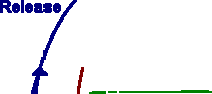


## Section 1.0 Chemicals in the Environment can Support or Harm

Key Concepts • All things (living and non-living) are formed by chemicals.

Explain how **Nitrogen** is recycled in the environment, using this model of the **Nitrogen Cycle**.



Explain the term **nitrogen fixation** and why it has to occur.

Processes and Activities that affect Environmental chemicals.

***Pollution*** *is any change in the environment that produces a condition that is harmful to living things*.

Describe cellular respiration. (p. 185)

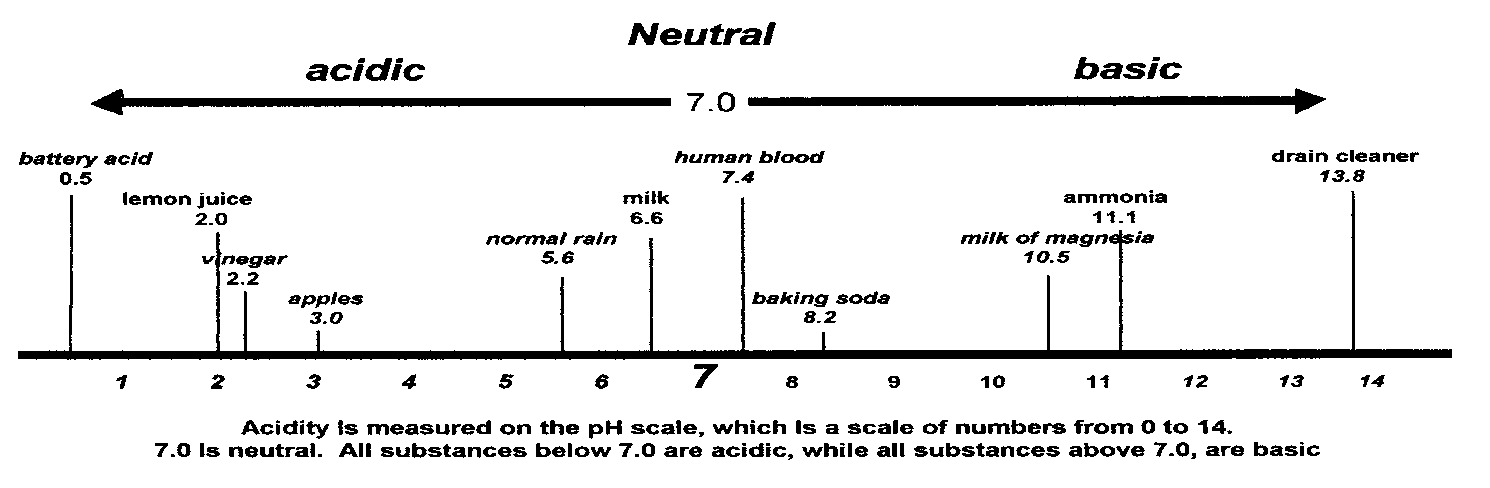
Human Activities that affect the environment..

Describe how each of the following examples of Human Activities can affect the balance of chemicals in the environment. (p.186-188)

|  |  |
| --- | --- |
| **Human Activity** | **How it affects the balance of chemicals in the environment** |
| Agriculture |  |
|  |
| Solid wastes |  |
|  |
| Wastewater |  |
|  |
| Fuel combustion |  |
|  |
| Industrial processes |  |
|  |



**Acids** and **Bases** occur naturally and are measured by their **pH**



Explain the difference between an **acid** and a **base**. Give 3 examples of each.

**Acid-base indicators** measure pH.

What is **pH** a measure of?

Complete the table



|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Indicator color** | | |
| **Acid** | **Neutral** | **Base** |
| **Bromothymol blue** |  |  |  |

In **neutralization** an acid and a base create a reaction.

Identify the **reactants** and the **products** in a **neutralization reaction**. Include a **chemical formula** that is an example of a neutralization reaction.

|  |  |
| --- | --- |
| **Reactants** | **Products** |
|  |  |
|  |  |

Example: (chemical formula)

Plants & animals need common elements such as C, H and O. Explain the difference between **macronurients** and **micronutrients**. Give 2 examples each of macronutrients and micronutrients

Optimum amounts of nutrients are need for good health What does ***‘optimum amount’*** mean?



**Organic** molecules contain carbon, **inorganic** molecules don’t

Identify the four classes of organic compounds and give examples of each.

|  |  |  |  |
| --- | --- | --- | --- |
| **Class of organic compound** | **Example 1** | **Example 2** | **Example 3** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Describe the **test** used to identify the presence of each organic molecule.

|  |  |
| --- | --- |
| **Substance** | **Test** |
| **Glucose** | Benedict’s solution turns from blue to yellow-orange-red |
| **Starch** | Iodine solution turns from red-brown to blue-black |
| **Fat / Oil** | Fats and oils leave a spot on brown paper that light can pass through |
| **Protein** | Biuret solution turns from blue to purple or mauve |

Plants use inorganic substances to produce organic molecules

Describe 3 examples of how plants use **inorganic molecules** to make **organic molecules**. 1.

2.

3.

Plants take in substances through their roots by **osmosis**, animals **ingest** food and **absorb** nutrients in their blood.

Describe **diffusion.** Draw an illustration

Describe the process of **osmosis** using an *illustration*

Describe the process of **active transport** using an *illustration*

What is **hydrolysis**?

Environments and **substrates** affect the availability of nutrients. Identify the **substrate** for each of the following organisms:



Lichen



Mold

Red Algae

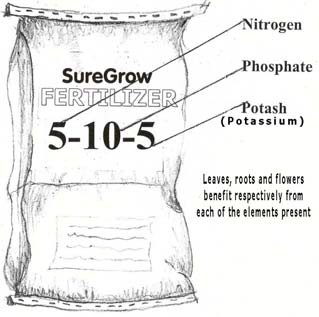
Cactus







Identify what each **number** on the fertilizer bag stands for



What does the other 80% include?

What are the advantages and disadvantages of using **artificial fertilizers**?

Advantages :

Disadvantages:

## Section 2.0 Environmental Monitoring of Chemicals

Key Concepts

**Water quality** guidelines protect living things

List the five categories of water use which Provincial and Federal governments regulate for water quality:

For whom are these water quality guidelines designed to protect?

Chemical concentrations are measured in **parts per million**

Calculate the parts per million in the following example. Show your work.

## Add 4ml of food coloring solution to 96ml of water

Calculate in **ppm** (parts per million) the amount of 1 milligram of mercury that was found in a barrel containing 30 Litres of water.

**Biological indicators** (invertebrates) and **Chemical indicators** (dissolved oxygen, phosphorus, nitrogen) measure water quality

Identify the 3 biological indicators

What are the 6 most common chemical indicators of water quality?

# Science In Action 9 – Unit 3 Environmental Chemistry Summary of Key Concepts and Review Questions Booklet



What are the 4 factors that determine the amount of oxygen that can be dissolved in water?

Explain the term **spring acid shock**.

Explain the difference between **acute** and **chronic toxicity**.

What does **LD50** refer to?

Give 2 examples of heavy metals. Why are **heavy metals** harmful?

How can air quality be measured?

What are **catalytic converters** used for and how effective are they?

What is a ‘**scrubber**’?

Explain the difference between **point** and **non-point sources** of pollution.



**Carbon dioxide** and **Ozone** are monitored globally What are the 3 major **contaminants** in the air?

Describe the ‘**greenhouse effect**’ and the ‘**enhanced greenhouse effect**’. **Greenhouse effect** -

## Enhanced greenhouse effect -

What is the cause of **climate change** and what consequences are there if it is not controlled?

What is the role of **CFC’s** in the depletion of the **Ozone** layer?

## Section 3.0 Harmful substances spread and are concentrated

What are the **three stages of transport** with regards to substances in the environment?

Stage 1

Stage 2

Stage 3

**Airborne chemicals** will travel certain distances and in certain directions depending on what?

Chemicals are **dispersed**, **diluted** and **deposited** by air, soil & water How can the movement of chemicals be controlled in the environment?

Groundwater can help to chemically change substances. Give 4 examples of how groundwater be contaminated?

Describe the difference between **permeable** and **impermeable** soil zones.

What is an **aquifer**?

Describe 3 substances that can **contaminate** groundwater-identify its possible source and what effect it has on humans

How are sanitary landfills **secured**?



When water lands on a farmer’s field, four things can occur. They are:

**Concentration** changes by **dispersion**, **dilution**, **biodegradation**, **phytoremediation** and **photolysis**

Explain how each process can reduce the concentration of a contaminant:

|  |  |
| --- | --- |
| Process | The way it works … |
| Dispersion |  |
| Dilution |  |
| Biodegradation |  |
| Phytoremediation |  |
| Photolysis |  |

Hazardous materials affect living things and the environment (oil spills) What does **biomagnification** do to living things?

**Using**, **storing**, **disposing** and **transporting** hazardous materials are regulated What is the difference between **WHMIS** and **MSDS**?