

**Penang Sangam High School**  
**P.O. Box 44, Rakiraki**  
**Year 13 Agriculture Lesson Notes Week 12**

<b>Strand</b>	<b>AS 13.3 Agronomy</b>
<b>Sub-Strand</b>	<b>AS 13.3.1: Soils</b>
<b>Content Learning Outcome</b>	<b>AS 13.3.1.1 Demonstrate the assessment methods in determining the chemical properties of the soil.</b>

**Lesson 7: Soil Air**

**Lesson Outcome:** At the end of this lesson student should be able to

- 1. explain the relationship between soil air and soil water**
- 2. discuss the importance of soil air in the growth of plants**

1. Soil air - is the amount of air present in the soil pore spaces.
2. Pore space - the space between soil particles, usually containing air or water.
3. Diffusion - movement of gases from high concentration to low concentration in soil

Soil aeration influences availability of many nutrients. Soil air is needed by many micro-organisms that release plant nutrients in soil.

**Inverse Relationship between Soil Air and Soil Water in soil**

- ✓ An increase in soil water content often causes a reduction in soil aeration.
- ✓ A reduction in soil water content may mean an increase in soil aeration.

Since plant roots require water and oxygen (from the air in pore spaces), maintaining the balance between root and aeration and soil water availability is a critical aspect of managing crop plants.

Gases move in soil by diffusion and the process is influenced by: <ul style="list-style-type: none"> <li>➤ soil texture</li> <li>➤ soil structure</li> <li>➤ soil water content</li> <li>➤ the degree of soil compaction</li> </ul>	<b><u>Importance of Soil Air</u></b> <ul style="list-style-type: none"> <li>✓ For respiration in plants and by soil organisms</li> <li>✓ Photosynthesis and germination of seeds</li> <li>✓ It determines relative proportion of water in soil</li> <li>✓ Oxygen is necessary for growth and development</li> </ul>
---	---

**Student Activity**

1. Explain the relationship between soil air and soil water in the soil.

---



---

2. Describe one way in which soil air influences life in the soil.

---



---

## **Lesson 8: Soil pH**

**Lesson Outcome:** At the end of this lesson student should be able to

1. define soil pH and describe the sources of soil acidity and soil alkalinity
2. describe the effects of soil acidity and alkalinity on plant growth
3. explain ways of managing soil acidity and alkalinity
4. explain the relationship between soil pH and nutrient availability

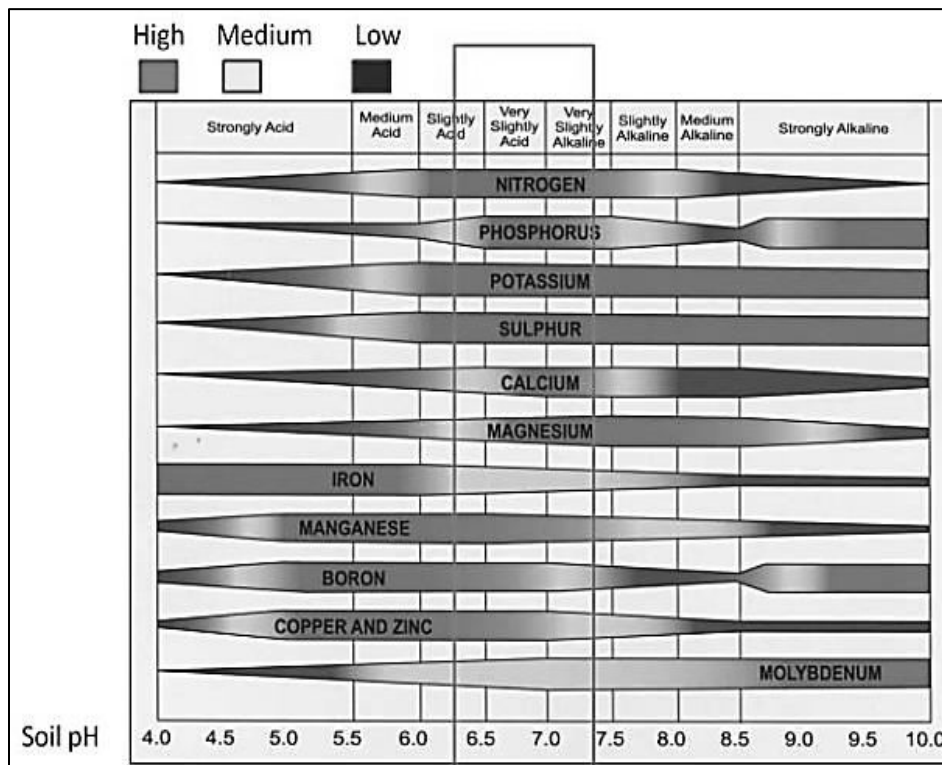
1. Soil pH - is the negative logarithm of the hydrogen ion activity in a solution.
2. Soil Acidity - is the hydrogen ( $H^+$ ) ion concentration in the soil where the pH is  $< 7$ .
3. Soil Alkalinity - is the hydroxyl ( $OH^-$ ) ion concentration in the soil where the pH is  $> 7$
4. Actinomycetes - a group of gram-positive bacteria that have a superficial resemblance to fungi

The soil pH significantly influences chemical as well as biological properties of soil and affects the availability of most of the chemical elements of importance to plants and microbes.

The availability of nitrogen, sulphur and molybdenum are restricted at low pH values, whereas that of phosphorus is best at intermediate pH levels. The ideal pH for growing most crops is from 6.5 - 7 whereas the best pH for the microbes in the soil is from 6 - 8.

Most general-purpose bacteria and actinomycetes function at intermediate pH values. Fungi tend to predominate in acidic soils, whereas at intermediate and higher pH they meet stiff competition from actinomycetes and bacteria.

### **How Soil pH Affects Availability of Plant Nutrients**



### **Student Activity**

Explain one reason why most vegetables grow best within the soil pH range of 6.5 to 7.

---



---



---



---



---



---



---



---