

# Food Security

**Answer the questions below:**

1. State two methods of maintaining fish stocks.

**Restricting net size and using fishing quotas.**

2. State two biological consequences of global warming.

**Loss of habitats, changing breeding patterns and changing migratory patterns**

3. Explain why energy is lost between trophic levels in a food chain.

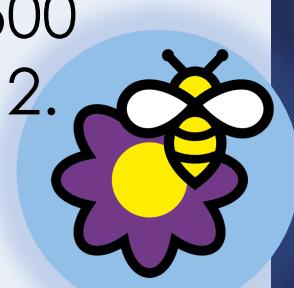
**Some biomass is lost as waste (urine, faeces, sweat etc) and some is used for life processes, such as movement, growth and thermoregulation.**

4. What is the name of an animal that eats only plants?

**Herbivore / primary consumer**

5. Calculate the efficiency of the biomass transfer when there is 500 kg biomass in trophic level 1 and 40 kg biomass in trophic level 2.

**(40 kg / 500 kg) x 100 = 8%**



# Taking It Further: Food Security

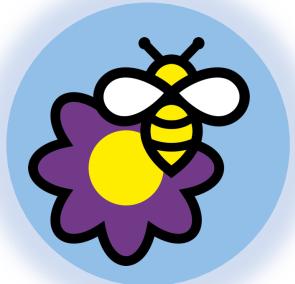
B3.2.9

Science  
**Mastery**

- B3.2.1 Prior Knowledge Review
- B3.2.2 Biodiversity
- B3.2.3 How Humans Affect Biodiversity
- B3.2.4 How Humans can Preserve Biodiversity
- B3.2.5 The Effect of Pollution on Biodiversity
- B3.2.6 Global Warming
- B3.2.7 Taking It Further: Pyramids of Biomass



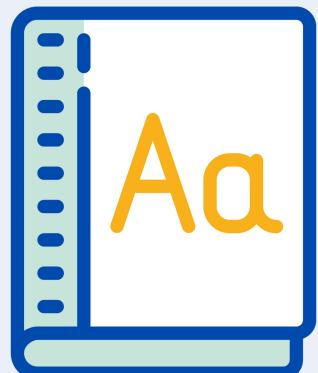
- B3.2.8 Taking It Further: Farming and Biotechnology
- **B3.2.9 Taking It Further: Food Security**



## Following this lesson, students will be able to:

- State the definition of food security
- Describe factors that may threaten food security
- Explain what is meant by sustainability

### Key Words:



famine

food security

sustainability

drought

# This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

- The teacher should customise this slide as needed, to facilitate
  - **reteach, explanation, demonstration or modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.

## Answer the questions below.

1. Which is an advantage of using intensive farming methods?  
 A. Less energy is lost through movement and thermoregulation  
 B. Populations of animals must be kept very low  
 C. Animals can be treated with antibiotics
2. Which best explains why fishing quotas are used?  
 A. So that each country gets the same amount of fish  
 B. To make sure that not all fish are caught in each trawl  
 C. To maintain fish populations at a stable breeding level
3. Which is the correct description of mycoprotein?  
 A. Genetically modified crops with added nutritional value  
 B. A protein-rich food made from the fungus fusarium  
 C. Bacteria that are used to produce insulin

# Food Security

Food security is having **enough food** to feed a **population**

A number of biological factors can threaten food security:

- Increasing **birth rate** in some countries
- Changing diets in **developed** countries
- New **pests** and **pathogens**
- **Droughts** or **flooding**
- Cost of **agricultural inputs** e.g. fertilisers
- **Conflicts** in parts of the world



# Improving Food Security

Sustainable methods must be found to feed all people on Earth

**Sustainability** means supporting long-term ecological **balance** by not depleting natural resources

Food security can be increased by making food production more efficient

Food security can be improved by:

- reducing meat intake and eating more food products from producers
- eating local, seasonal produce where possible



## Quick Quiz

Determine if the following statements are true or false:

- a. Food security is having enough food to feed a population

**True**

- b. Food security is only a threat to developing countries

**False**

- c. A decreasing birth rate is a threat to food security

**False**

- d. Food security is a local issue

**False**

## Which statements do you agree with?

Food security should be an issue for each government separately

Food security is where each person gets the same amount of food

Crops can only be affected if there is not enough rain

Sustainability means that our needs are met without compromising resources for future generations

## Drill

1. Define food security.
2. State one biological factor that can threaten food security in developed countries.
3. State one biological factor in agriculture that can threaten food security.
4. State one other biological factor that can affect food security.
5. Define sustainability.

## Drill answers

1. Food security is having enough food to feed a population
2. Changing diets in developed countries
3. Cost of agricultural inputs
4. Increasing birth rate in some countries/new pests and pathogens/droughts or flooding/conflicts in parts of the world
5. Sustainability means supporting long-term ecological balance by not depleting natural resources

Check for understanding

# I: Explain using scientific understanding to make something clear or state the reason for something happening

Example question:

The increasing human population has caused a decline in fish stocks.

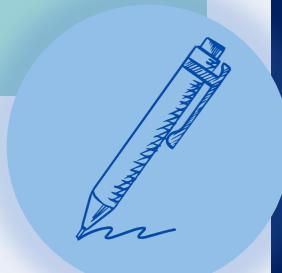
**Explain** how fishing quotas can help to return fish stocks to a sustainable level.

Model answer:

- Fishing quotas limit the number of fish caught
- This means that fewer fish are caught so more fish survive to reproduce

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



# We: Explain using scientific understanding to make something clear or state the reason for something happening

Example question:

Herring fish can live up to 12 years and reproduce between 3-4 years old. One law to improve food security is to control mesh size of fishing nets, meaning that herring fish under 5 years do not get caught.

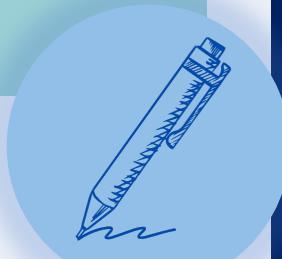
**Explain** how the control of mesh size of fishing nets has helped to conserve stocks of herring.

Model answer:

- Controlling mesh size means that smaller or younger fish are not caught
- This means they can survive to reproduce
- This increases numbers of herring fish

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



# You: Explain using scientific understanding to make something clear or state the reason for something happening

Example question:

Food security can be increased by making food production more efficient.

**Explain** how the intensive farming of pigs increases the efficiency of food production.

Model answer:

- Intensive farming means that animals are kept inside in a warm environment
- So, less energy lost in thermoregulation
- Pigs are kept enclosed or in a restricted environment
- So, less energy required for movement
- This means that more energy is available for growth

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



## Answer the questions below.

1. Which is the best definition of food security?  
 A. Every person having the same amount of food  
 B. Having a sufficient amount of food for a population  
 C. Making sure that crops are protected against droughts or floods
  
2. Which is least likely to be a threat to food security?  
 A. A decreasing birth rate  
 B. A new resistant pathogen (disease-causing microorganism)  
 C. An ongoing political conflict
  
3. Which is the best definition of sustainability?  
 A. Ensuring that food supplies never run out  
 B. Supporting long-term ecological balance by not depleting natural resources  
 C. Using farming and agricultural methods that are environmentally friendly and considerate of animals

## Lesson B3.2.9

What was good about this lesson?

What can we do to improve this lesson?

[Send us your feedback by clicking this link](#)  
or by emailing [sciencemastery@arkonline.org](mailto:sciencemastery@arkonline.org)  
Thank you!