



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

Section 1.0 Chemicals in the Environment can Support or Harm

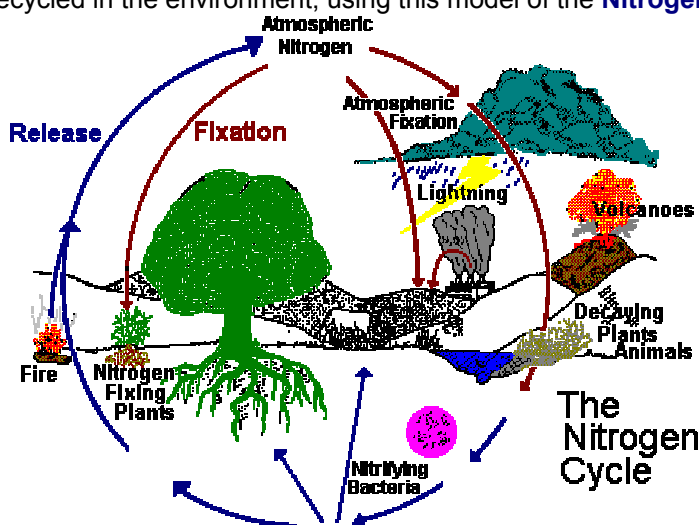
- Key Concepts
- All things (living and non-living) are formed by chemicals.

What chemical (in large quantities) is released into the atmosphere by **volcanoes** each year? Give an example of a positive and negative effect (on living things) that this chemical has.

Positive effect _____

Negative effect _____

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.



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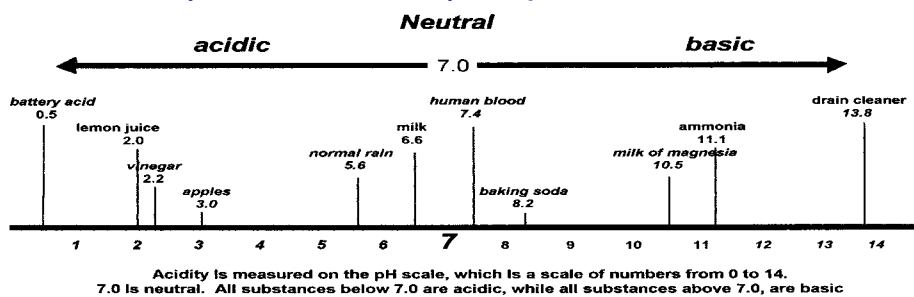
Describe cellular respiration. (p. 185)

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

Acids and Bases occur naturally and are measured by their pH

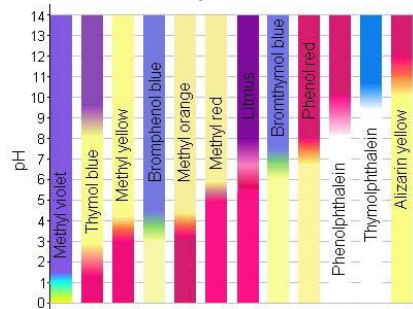


Explain the difference between an **acid** and a **base**. Give 3 examples of each.



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Acid-base indicators measure pH.



Universal pH paper Indicator

Complete the table using the samples above

Indicator	Indicator color		
	Acid	Neutral	Base
Bromothymol blue			
Methyl orange			
Phenolphthalein			

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 **macronutrients** and **micronutrients**.

Optimum amounts of nutrients are need for good health

What does '**optimum amount**' mean?



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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	
Starch	
Fat / Oil	
Protein	

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**.



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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:

Red Algae



Lichen



Mold



Cactus





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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?

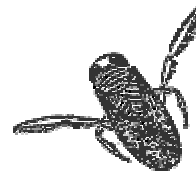
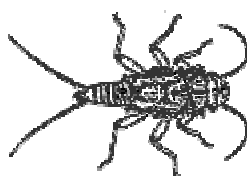
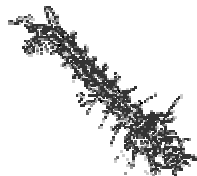
Chemical concentrations are measured in **parts per million**

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

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

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

Identify the 3 biological indicators illustrated below



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



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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 term **toxicity**.

What does **LD50** refer to?

Why are **heavy metals** harmful?

Air quality is measured (SO₂ and NO₂) over time

How can air quality be measured?

What is a '**scrubber**'?

Carbon dioxide and **Ozone** are monitored globally

What are the 3 major **contaminants** in the air?



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Describe the '**greenhouse effect**' and the '**enhanced greenhouse effect**'.

Greenhouse effect - _____

Enhanced greenhouse effect - _____

What is the cause of **global warming** 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**

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?



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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?

Identify 3 **clean-up procedures** used when there is an oil spill.

Using, storing, disposing and **transporting** hazardous materials are regulated

What is the difference between **WHMIS** and **MSDS**?
