BIOTIC (Living) FACTORS

- **Producers** – make food. (*AutoTrophs*.) Includes all green plants that can PhotoSynthesise.
- **Consumers** – eat food. (*HeteroTrophs*.) All animals.

- Animals that **eat plants** are **Herbi**Vores.
- Animals that **eat meat** are **Carni**Vores. *Predators* hunt and kill their food. *Scavengers* eat meat off bodies that are already dead.

- Animals that eat **plants and meat** are **Omni**Vores.
- **Decomposers** – MicroOrganisms that break down dead (**rotting**) plants and animals. (*SaproPhytes*.)

The **position** that each organism has in its EcoSystem is called its ***NICHE***.

D. Biotic Components of Ecosystems

Question 1

1. Producers - organisms that can manufacture food e.g. plants.
2. Consumers – organisms that cannot manufacture their own food.
3. Decomposers – organisms that breakdown dead organic material to obtain food. E.g. Bacteria, Fungi.
4. Ecological niche – is the position an organism occupies within an ecosystem.
5. Herbivore – organisms that feed on plants.
6. Carnivores – organisms that feed on other animals.
7. Omnivore – organisms that feed on plants and animals.

ENERGY FLOWING through the ECOSYSTEM

FOOD CHAINS

These show how **food** moves from one link to the next.

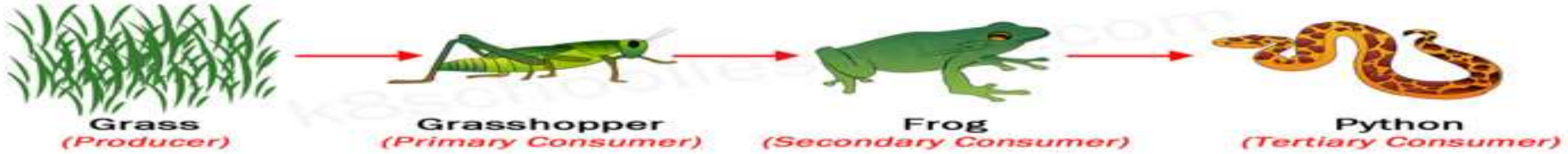
Grass → Grasshopper → Frog → Snake

Trophic level 1: **Producer** of the food. *Grass*.

Trophic level 2: Primary consumer = **1st eater**. *Grasshopper*.

Trophic level 3: Secondary consumer = **2nd eater**. *Frog*.

Trophic level 4: Tertiary consumer = **3rd eater**. *Snake*.



FOOD WEBS

Two or more Food-Chains joined together.


Diagram Card #1
Hawk
Snake
Frog
Grasshopper
Grass and trees


Diagram Card #2
Snake
Hawk
Fox
Bird
Beatle
Chipmunk
Squirrel
Caterpillar
Grass and trees

FoodChains and FoodWebs can be represented in **Food Pyramids.**

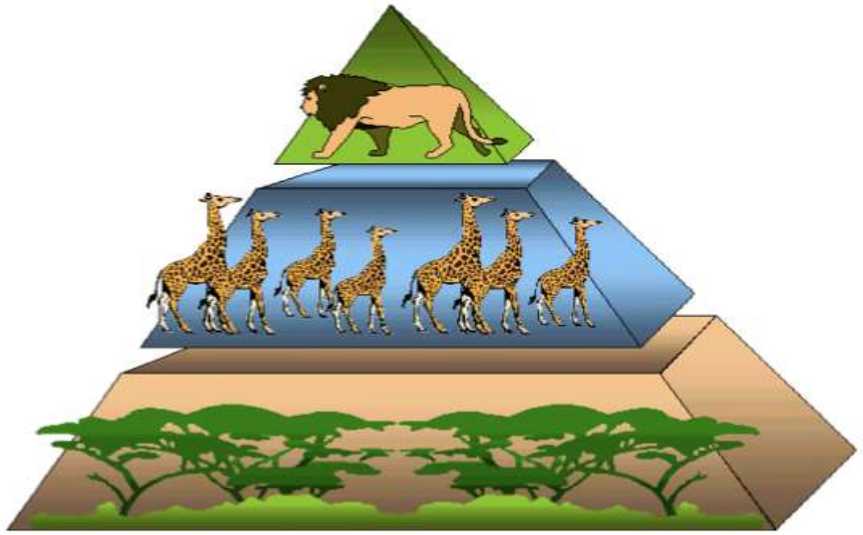
Trophic level 1 (the Producer) is always at the bottom. The bottom level is always the **biggest**, and so represents the **largest quantity** in that system.

Trophic level 2 (1st eater) is always directly above it, and is the **next biggest**.

The **top** of the pyramid always has the **final** consumer – the **top predator** of that area. This is the **smallest** area, showing the **smallest quantity**.

The **FoodPyramid** can be based on:

- The full **masses** of the organisms.
- The **numbers** of the organisms.
- The **energy** in each of the organisms



E. Energy Flow through Ecosystems.

Question 1

1. For each biome, arrows should start at the producer and end at the quaternary consumer.
2. There will be many different answers, **for example**: **Grassland** – *accept any suitable answers*.

   Pond – *accept any suitable answers*. **Ocean** – *accept any suitable answers*.
3. a) A **producer** is an autotroph that manufactures its own food by photosynthesis, while a **primary consumer** is a herbivore that eats plants.

   b) A **secondary consumer** is a carnivore (or omnivore) that eats primary consumers, and a tertiary consumer eats secondary consumers, so is higher up the food chain.

   c) **Phytoplankton** is autotrophic and manufactures its own food by photosynthesis; **zooplankton** are tiny animals that are heterotrophic.
4. **Freshwater biomes** have fresh water, are located on land, and many are seasonal.

   Ocean biomes have salty water, are located away from land / at sea, and are not affected by the seasons.
5. a) Grass, phytoplankton (algae is an autotrophic protist, not a plant)

   b) Grasshopper, mosquito larva, zooplankton

   c) Rat, snake, eagle, dragonfly larva, fish, otter, fish, seal, shark

   d) Rat, snake, eagle, dragonfly larva, fish, otter, fish, seal, shark e) grasshopper, mosquito larva, zooplankton

Question 2

1. a) A: zebra, F: locust
   b) D: human
   c) B: spider, E: lion, D: human
   d) C: green plant

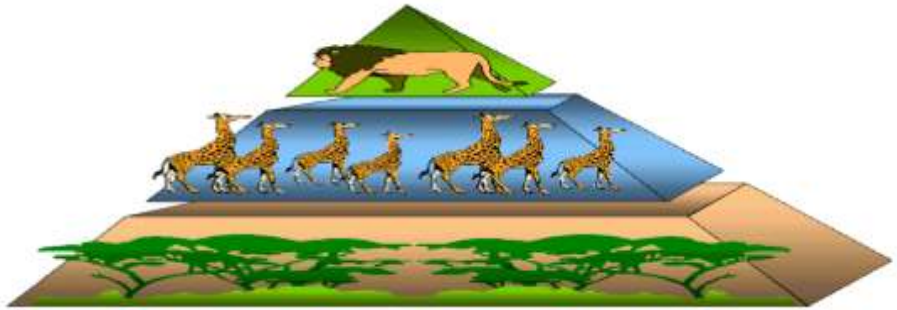
2. Green plant → zebra → lion
   Green plant → locust → spider

3. They represent the flow of energy and nutrients as they are consumed by consecutive organisms along the food chain.

4. The producer / plant would have no consumers, so its population size would grow very large; but because the food supply of the secondary and tertiary consumers has been removed, the secondary consumers would starve to death. For a short while, the tertiary consumers would still have the secondary consumers to eat, but once they had all been consumed, the tertiary consumers would also starve to death.

Question 3

1. *Accept appropriate pyramid diagram*



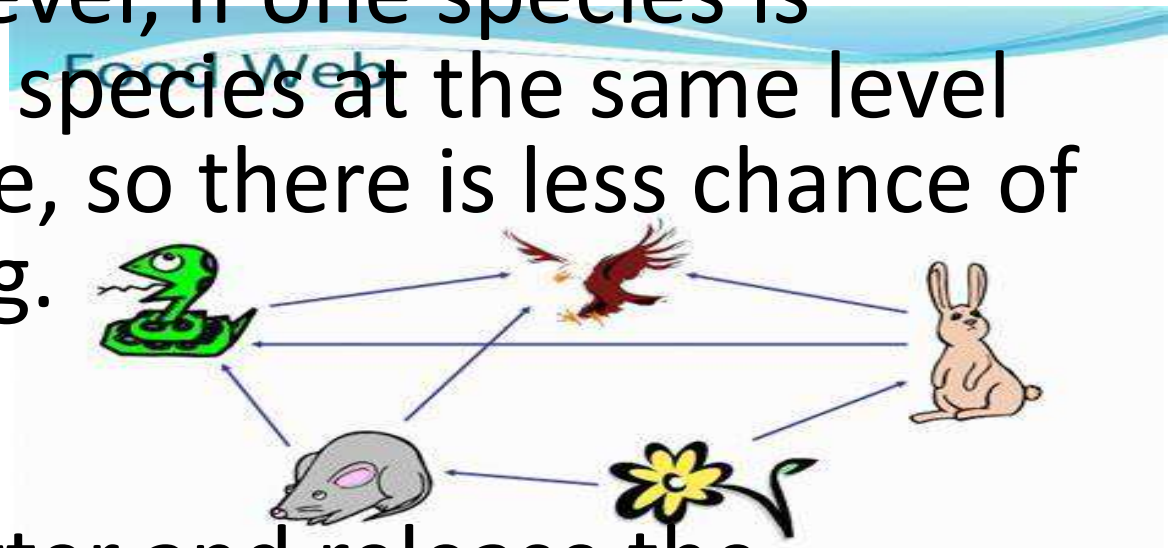
2. The food chain is based on only 1 tree - the pyramid of numbers reflects this, so it has a small base. At every level in the food chain, energy is lost, so pyramids of energy always have a broad base and a narrow apex, reflecting the successive loss of energy along the chain.

3. Energy is lost via all the metabolic processes, e.g.: cellular respiration, tissue repair, growth, reproduction and metabolism, as well as being lost in metabolic wastes that are excreted and defecated.

4. The total mass of the organisms at each trophic level.

Question 4

1. Bean plant → aphids → ladybirds → bird
2. 4
3. In a food chain, if one organism/trophic level is removed, all the trophic levels above it collapse. However, because a food web has numerous different species of organisms represented at each trophic level, if one species is removed, there are still other species at the same level which can act as a food source, so there is less chance of the entire food web collapsing.



4. a. Pyramid A
   b. Pyramid B
5. To breakdown dead organic matter and release the nutrients contained in the tissues back into the ecosystem so that they may be recycled and reused.