

Energy Flow and Energy Pyramid

Objective: I Can explain the flow of energy through an ecosystem

6.1a Energy flows through ecosystems in one direction, typically from the Sun, through photosynthetic organisms including green plants and algae, to herbivores to carnivores and decomposers.

6.1b The atoms and molecules on the Earth cycle among the living and nonliving components of the biosphere. For example, carbon dioxide and water molecules used in photosynthesis to form energy-rich organic compounds are returned to the environment when the energy in these compounds is eventually released by cells. Continual input of energy from sunlight keeps the process going. This concept may be illustrated with an energy pyramid.

Slide #1- Motivation/ Prior Knowledge

We eat because our food provides us with energy to live (life functions).

Some foods have a higher amount of energy (calorie) than other foods.

Look at this image: Which organism will provide the most amount of energy per pound? Spinach or Chicken



Slide #2- How does energy flow through an ecosystem?

- The arrows in this image show the flow of energy
- The first source of energy for the planet is the sun
- Producers (plants) can take in the sun's energy and change it to chemical energy (food)
- As organisms consume each other, the amount of energy that moves on to the next level is very little.
- A lot of energy is lost as heat

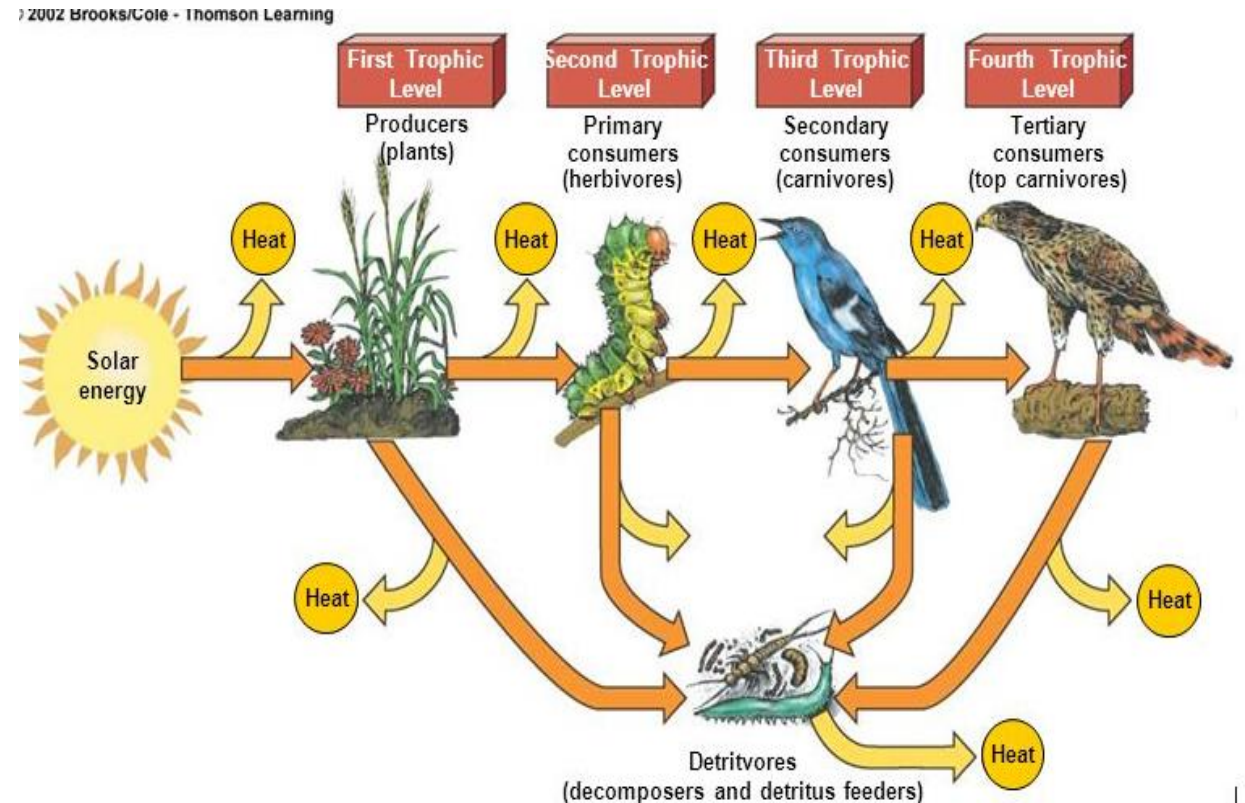
What do we know?

The sun: provides energy

Producers: harness energy from the sun (ex. plants)

Consumers: organisms that eat something else (ex. Animals)

Decomposers: return energy to the environment (ex. Fungus and bacteria)

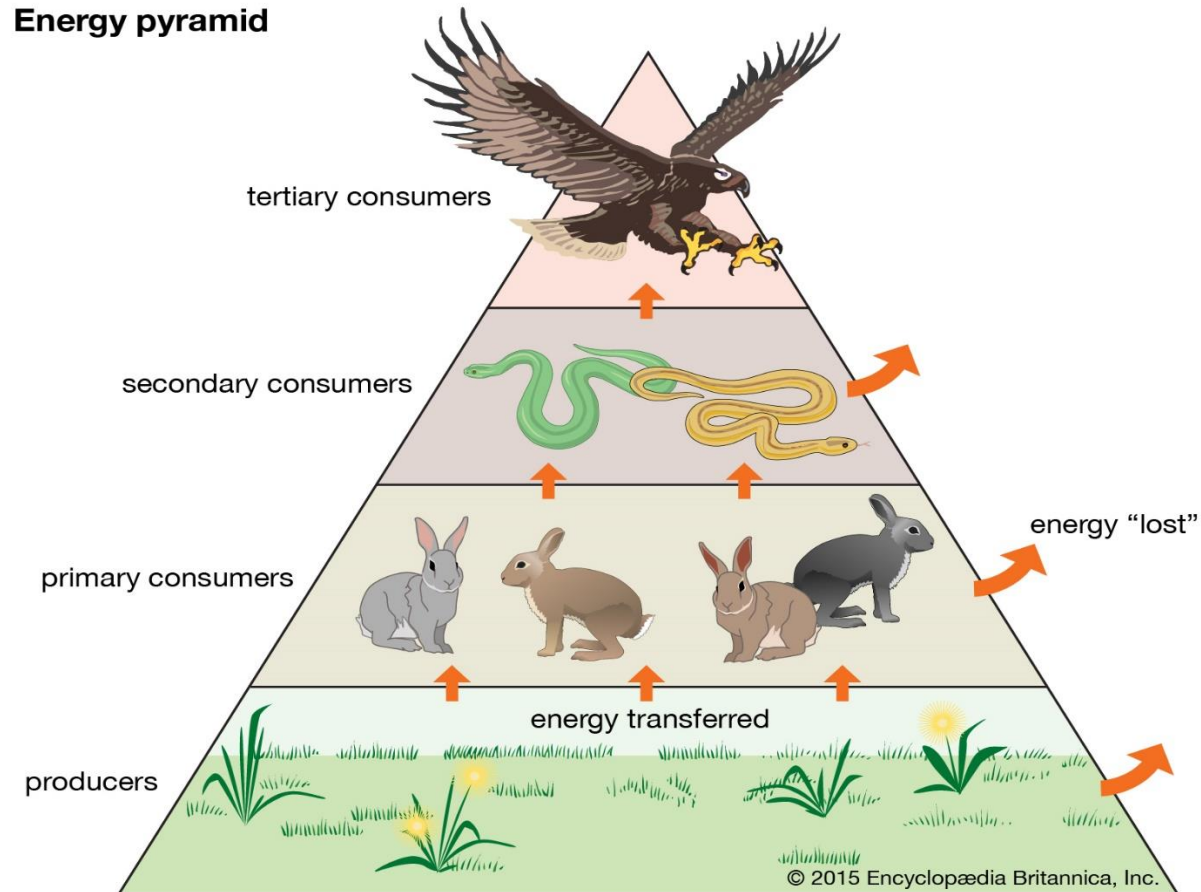


Slide #3: What is an energy pyramid?

- An energy pyramid shows the flow of energy in an ecosystem
- The most amount of energy is found on the bottom of the pyramid
- The least amount of energy available is at the top of the pyramid.
- Only 10% of the energy available is passed on to each trophic level
- For example: as the rabbits consume the grass, only 10% of the energy from the grass is passed on.

REGENTS FACT:
Why is so little energy passed on?
It “costs” energy to live. In other words, organisms use energy to carry out life functions

Energy pyramid



Slide #4- Energy flow video

<https://youtu.be/0ZOvqYypOuo>

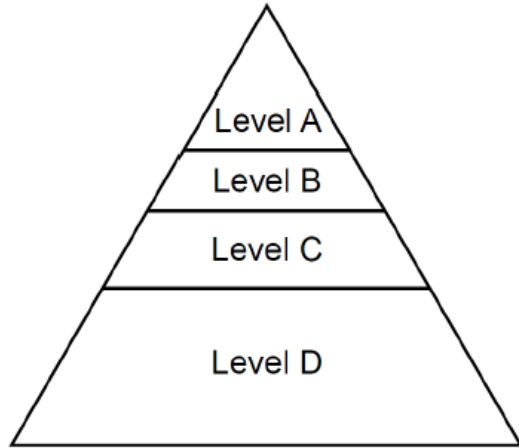


Based on this video

1. What is the MAIN purpose of a food chain?
2. What is a producer? Give an example
3. What is the primary consumer in this video? Are they a herbivore, carnivore or omnivore?
4. Which essential part of a food chain is missing from this video?
5. IMPORTANT: Why is a food chain limited to just 4 or 5 organisms?
6. Explain the “rule of thumb” mentioned in the video.

Slide #5-Regents Practice

1. The diagram below represents an energy pyramid.



In this pyramid, the greatest amount of stored energy is found at level

- A) *A* B) *B* C) *C* D) *D*

2. Some organisms in an ecosystem are represented in the pyramid below.

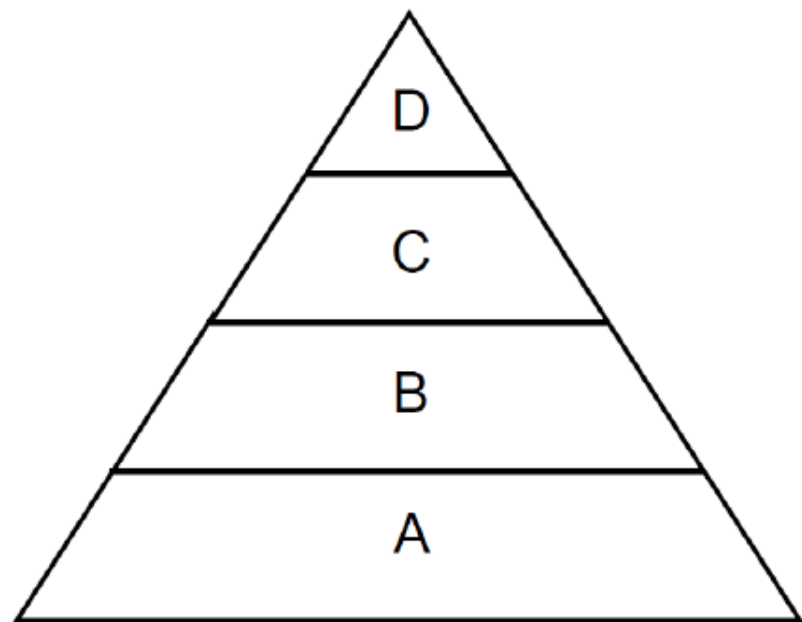


Source: Sylvia Mader, Human Biology (McGraw-Hill,

In the pyramid, the arrows labeled *X* represent

- A) the loss of organisms due to predation B) a decrease in photosynthetic organisms
C) the loss of energy in the form of heat D) a decrease in available oxygen

3. The diagram below represents an energy pyramid.



Which type of organism could occupy levels *B*, *C*, and *D* of this energy pyramid?

- A) consumer B) producer
C) autotroph D) carnivore

4. The sequence that best illustrates the flow of energy through an ecosystem is

- A) sunlight → plant → wolf → rabbit
B) plant → sunlight → rabbit → wolf
C) sunlight → plant → rabbit → wolf
D) wolf → rabbit → plant → sunlight

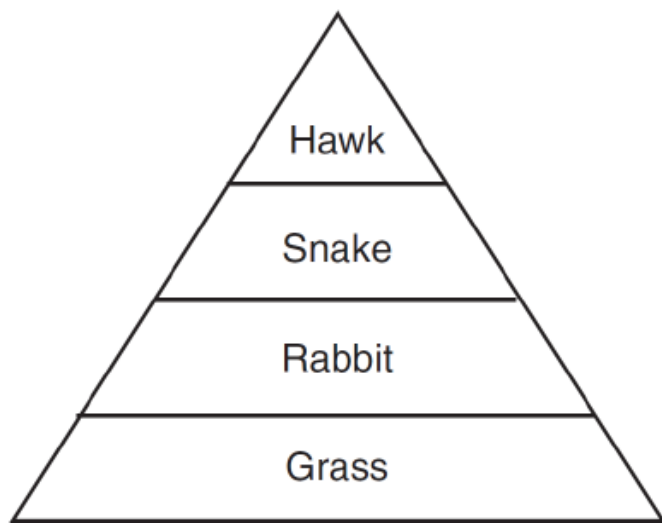
5. Which sequence best represents the flow of energy through an ecosystem?

- A) Sun → green plants → herbivores → carnivores
B) Sun → herbivores → producers → consumers
C) green plants → carnivores → consumers → herbivores
D) consumers → carnivores → herbivores → producers

6. The flow of energy in an ecosystem is best described as energy moving in

- A) one direction from the Sun to the producers and then to the consumers
B) one direction from a consumer to a producer and then to the Sun as heat and light
C) two directions between the producers that are present
D) two directions, back and forth, between the producers and the consumers

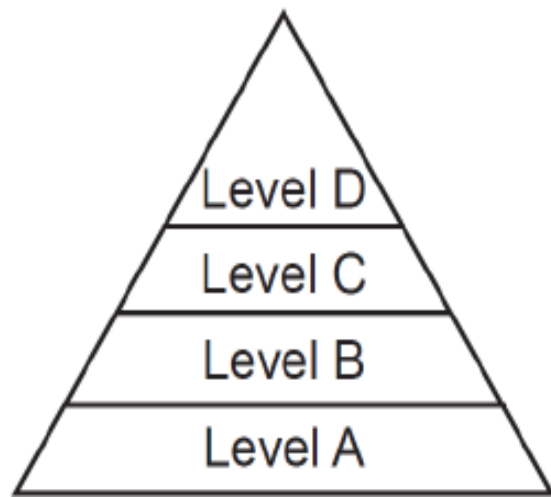
7. The diagram below represents a food pyramid in an ecosystem.



The best explanation for the decrease in the amount of energy transferred to each succeeding level is that much of the energy is

- A) consumed by predators
- B) released as heat
- C) stored within inorganic materials
- D) used in photosynthesis

8. Which level of the pyramid below is correctly paired with the type of organism that would most likely be found at that level in an ecosystem?



- A) Level *A* - producers
- B) Level *B* - carnivores
- C) Level *C* - herbivores
- D) Level *D* - decomposers