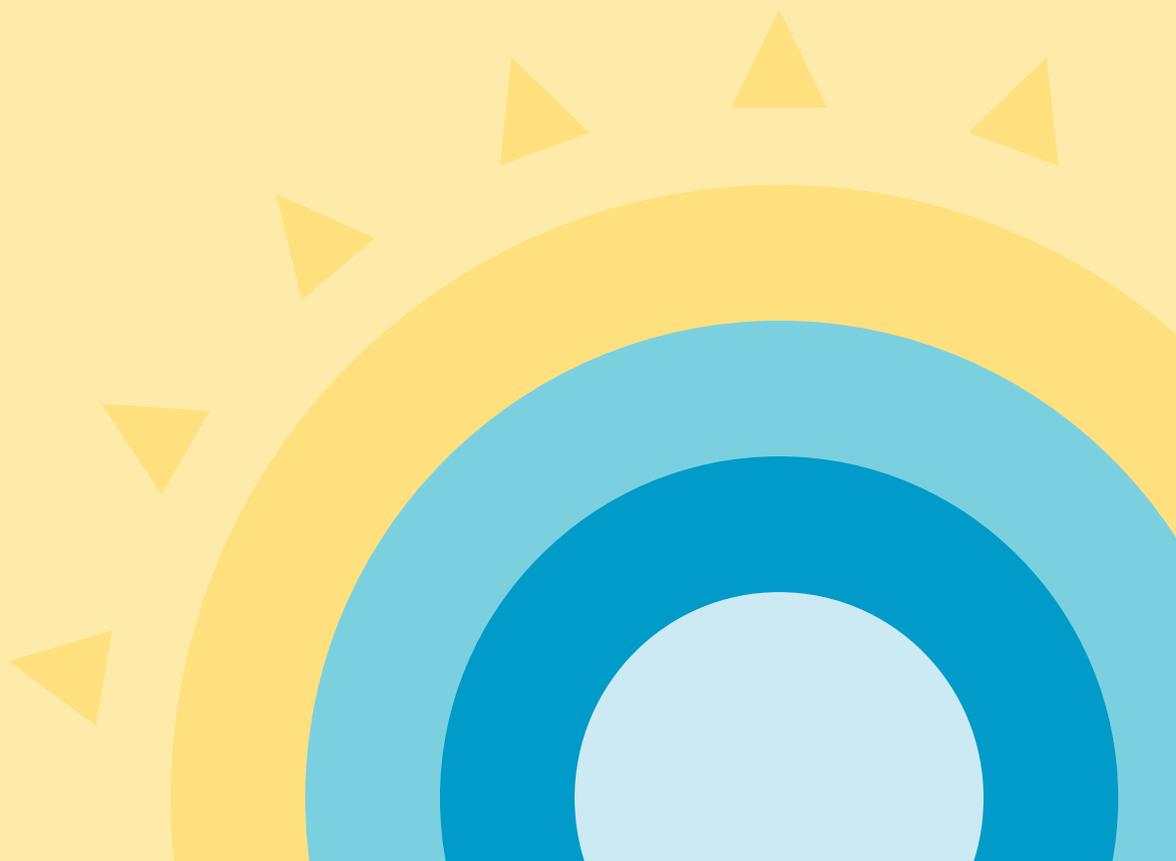


KNOWLEDGE EXPANDER

# FOOD



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# WHY IS PHOTOSYNTHESIS SO IMPORTANT?

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**Photosynthesis is a key process in the carbon cycle, removing carbon dioxide from the atmosphere and converting it into biomass.**”

## NATURE'S WAY OF MAKING SOLAR FUEL

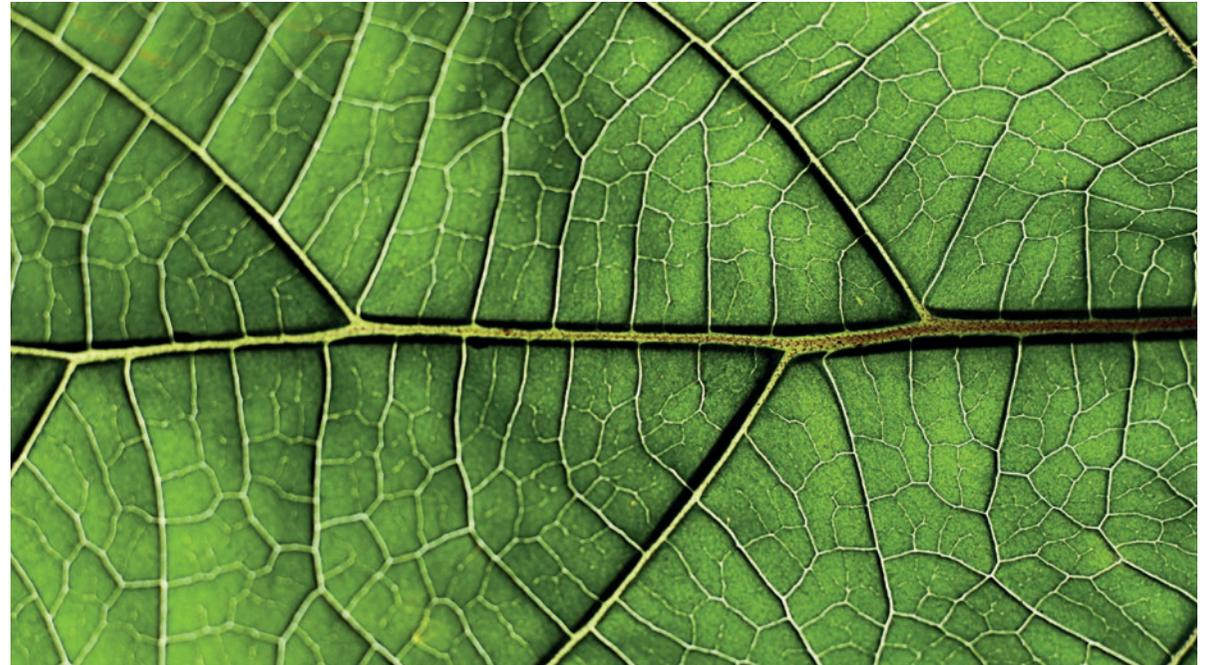
Photosynthesis is the process by which plants and other organisms transfer electromagnetic energy, normally from sunlight, into chemical energy to fuel the organisms' activities.

Photosynthesis uses carbon dioxide and water to produce simple sugars. Oxygen is produced as a by-product of this process. Oxygen is essential to life.

Photosynthesis is a key process in the carbon cycle, removing carbon dioxide from the atmosphere and converting it into biomass.

Photosynthetic organisms are primary producers, which form the starting point of all food chains.

Scientists are researching the concept of the 'artificial leaf'. They are developing catalytic systems that harness solar energy to turn carbon dioxide and water into chemical fuels.



## WHAT ARE FEEDING RELATIONSHIPS?

**Food chains and food webs illustrate the feeding relationships between organisms in an ecosystem.**

**Energy is lost as it is transferred between trophic levels, the positions that organisms occupy within a food chain.**

**Organisms' feeding behaviours adapt as ecosystems change, with food sources becoming more or less prevalent, and competition necessitating the consumption of different food types.**

**The type and amount of food consumed affects health.**

**Different societies can hold different cultural beliefs into what foods are acceptable. For example, insects are an unacceptable food to many, although they are consumed by an estimated 2 billion people worldwide.**

# WHAT DOES THE FUTURE HOLD FOR FOOD PRODUCTION?

## **THE EFFICIENCY AND QUALITY OF FOOD PRODUCTION WILL NEED TO INCREASE TO MEET THE NEEDS OF THE ESTIMATED WORLD POPULATION OF MORE THAN 9 BILLION PEOPLE BY 2050**

The efficiency and quality of food production can be improved through better land and water management, and through new farming methods and technologies.

Avoiding over-production of food and the reduction of waste reduces carbon and water footprints.

Selective breeding and genetic engineering allows increased yields and desired traits to be introduced into food-producing animals and crops. Reduction in meat consumption, the use of biotechnology to produce foods such as mycoprotein and cultured meat products, and the increased consumption of alternative food types (for example, insects) provides an opportunity to reduce energy and water-intensive meat production.



## WHAT IS THE CARBON FOOTPRINT OF DIFFERENT TYPES OF FOOD?

### **A CARBON FOOTPRINT MEASURES THE TOTAL GREENHOUSE GAS EMISSIONS CAUSED DIRECTLY AND INDIRECTLY BY A PERSON, ORGANISATION, COMMUNITY, EVENT OR PRODUCT**

The activities associated with food production, processing and transportation result in the emission of greenhouse gases. Typically, carbon footprints for food production are measured in kilograms of carbon dioxide emitted for the production of 1 kilogram of food.

A vegetarian diet results in a significantly reduced carbon footprint.

Locally sourced food results in a significantly reduced carbon footprint due to reduced transportation costs.

“

**A vegetarian diet results in a significantly reduced carbon footprint.** ”



## **WHAT IS THE WATER FOOTPRINT OF DIFFERENT TYPES OF FOOD?**

**A water footprint measures the total volume of water required for the products and services consumed by a person, organisation or community.**

**The activities associated with food production, processing and transportation require different volumes of water, depending on the food type. Typically, water footprints for food production are measured in litres of water required for the production of 1 kilogram of food.**

**A vegetarian diet results in a significantly reduced water footprint.**

# WHAT IS THE EFFECT OF CLIMATE CHANGE ON THE FUTURE OF FOOD AND FARMING?

## **THE SUITABILITY OF CROPS, LIVESTOCK AND FISH IN PARTICULAR HABITATS IS DEPENDENT UPON THE CLIMATIC CONDITIONS. CLIMATE CHANGE WILL AFFECT THE ABILITY OF CROPS, LIVESTOCK AND FISH TO THRIVE**

Increases in temperature and carbon dioxide levels may be beneficial for some crops, provided water and nutrient levels can be maintained, but changes in the frequency and severity of droughts and floods will have an adverse effect on many ecosystems.

Farming methods will need to adapt to mitigate the effect of climate change.

The global distribution of farmed crops, livestock and fish is likely to change.

