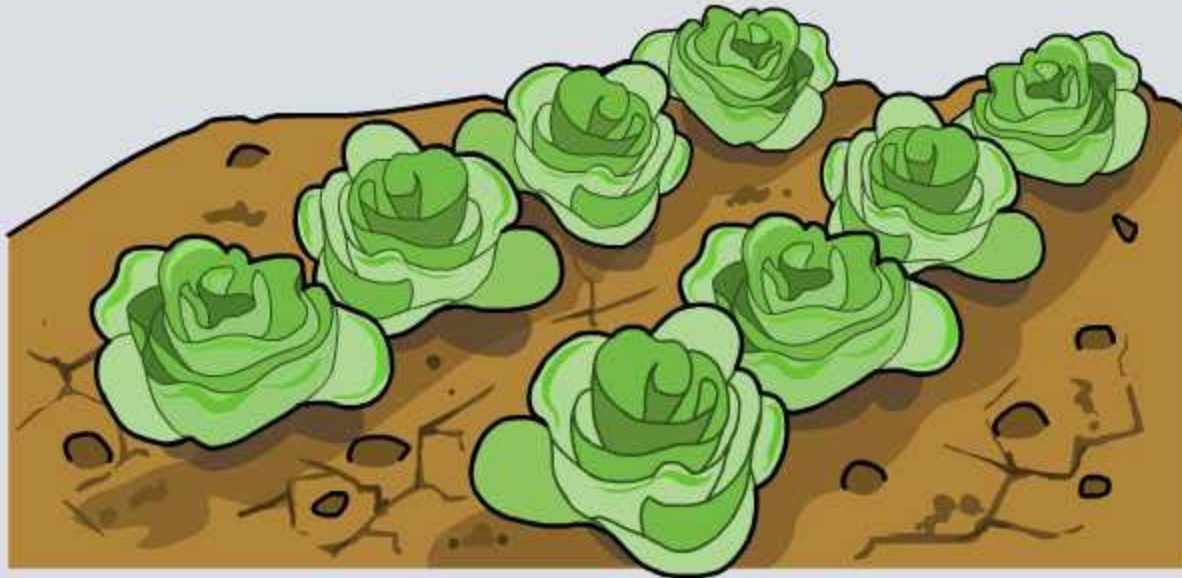


Growing Plants



Plants need carbon dioxide and water for photosynthesis, but they also need small amounts of **mineral salts** for healthy growth.

Minerals are dissolved in water in the soil and so plants absorb these nutrients in the water they take in from the soil.

The four main elements in mineral salts are:

- **nitrogen (N)** – needed for healthy leaves
- **phosphorus (P)** – needed for healthy roots
- **potassium (K)** – needed for healthy flowers and fruit
- **magnesium (Mg)** – needed for photosynthesis.



What happens when plants use up all the minerals in the soil? What do they look like?



low

phosphorous



low

potassium



low

magnesium



low

nitrogen

Can you explain why potted plants often look sickly?



Healthy plant growth



Fertilizers and plant growth

Plants take in mineral salts from the soil and over time there are fewer nutrients available in the soil.

Farmers and gardeners often add manure or chemicals, called **fertilizers**, to soil to make sure that their crops get enough mineral salts.

Manufactured fertilizers help crops to grow well and so increase the farmer's crop yield, but they can be very expensive.

If fertilizers aren't used responsibly, they can run into rivers, causing **water pollution**.



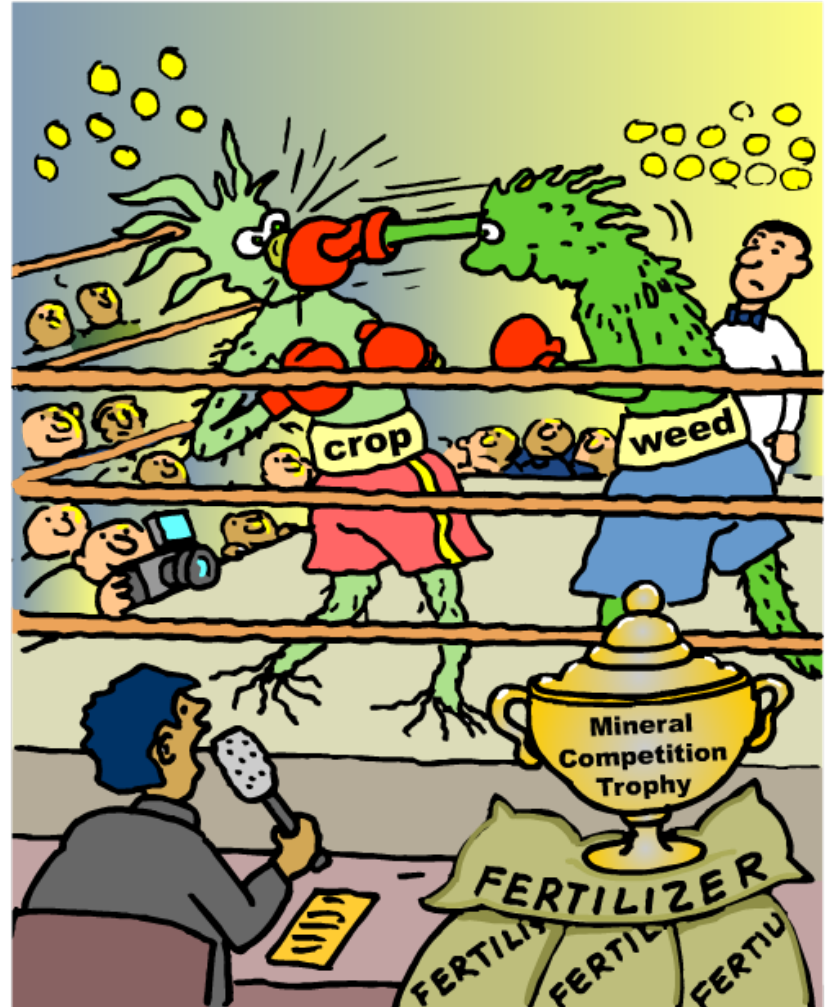
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Competition between plants

Organisms that share a habitat have to **compete** with each other for limited living resources.

A **weed** is any plant that is growing in the wrong place.

Weeds are a problem for farmers as they compete with the crops for resources such as light, water, living space and mineral salts.



How does **competition** affect the growth of crops?

Weeds compete with crops for living resources and this can reduce crop yield. What can farmers do to control weeds?

One way farmers can control weeds is to use chemicals called **herbicides**.

Weeds are part of the food web. How might using herbicides affect other organisms in the food web?



Non-selective herbicides kill most of the plants that they are sprayed on. This type of herbicide can be used to clear large patches of ground.

Selective herbicides only kill specific types of plants.

Many of the weeds that are killed using herbicides are important sources of food or shelter for consumers like insects and butterflies.

As the number of weeds decline, competition between the consumers increases.

Is this thistle a weed to a farmer?



Insects can cause a huge amount of damage to crops. They are considered **pests** because they compete with humans for food.

One way farmers can control insects is to use chemicals called **insecticides**. Insecticides can kill the adult insect or prevent insect larvae from hatching.

However, nearly all types of insecticides can cause damage to local ecosystems and many are toxic to humans.



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Organic farming is an alternative farming method. It is thought that this method may have less impact on the environment since fewer artificial chemicals are used.

- Artificial fertilizers can be replaced with **natural fertilizers** and **crop rotation** to keep the soil rich in nutrients.
- As an alternative to insecticides, farmers may encourage the insects' **natural predators**, such as birds and other insects, to feed on them.
- Instead of using herbicides, weeds are removed by hand or mechanically.



The pros and cons of organic farming

There are both advantages and disadvantages to organic farming.

Using fewer artificial chemicals may decrease the risk of toxic substances remaining on food, and reduces the impact farming has on the environment.

However, organic farming is more labor-intensive and may result in a lower yield. This means that organic farming requires more labor and space, making organic food more expensive.





Which chemical?

What type of chemical do these statements relate to?

fertilizer

herbicide

insecticide

kills
insects

?

C

solve

↶