Unit 2: GCSE Applied Science

2.2 Protecting Our Environment

Bioaccumulation - caused by:

- pesticides
- heavy metals (industrial waste).

These substances can be washed into soils and rivers. If they enter the food chain:

- they are persistent: do not break down in animal tissues
- they accumulate along the food chain until they reach toxic levels
- they therefore cause reduced fertility or death in top predators.

Eutrophication - caused by:

- fertilisers
- untreated sewage.

If either of these substances is washed from the crops where farmers have placed them to increase growth of plants, then:

- They can be washed into rivers, lakes and ponds.
- The nitrates in the sewage and fertilisers increase the growth of algae and water plants.
- When they die, they are broken down by microbes. The increase in food for the microbes allows them to increase in number.
- Respiration of the now huge numbers of microbes uses up the oxygen in the water and fish and other aquatic organisms suffocate and die.

Reduce, Reuse, Recycle

Reduce use of items that would normally be thrown away to reduce the amount of waste going to landfill.

Reusing refers to using an object as it is without treatment. This reduces pollution and waste, thus making it a more sustainable process.

Recycling means turning an item back into raw materials which can be used again, usually to make a completely new product.

Disposal of plastics

Most plastics are not biodegradable.

This means they can persist in the environment for a very long time.

Our oceans contain large quantities of plastics. This may cause animals to choke if they mistake it for food.

The government in Wales introduced charges on carrier bags to help try to **reduce** our use of plastic bags.

The use of **biodegradable** plastics also helps **reduce** the long-term impact of the plastics on the environment.

Where possible, plastics should be recycled to prevent pollution of the environment.

Sewage

In sewage treatment works, the waste is broken down by bacteria into products which are harmless to the environment. Oxygen is provided by stirring the waste. This oxygen is needed by the bacteria for aerobic respiration. **Aerobic respiration** means that the waste is completely broken down.

Untreated sewage results in eutrophication.

Waste household items can cause problems

Many household items contain toxic chemicals e.g.

- low energy lamps contain mercury
- batteries and mobile phones contain toxic chemicals.

These should not be put in general household waste to be buried in a landfill site.

Sustainability means that we provide for our needs **without** using up the resources and damaging the environment.

To act sustainably we need to think carefully about the consequences of:

1. using natural resources.

This may require us to change the way we do things. For example, quotas are placed on fishing so that fish stocks are not completely used up. Trees may be replanted if some woodland is removed. Recycling schemes are put in place so reducing our need to find new raw materials.

2. changing the way we use land.

This requires us to take into account the impact of, for example, housing developments or road building on the environment.

Indicator species

A growing population means that more space is needed for:

- housing
- industry
- agriculture.

These will have an environmental impact polluting and endangering species. Government agencies have an important role in monitoring, protecting and improving the environment.

Pollution can be measured in a few ways:

- measuring **oxygen levels** (less oxygen - more pollution)
- measuring **pH levels.**

Lichens are used to indicate **air pollution** (sulphur dioxide in air). Some species will only grow in clean air, others can tolerate higher levels of pollution. Very high levels of pollution - no species will grow.

Freshwater invertebrates – Some invertebrates can only live in very clean water; others can tolerate more pollution. Collecting samples of water and recording the invertebrates found can indicate the level of pollution.

Habitat Destruction

Habitat is a place where an organism or a community of organisms live.

Examples of habitat destruction: clearing forests for farmland, filling in wetlands to build houses, mining or quarrying, poisoning land with pollutants from mine waste.

Biodiversity and endangered species can be conserved and protected by:

- Convention on International Trade in Endangered Species
- Sites of Special Scientific Interest
- captive breeding programmes
- national parks
- seed/sperm banks
- local biodiversity action plans
- nature reserves.

Land corridors connecting smaller reserves together allows organisms to move between habitats and improves their chance of survival.