



## 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.

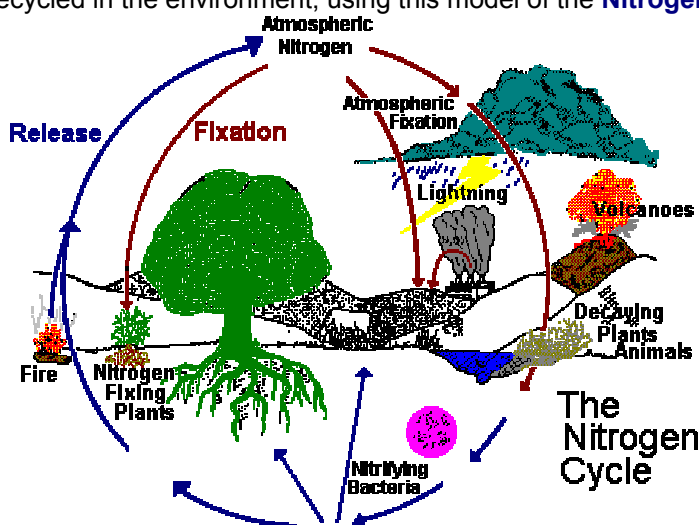
What chemical (in large quantities) is released into the atmosphere by **volcanoes** each year? Give an example of a positive and negative effect (on living things) that this chemical has.

\_\_\_\_\_

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.



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

Describe cellular respiration. (p. 185)

---



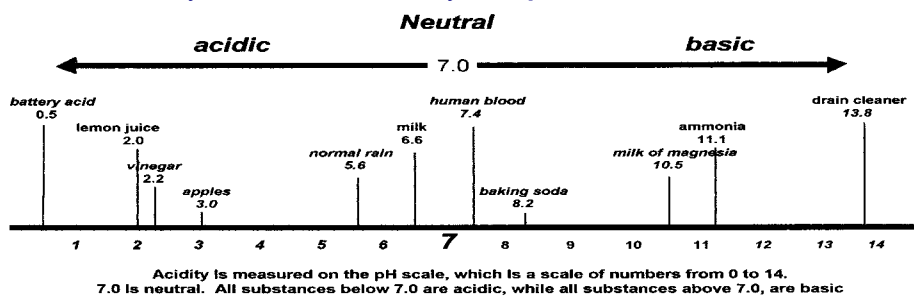
---

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.

---



---

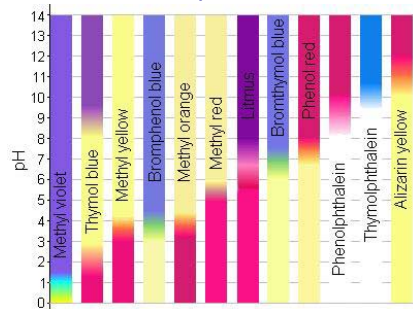


---



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

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?

---



---



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

**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**.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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

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



---

---

---

---



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

### 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?

\_\_\_\_\_

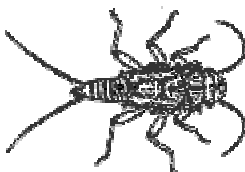
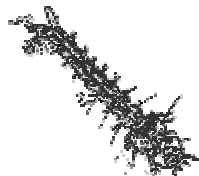
Chemical concentrations are measured in **parts per million**

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?

\_\_\_\_\_  
\_\_\_\_\_



## 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 term **toxicity**.

---

---

What does **LD50** refer to?

---

---

---

Why are **heavy metals** harmful?

---

---

**Air quality** is measured (SO<sub>2</sub> and NO<sub>2</sub>) 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?

---



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

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?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





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

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**?

---

---

---

---