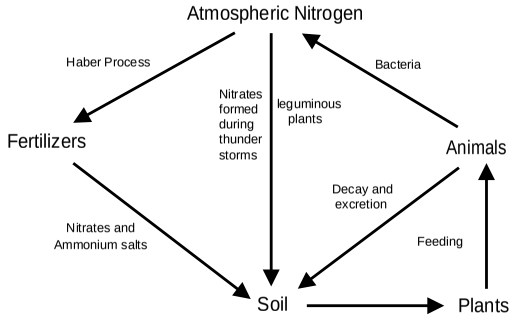
All you need to know about ...

OCR 21st Century Science

Module C3

NUTRIENTS

- all living things are made of chemicals
- there is continual cycling of elements in the environment
- the nitrogen cycle is an example of a natural cycle
- where crops are harvested elements, such as **nitrogen (N)**, **potassium (K)**, and **phosphorus (P)**, are lost from the soil
- land becomes less fertile unless elements are replaced



FOOD CHAINS

- natural chemicals in plants may be toxic or cause allergies
- moulds such as **aflatoxin in nuts** can contaminate crops
- harmful chemicals may form during food processing
- labelling food can warn people of the dangers of allergies
- The **Food Standards Agency** protects consumers' interests

FOOD ADDITIVES

- natural and synthetic chemicals may be added to food during processing. European **E numbers** have been tested
- **food colours** - make processed food look more attractive
- **flavourings** - enhance the taste of food
- **artificial sweeteners** - help to reduce the amount of sugar in processed foods and drinks
- **emulsifiers and stabilizers** - help to mix ingredients together that would normally separate, such as oil and water
- **preservatives** - help to keep food safe for longer by stopping the growth of harmful microbes
- **antioxidants** - are added to foods containing fats or oils to stop them reacting with oxygen in the air

FARMING - ORGANIC or INTENSIVE?

ORGANIC

- smaller yields
- uses sustainable resources
- recycle nutrients
- less waste
- use manures instead of fertilizers (can be washed into streams)
- crops are rotated to keep soil fertile and prevent disease
- do not use pesticides
- use predators to control pests
- uses smaller fields / more hedges to stop soil being blown away
- farmers may use some approved chemicals

FOOD

- may be smaller and vary more in size and appearance
- generally more expensive, because of greater labour costs

INTENSIVE

- get as big a yield as possible
- large fields
- use manufactured fertilizers (can be washed into streams)
- crops sprayed to kill weeds and insects
- less wildlife

FOOD

- regular high quality
- large and all the same size
- free of pests.

PROBLEMS WITH FERTILIZERS

Fertilizer and manure can be washed into streams. Here they cause water weeds to grow very fast. Later, the weeds die and rot. Rotting uses up the oxygen in the water. Fish die if there is not enough oxygen.

NATURAL POLYMERS

- many chemicals in living things are natural polymers (including carbohydrates and proteins)
- cellulose, starch and sugars are **carbohydrates** that are made up of **carbon**, **hydrogen** and **oxygen** only
- **amino acids** and **proteins** consist mainly of **carbon**, **hydrogen**, **oxygen** and **nitrogen**

CARBOHYDRATES	**C**	**H**	**O**	
PROTEINS	**C**	**H**	**O**	**N**

DIGESTION

Digestion breaks down natural polymers to into smaller and more soluble compounds

- small molecules can be absorbed and transported in the blood
- starch breaks down into glucose
- high levels of sugar (in many processed foods) are quickly absorbed into the bloodstream - rise in blood-sugar levels
- proteins break down into amino acids
- cells grow by building up amino acids from the blood into new proteins
- excess amino acids are broken down in the liver to form urea, which is excreted by the kidneys in urine

DIABETES

- high levels of sugar, common in some processed foods, are quickly absorbed into the blood stream, causing a rapid rise in the blood sugar level

TYPE 1

- the pancreas stops producing enough of the hormone, insulin
- controlled by insulin injections

TYPE 2

- late-onset diabetes
- it is more likely to be triggered by a poor diet
- obesity is one of the risk factors
- the body no longer responds to its own insulin or does not make enough insulin
- can be controlled by diet and exercise