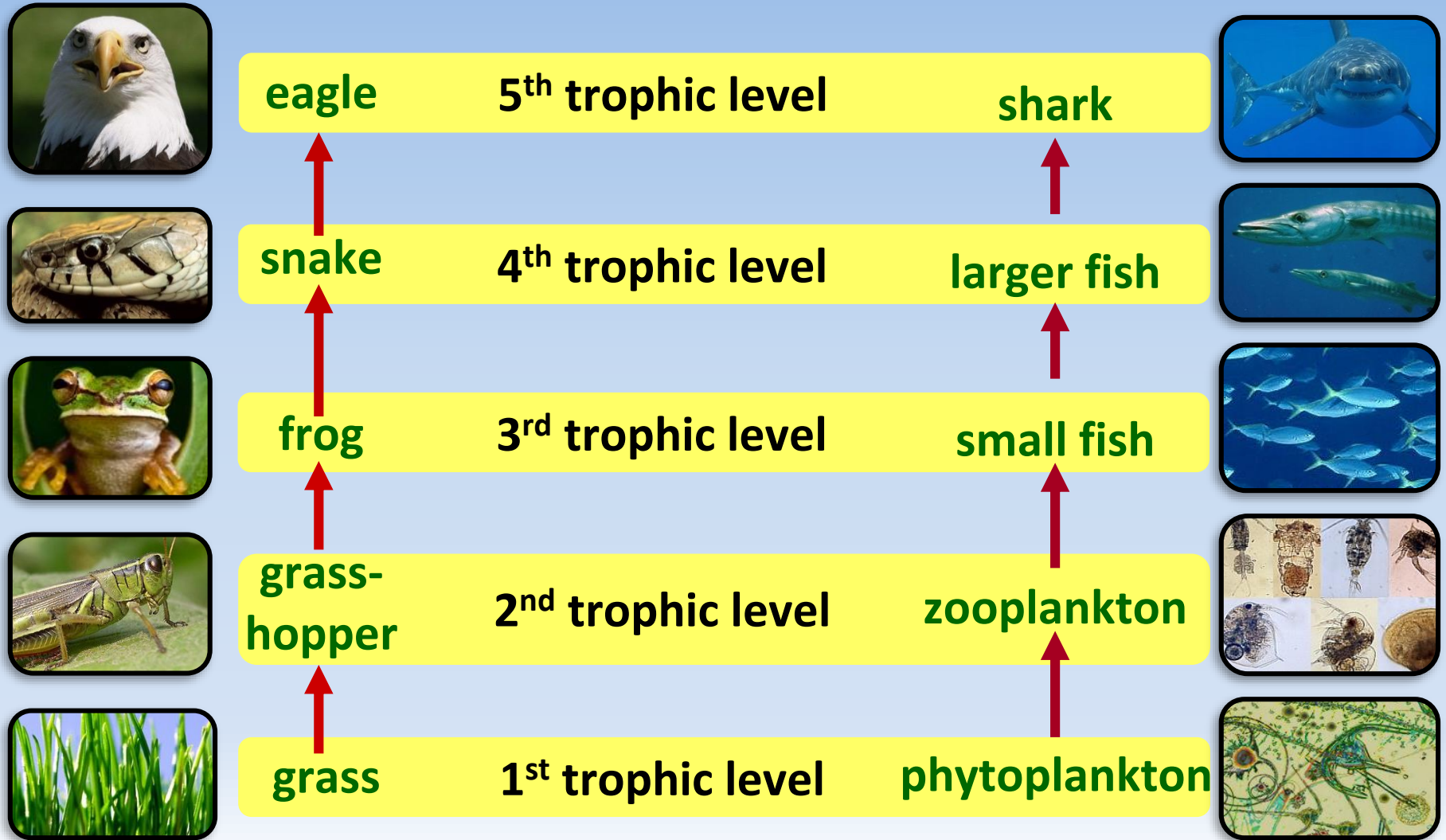
phytoplankton



TROPHIC LEVELS

Trophic Level: It is the **position** an organism occupies in a food chain.

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TROPHIC LEVELS



eagle 0.1 kcal
- 0.9 kcal



snake 1 kcal
- 9 kcal



frog 10 kcal
- 90 kcal



grass-hopper 100 kcal
- 900 kcal



grass 1000 kcal

As organisms eat one another, energy is transferred up the food chain.

However, as energy is moved from one trophic level to the next, only 10 % of the energy makes it to the next level.

This 10 % is used to build biomass as well as to fuel bodily functions.

This means that 90 % of the energy is lost, mostly in the form of detritus and as heat from metabolic processes.

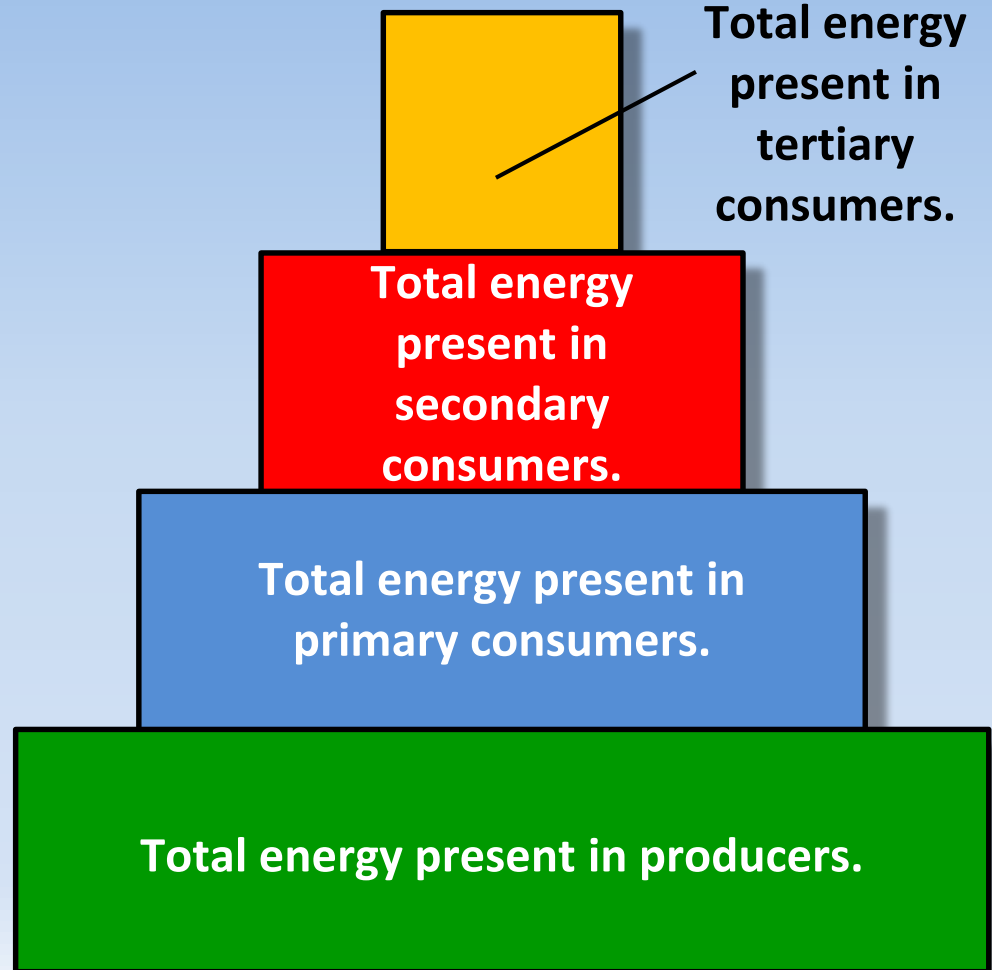
ECOLOGICAL PYRAMIDS

Ecological Pyramids: These are diagrams that represent each trophic level according to its energy, biomass, population.

1) Pyramid of Energy:

This pyramid indicates the amount of _____ that is present in each trophic level.
energy

The amount of energy **always decreases** as you move up trophic levels.



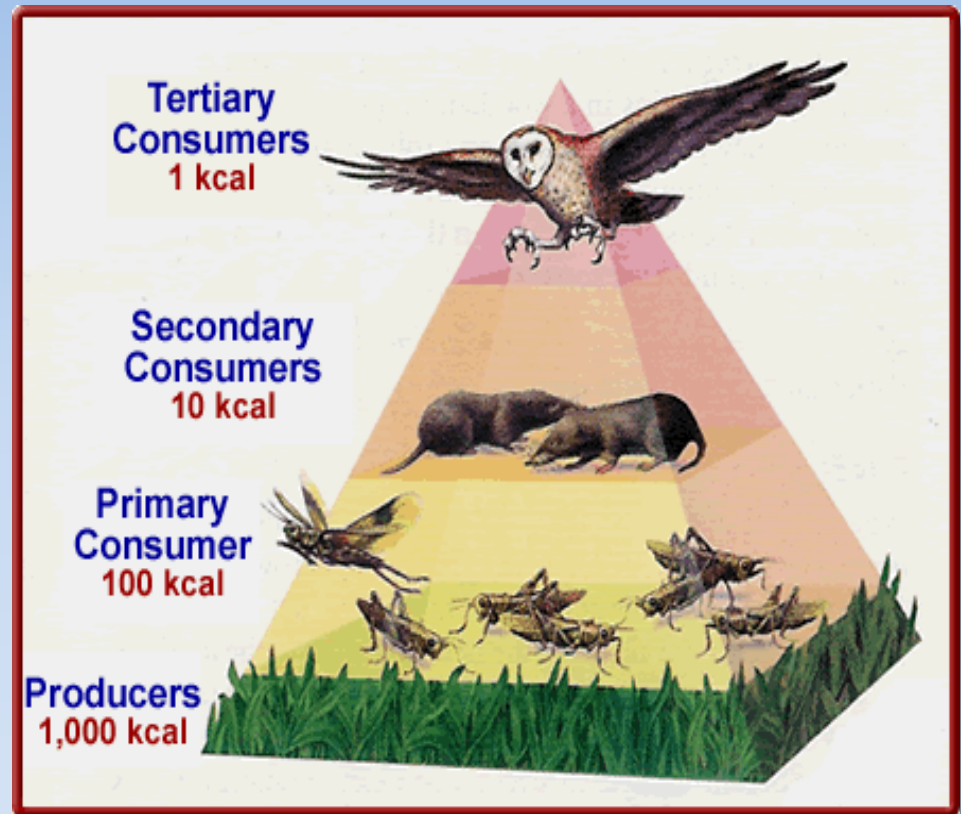
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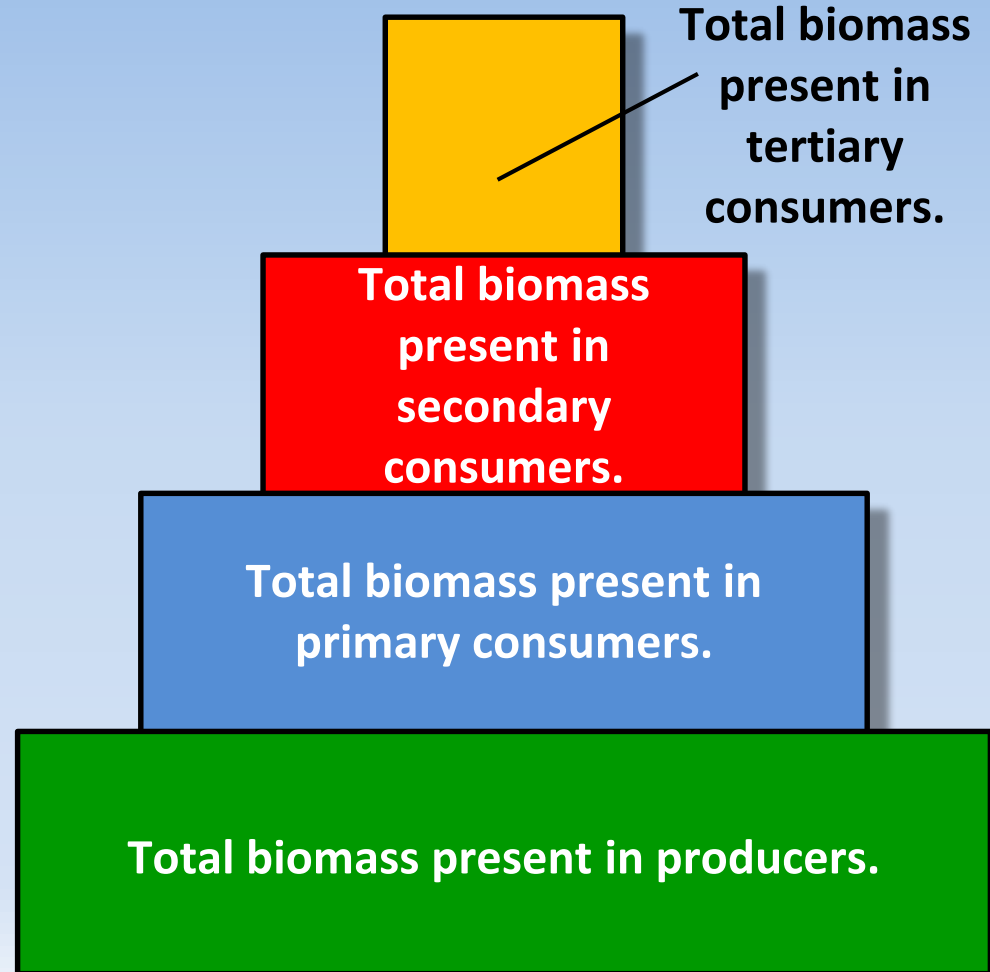
ECOLOGICAL PYRAMIDS

Ecological Pyramids: These are diagrams that represent each trophic level according to its energy, biomass, and population.

2) Pyramid of Biomass:

This pyramid indicates the amount of biomass present in each trophic level, in a given area.

Biomass is the amount of dry matter (without water) within organisms.



ECOLOGICAL PYRAMIDS

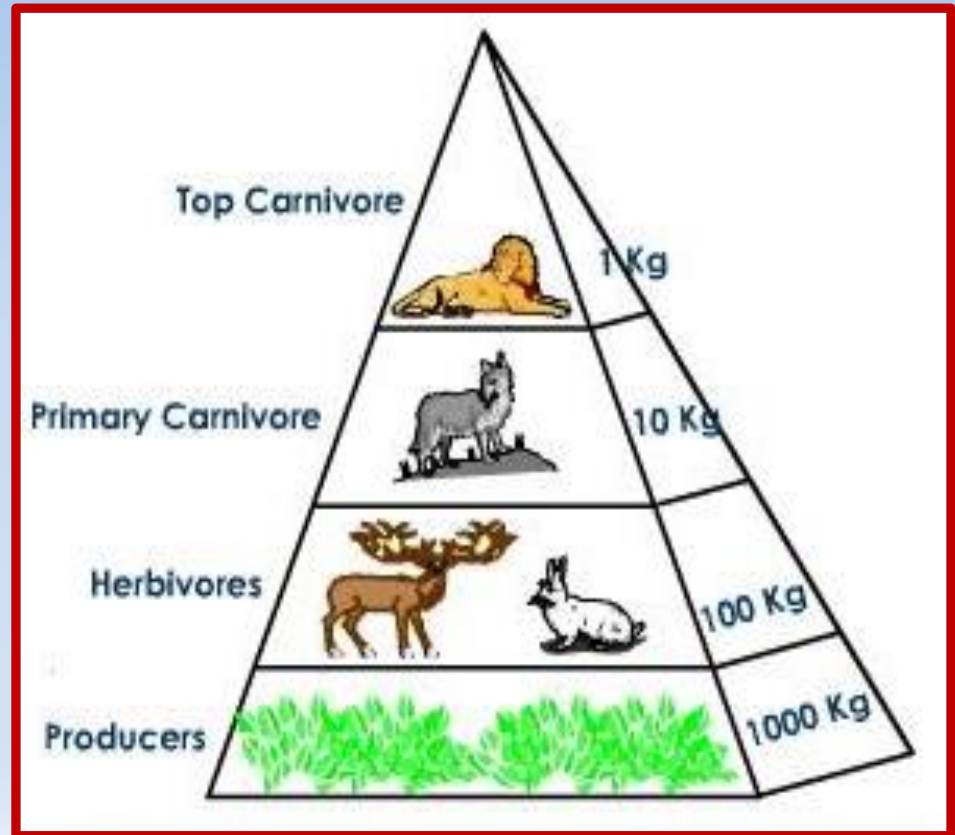
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population

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On land, the amount of biomass decreases as you move up trophic levels.

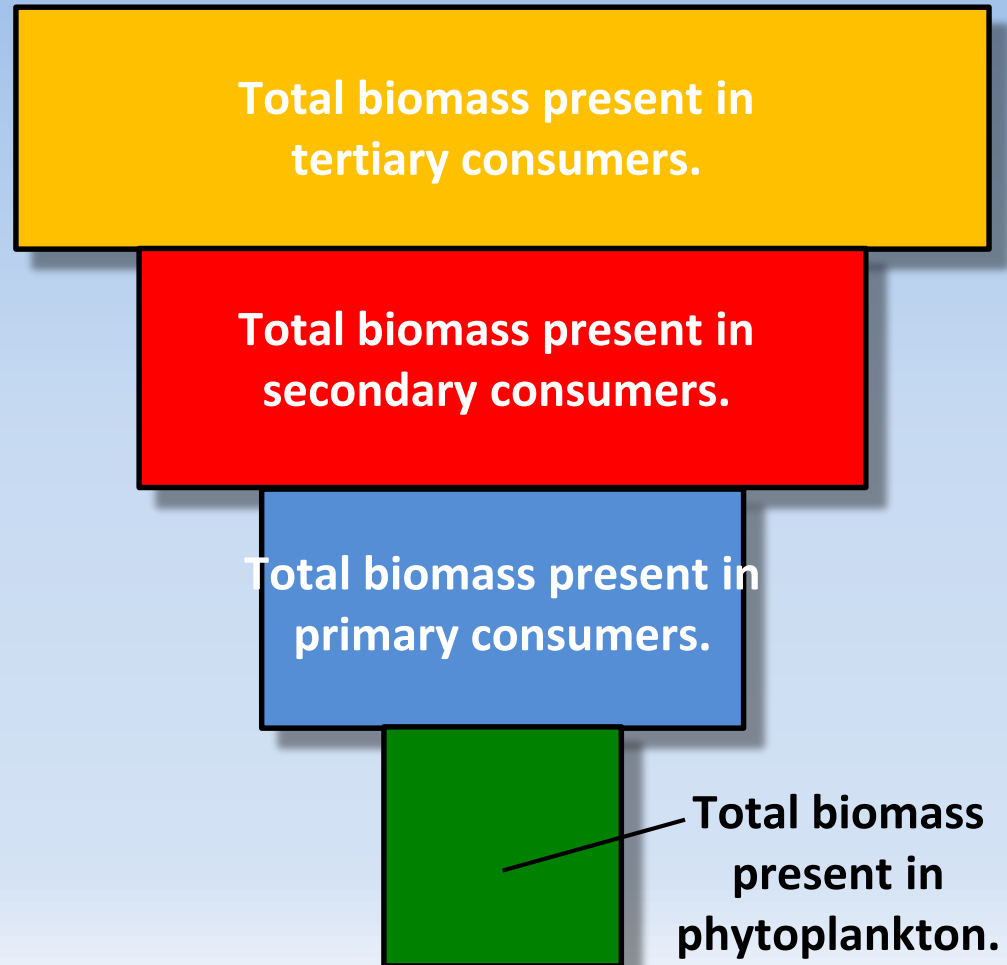


ECOLOGICAL PYRAMIDS

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2) Pyramid of Biomass:

In the water, the amount of biomass _____ as you move up trophic levels, creating an inverted pyramid.



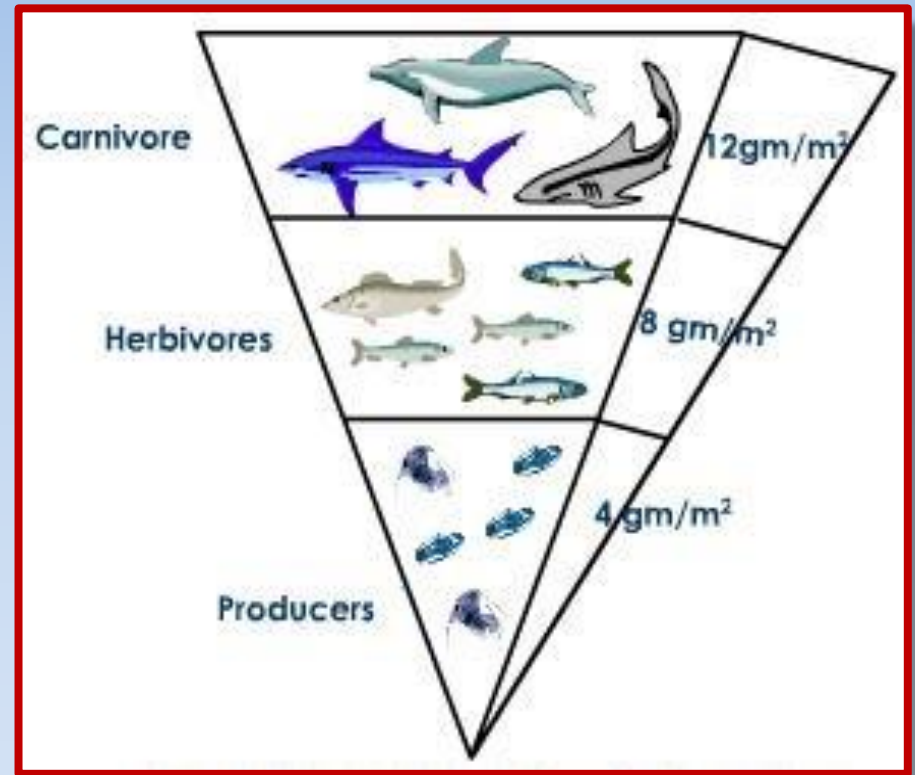
ECOLOGICAL PYRAMIDS

Ecological Pyramids: These are diagrams that represent each trophic level according to its energy, biomass, or population.

2) Pyramid of Biomass:

In the water, the amount of biomass _____ as you move up trophic levels,

This is only possible because the reproductive rate of the organisms _____ as you go down trophic levels.



ECOLOGICAL PYRAMIDS

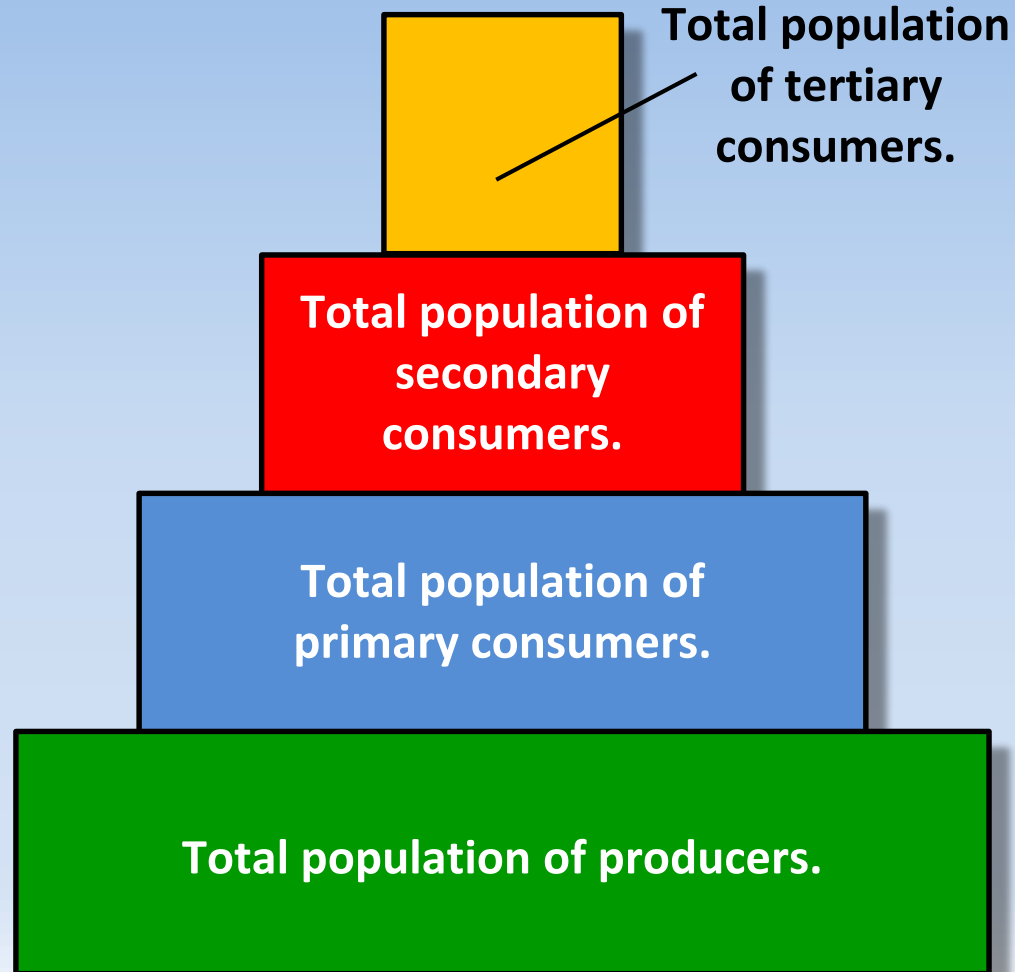
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3) Pyramid of Numbers:

This pyramid indicates the population of individuals at each trophic level.

The typical pyramid of numbers decreases as you move up trophic levels.

This occurs when many small and numerous producers feed a smaller number of consumers.



ECOLOGICAL PYRAMIDS

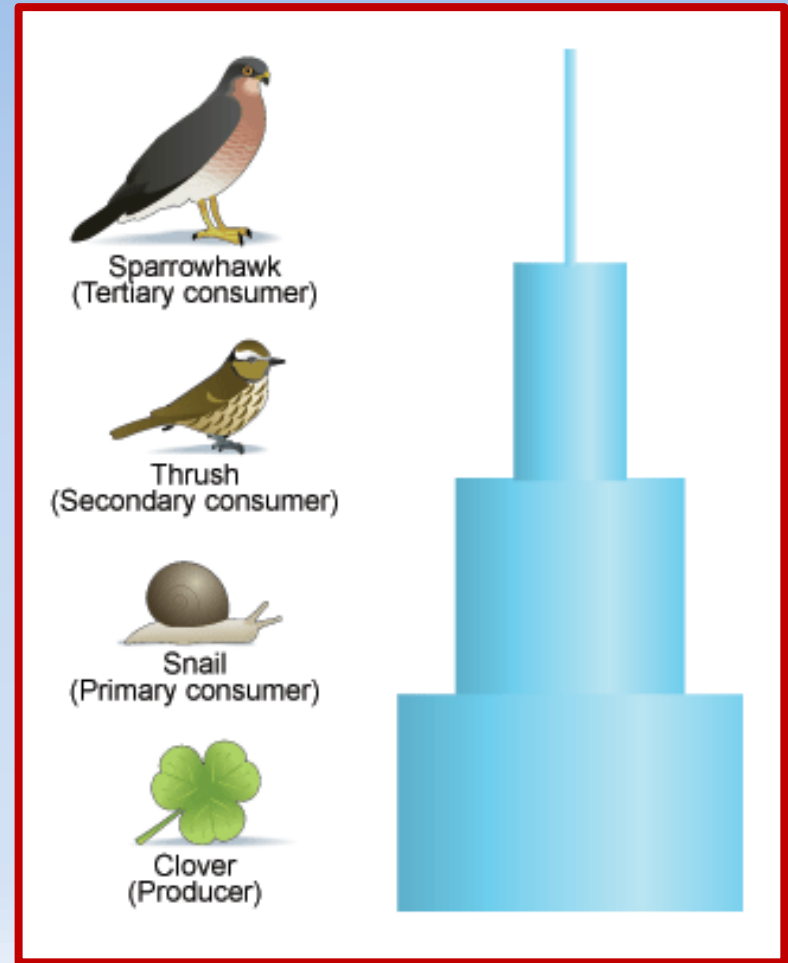
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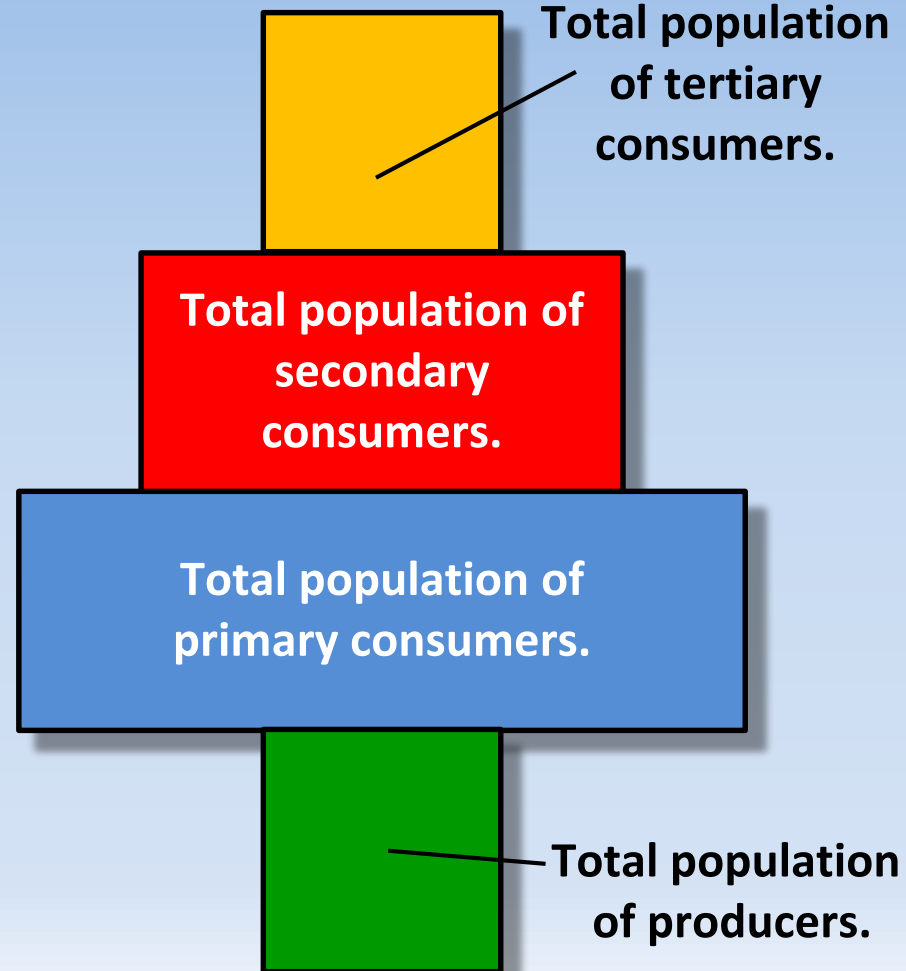
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3) Pyramid of Numbers:

However, when the producers are large, and are fewer in number than the primary consumers, the pyramid looks like this.

Give an example of the kind of producers that would result in this type of pyramid.



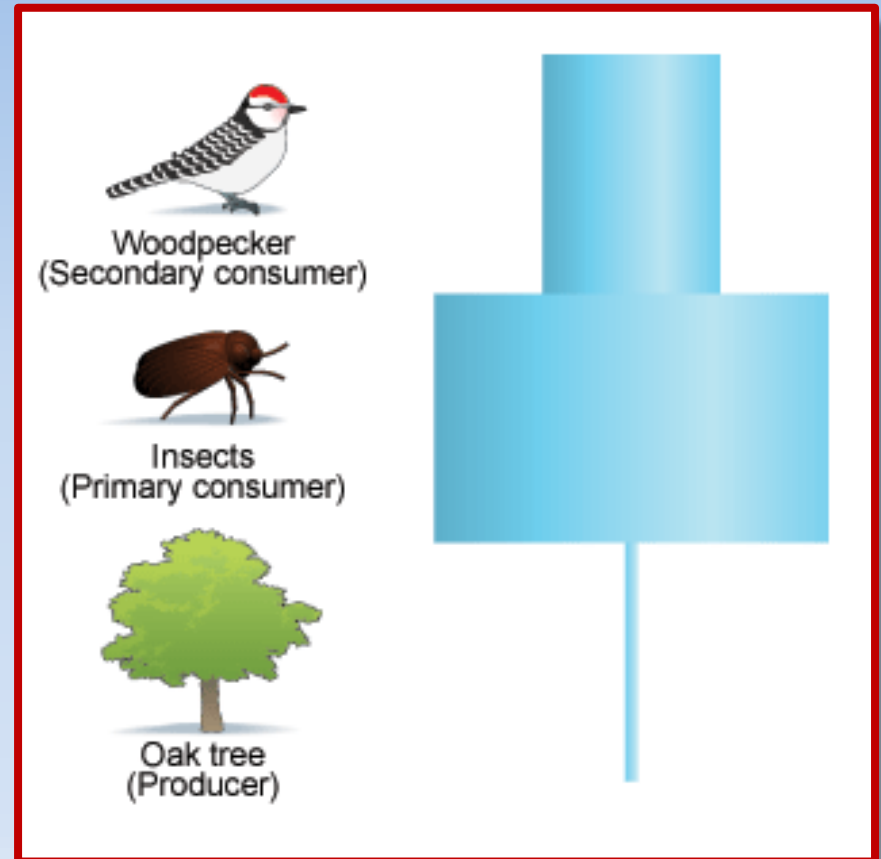
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The End!