Indicator Species

Some organisms can't live in areas where the air or water is **polluted**, but **other organisms** can. By **monitoring** these types of organisms they can be used as **indicators** for pollution.

Indicator Species.

Organisms very sensitive to changes in their environment can be studied to see the effect of human activities. These organisms are called indicator speciesand can be studied to monitor:

1. **Water Pollution**

   If **raw sewage** and **fertilisers** containing nitrates are released into rivers the population of bacteria **increase**, due to eutrophication, and **use up the oxygen**.

   Some invertebrate aquatic animals are **very sensitive** to any decrease in the **concentration** of **dissolved oxygen** in water, so are **good indicators** for water pollution.

   Stonefly larvae and **freshwater shrimps** are only **adapted** to live in water with high concentrations of oxygen, so their presence **indicate** the **water is clean.**

   Other invertebrates like **bloodworms** and **sludge worms** are **adapted** to live **in polluted conditions** with low concentrations of oxygen. Their presence indicates **high levels of water pollution.**

2. **Air Pollution**

   Plants called **lichens** are sensitive to levels of **sulphur dioxide** (SO_2) in the air. They can be used to monitor levels of SO_2 pollution from **car exhausts** and **coal fired power stations**.

   The number and type of lichen in a location indicate **how clean** the air is. If the air is **clean** you will find **lots of lichen**.

   If you are given data showing **more** lichen species **further away** from a city centre this is because **outside the city** there are **less cars**, so the air will contain less SO_2 from car exhausts.

   Blackspot fungus is found on rose leaves and it is also sensitive to SO_2. When levels of SO_2 are **low** the fungus is found on **many** rose leaves, indicating the **air is clean**.

   Non-Living Indicators.

   Dissolved oxygen meters and **chemical tests** are used to measure the concentration of dissolved oxygen in water, to show how levels of water pollution are changing.

   Electronic meters and **laboratory tests** can be used to measure concentrations of SO_2, to show how **air pollution** is changing.

The Carbon Cycle

Carbon is constantly moving between the **atmosphere**, the **soil and living things** in a process called the **carbon cycle**. The carbon comes from **carbon dioxide** in the air.

The major processes involved in the carbon cycle are **photosynthesis** and **combustion**