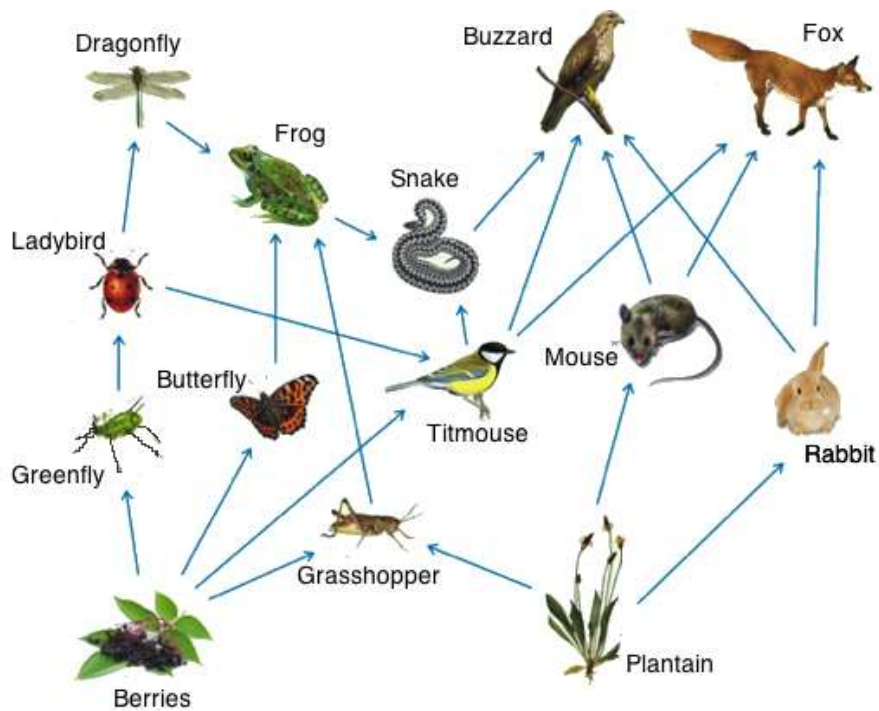




National 5 Biology

Unit 3 Life on Earth

3.4 Energy in Ecosystems



Name _____

Class _____

Teacher _____

Energy in Ecosystems

The ultimate source of energy for an ecosystem is the sun. Light energy from the sun is trapped by green plants and is converted to the chemical energy that maintains all life on earth. The flow of energy through ecosystems will be examined in this section.

Learning intention

- To find out about energy transfer in food chains.

Food chains



A food chain is a diagram that shows the feeding relationships of organisms living together in a particular ecosystem. The arrows represent the direction of energy flow and mean 'gets eaten by'.



Not all the energy is passed from one level of the food chain to the next. About 90 per cent of energy may be lost as _____ (released during respiration), through _____, or in materials that the consumer does not _____.

The energy stored in undigested materials can be transferred to decomposers.

Decomposers are organisms such as bacteria and fungi that can obtain energy by breaking down dead organisms.

Energy transfer in food chains

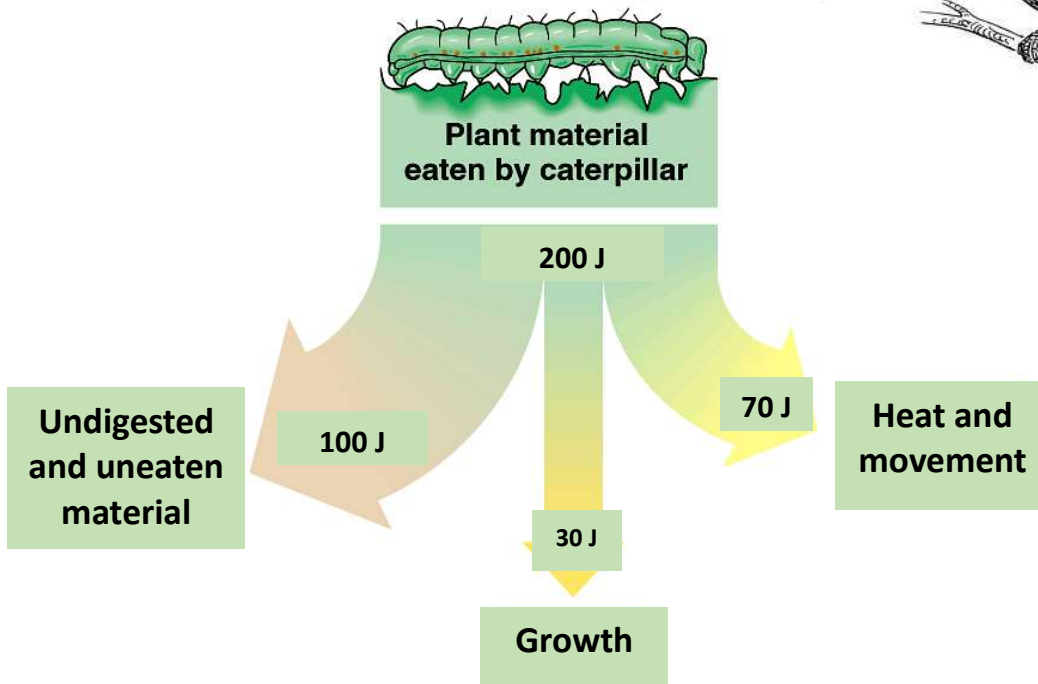
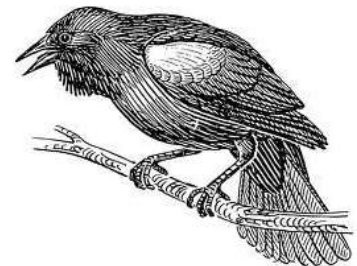


In transfers from one level to the next in a food chain, the majority of energy is lost as:

1. _____ (released during respiration): A lot of the energy is used to maintain body temperature.
2. _____: and more is used in moving around. All of this this can be lost as heat. This energy is not available to the next level in the chain.
3. _____ materials: Contain chemical energy that is lost from the food chain. However, the energy contained in the undigested waste or uneaten remains is available to decomposers such as bacteria and fungi.

Only a very small quantity is used for _____ and is therefore available at the next level in a food chain.

Does all the energy this caterpillar eats get passed to the bird who eats him?



Learning intention

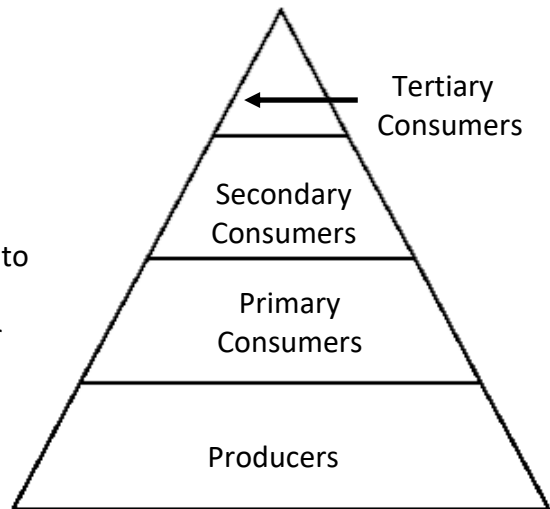
- To find out about pyramids of numbers and pyramids of energy.



Pyramid Diagrams

Every ecosystem can be broken down into trophic levels.

Each organism in an ecosystem can be categorised into one of these levels based on how it gets its energy or food. _____ form the energy base for all other life, so we always put them on the



bottom of a pyramid. _____ consumers come next on the pyramid, as they eat only producers. _____ consumers are carnivores and eat primary consumers, so follow on from primary consumers. Lastly, _____ consumers feed on both primary and secondary consumer and are at the top of the food chain and thus are shown at the top of the ecological pyramid.

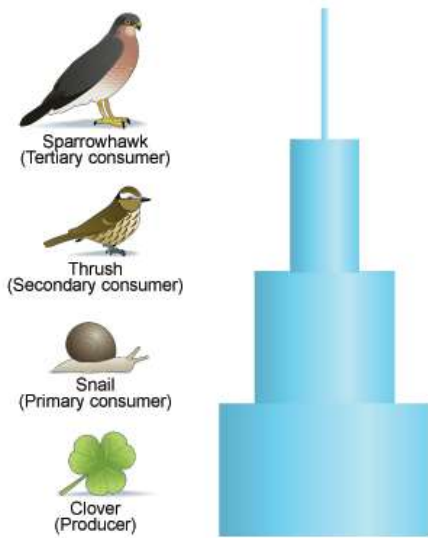
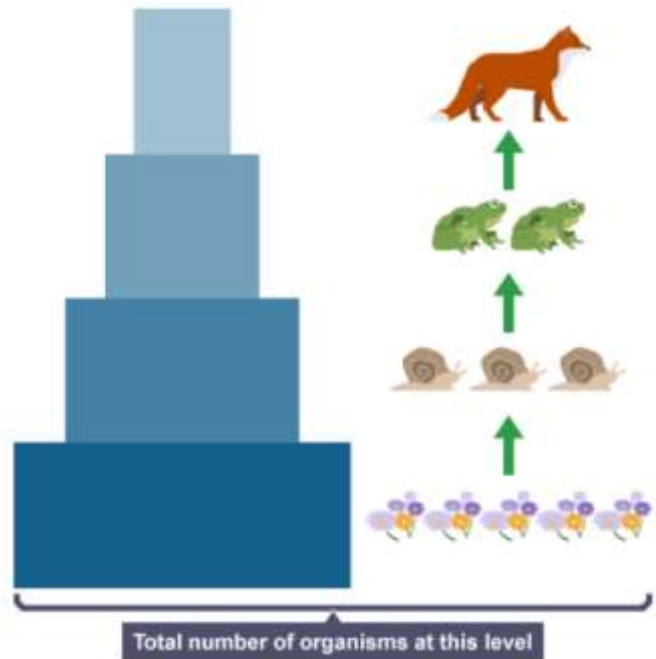
There are several ways that the trophic levels in an ecological pyramid can be represented: the _____ of organisms or the amount of _____ contained in each level.



Pyramids of numbers

A pyramid of numbers shows the total _____ of organisms at each stage in a food chain.

As you move up the pyramid, the number of organisms _____ but the size of each individual usually _____.

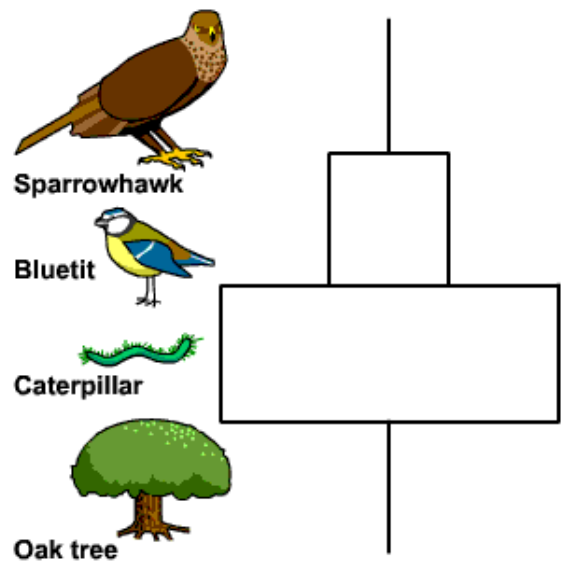


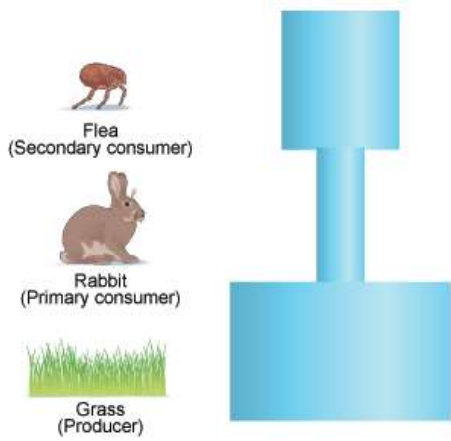
The energy lost at each stage in the food chain limits the numbers of organisms that can survive at the next level.

Pyramids of numbers do not always result in a true pyramid shape. There are exceptional food chains for which the number pyramid would be inverted. This makes them more tree-shaped.

An oak tree is very large so many caterpillars can feed upon it.

Hint: If it looks like a tree, it probably starts with a tree!





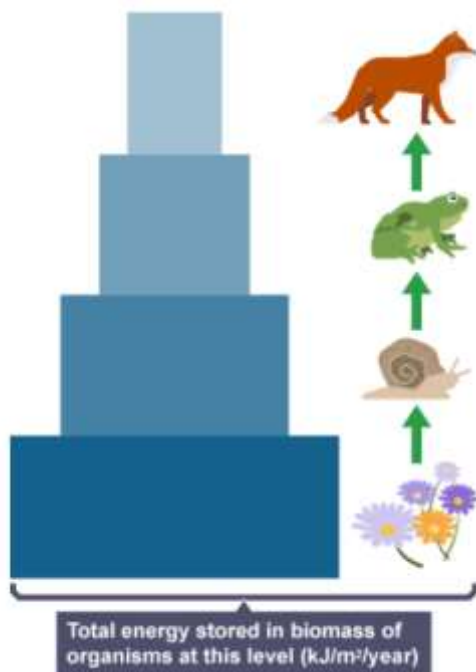
Fleas are very small and so lots of them can feed on a rabbit.

Irregular shapes of pyramids of numbers based on different body sizes can be represented as true pyramids of energy.



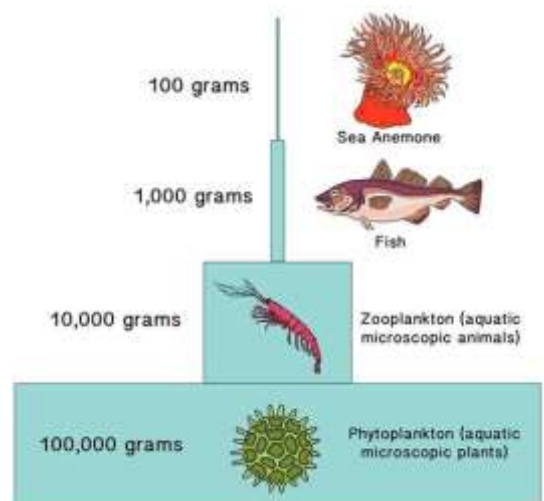
Pyramid of energy






A pyramid of energy shows the _____ energy in the bodies of all organisms at each level of a food chain. This can be estimated by burning samples of organisms and measuring the heat released.



Pyramids of energy show that the _____ store the highest quantity of energy and the energy stored then decreases at each level in the food chain of the ecosystem.

A pyramid of energy is the most realistic way of representing energy levels in a food chain and _____ has the shape of a true pyramid.



I can:	
State that in transfers from one level to the next in a food chain, the majority of the energy is lost as heat, movement or undigested materials.	
State that only a very small quantity of energy is used for growth and is therefore available at the next level in a food chain.	
Give the definition of a pyramid of numbers as a diagram that represents the total number of organisms at each stage of a food chain.	
Give the definition of a pyramid of energy as a diagram that shows the total energy in the bodies of all organisms at each level of a food chain.	
Compare pyramids of numbers and energy.	
State that irregular shapes of pyramids of numbers based on different body sizes can be represented as true pyramids of energy.	