

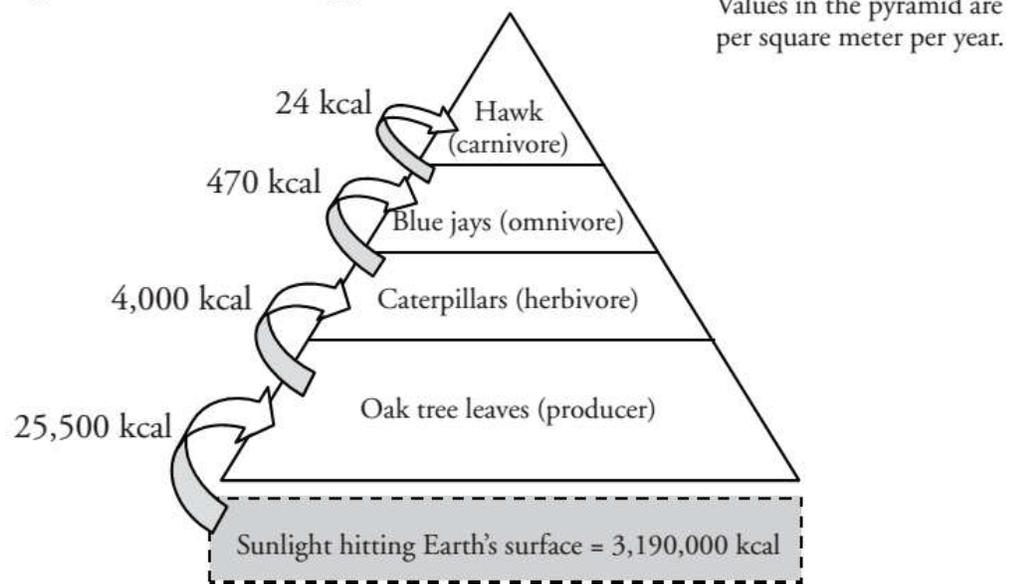
Ecological Pyramids

How does energy flow through an ecosystem?

Why?

Every organism in an ecosystem is either eating or being eaten. When cows eat grass, they obtain some of the energy that the grass transferred from the sunlight it absorbed. If cows could carry out photosynthesis, would they have access to more energy than they get as herbivores? Which organisms in an ecosystem require the most energy to sustain life?

Model 1 – Pyramid of Energy



1. A unit used to measure energy is the **kcal (kilocalorie)**. What is the source of all energy in the pyramid in Model 1?
2. Label the pyramid levels in Model 1 with the following (listed in order from bottom to top starting with oak tree): **primary producers, primary consumers, secondary consumers, and tertiary consumers.**
3. The arrows in Model 1 represent the energy available to the next level of the pyramid.
 - a. What process do oak leaves use to harness energy from the sun?
 - b. Describe the pattern of energy transfer among consumers within a pyramid of energy. In other words, does the **amount of energy that is transferred** from one level of the pyramid to the next *stay the same, increase, or decrease* as you move up the pyramid?

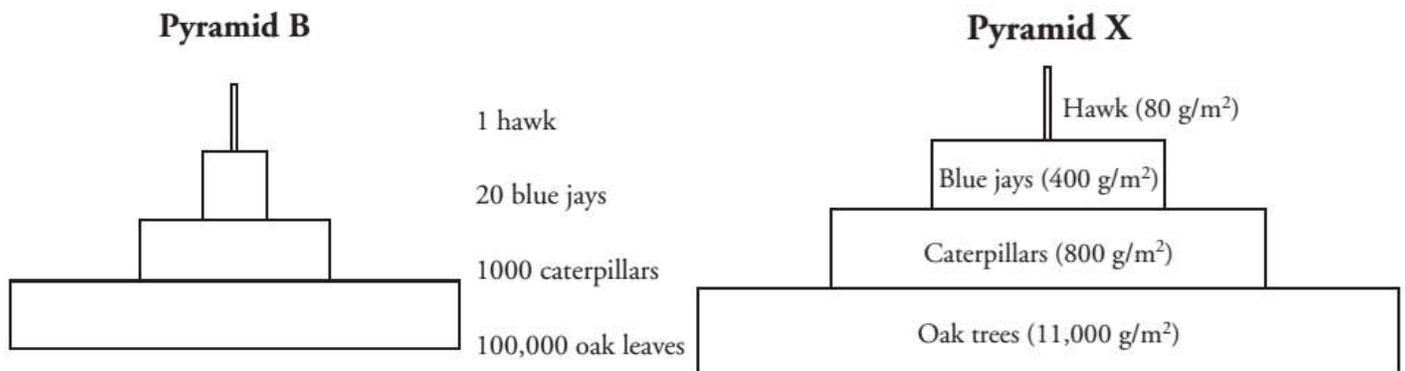
Read This!

Each level in the pyramid in Model 1 is a **trophic level**. The word “trophic” refers to feeding or nutrition. Model 1 shows one example of one organism that would be included in each level, but each level in an ecosystem includes many species of organisms.

4. Explain why the oak trees are considered **autotrophs**.

5. Explain why the caterpillars, blue jays, and hawks are considered **heterotrophs**.

Model 2: Pyramid of Numbers and Biomass



6. Examine the two pyramids above.
 - a. In general, do the number of organisms *increase or decrease* as you move up the levels?

 - b. Why do you think this pattern is necessary for an ecosystem to be sustainable? Why would it not be feasible to have the opposite pattern be true?

Energy Flow in Ecosystems Practice

COASTAL FOOD WEB

A. Examine the coastal food web at right.

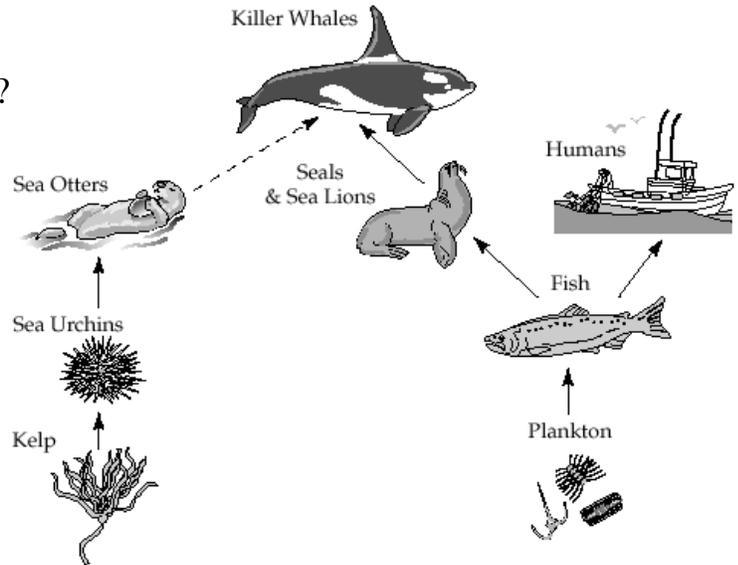
1. What do the arrows indicate in the food web?

2. Identify all **producers**:

3. Identify all **primary consumers**:

4. Identify all **secondary consumers**:

5. Identify all **tertiary consumers**:



B. Describe how over-fishing by humans would affect the populations of:

1. Plankton:

2. Seals and Sea Lions:

3. Sea Otters:

C. Insert the organisms from the food web into the energy pyramid at right, and answer the questions that follow.

1. Which level contains the most **biomass**?

2. Which level represents the most available **energy**?

