OGUN DIGICLASS

SUBJECT: AGRICULTURAL SCIENCE

TOPIC: PLANT NUTRITION

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LEARNING OBJECTIVES

- Explain what nutrients are and give examples.
- Classify plant nutrients.
- Describe the Nitrogen Cycle and identify the key processes involved in the cycle.
- Describe the Carbon Cycle.

INTRODUCTION

It is a statement of fact that all animals directly or indirectly feed on plants. This implies that all animals (Man inclusive) obtain their needed life sustenance mainly from plants.

Taking a leap into the world of plants to see what makes them tick. Ever wondered what plants themselves feed on?

NUTRIENTS

PLANT NUTRITION

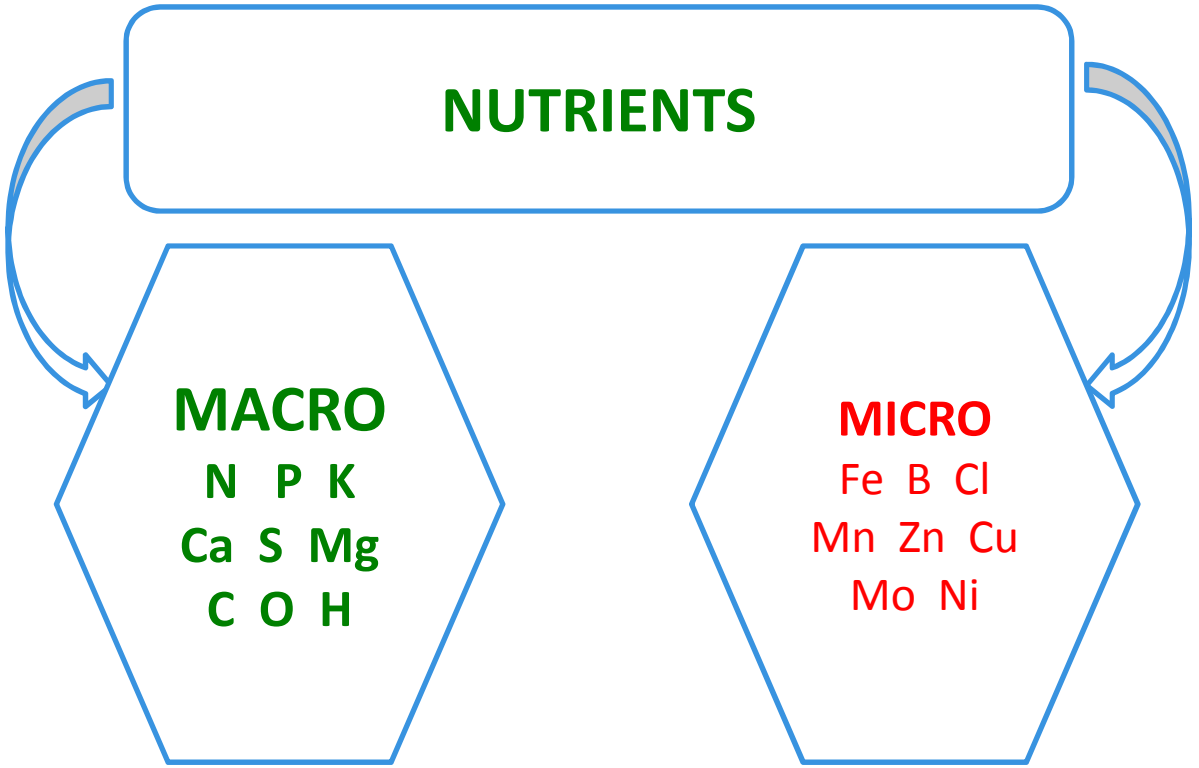
What are Nutrients?

This refers to the study of chemical elements or compounds required for proper growth and metabolism in plants. In other words, it is the study of nutrients needed by plant for optimal growth and development.

It also looks at how these nutrients are gotten by plants from nature.

Classification of Plant Nutrients

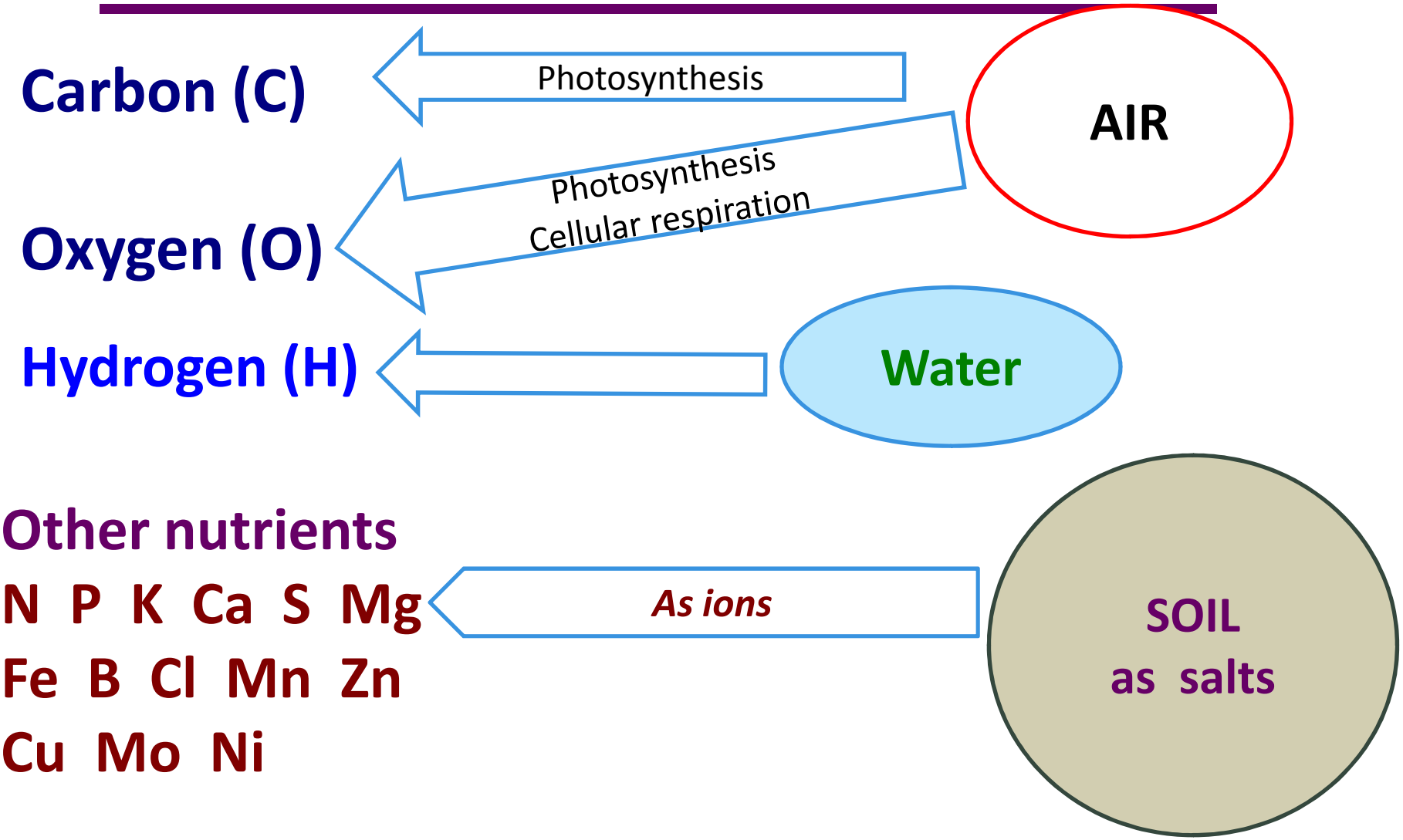
There about seventeen (17) essential nutrients needed by plants for their optimal growth.



Nitrogen
Phosphorus
Potassium
Calcium
Sulphur
Magnesium
Carbon
Oxygen
Hydrogen

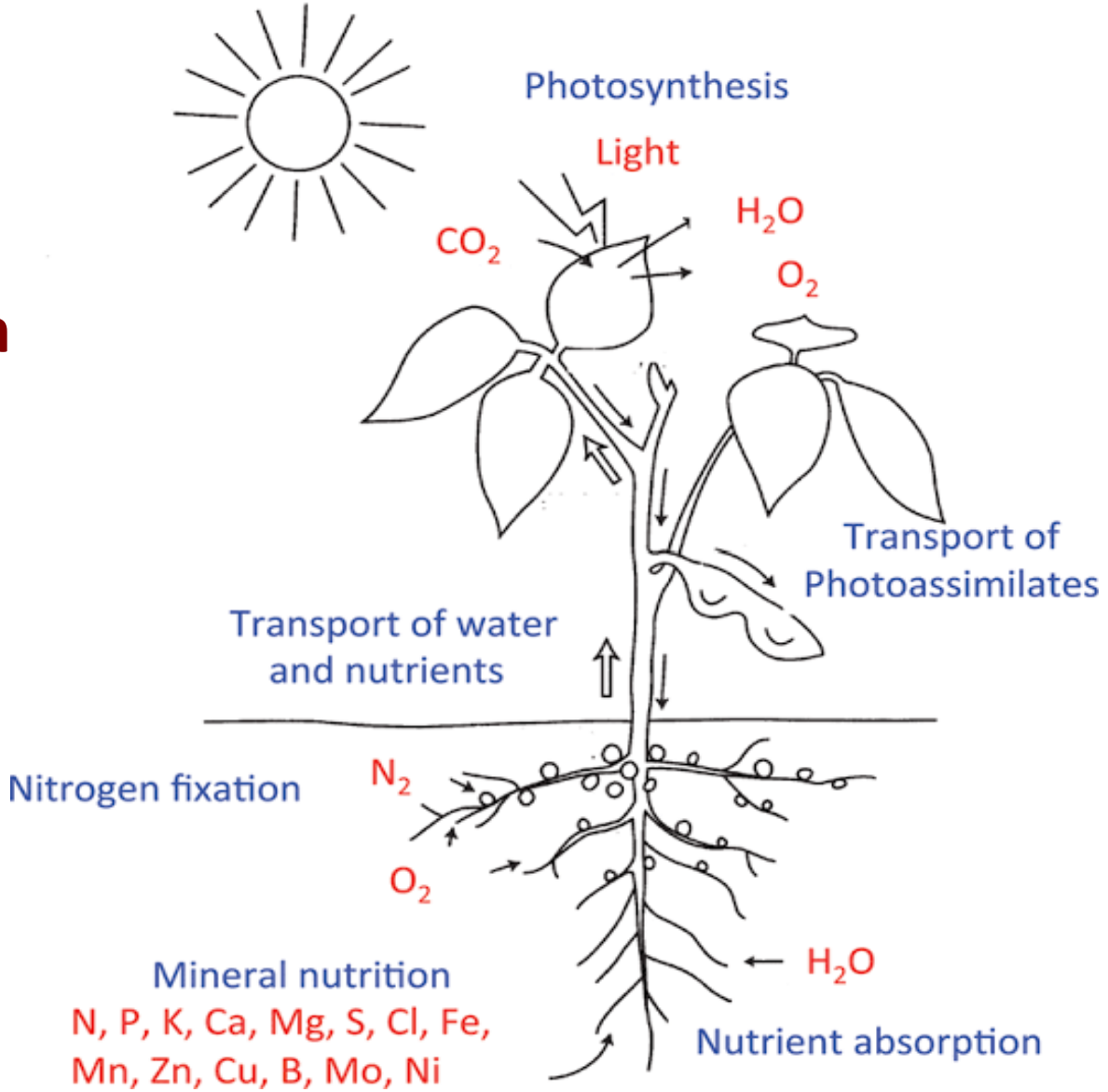
Iron
Boron
Chlorine
Manganese
Zinc
Copper
Molybdenum
Nickel

Sources of Plant Nutrients



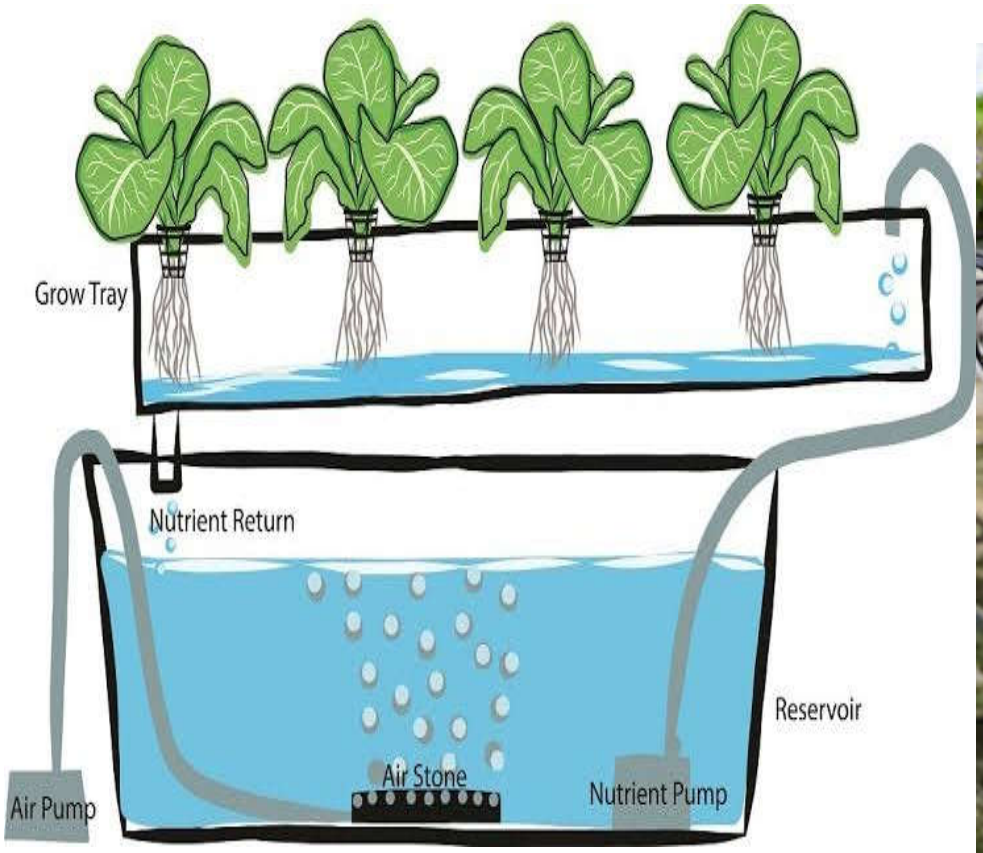
Ways of Nutrient Uptake by plants

- ✓ **Simple diffusion**
- ✓ **Facilitated Diffusion**
- ✓ **Active Transport**



Importance of understanding Plant Nutrition

The importance of understanding plant Nutrition in Agricultural systems brought about the concept of ***hydrophonics*** (method of growing plants in a water nutrient solution without use of soil).



Some Macronutrients, their importance & their deficiency symptoms

Nutrients	Importance	Deficiency symptoms
Nitrogen	• Essential constituent of Proteins, Chlorophyll, Vitamins, hormones and DNA.	• Stunted growth • Chlorosis • Leaf fall
Phosphorus	• Structural component of Nucleic acids • Needed for energy transfer in cells (ADP/ATP)	• Intense green colouration/ reddening of leaves
Potassium	• Necessary for Carbohydrate and protein formation • Acts as a catalyst • Regulates opening and closing of stomata	• Necrosis (Chlorosis of veins)
Sulphur	• Essential for chloroplast growth • Component of amino acids like cysteine and methionine	• Yellowing of leaves • Stunted growth
Calcium	• Activation of certain plant enzymes	• Stunting • Leaf curl

Some Micronutrients, their importance and their deficiency symptoms

Nutrients	Importance	Deficiency symptoms
Iron	• Essential for photosynthesis and acts as an enzyme cofactor	• Interveinal chlorosis and necrosis
Copper	• Important for photosynthesis • Involved in grain production	• Chlorosis
Manganese	• Necessary for photosynthesis • Formation of Chloroplasts	• Spots on foliage
Zinc	• Required in large number of enzymes • Essential in DNA transcription	• Stunted leaves

THE NITROGEN CYCLE

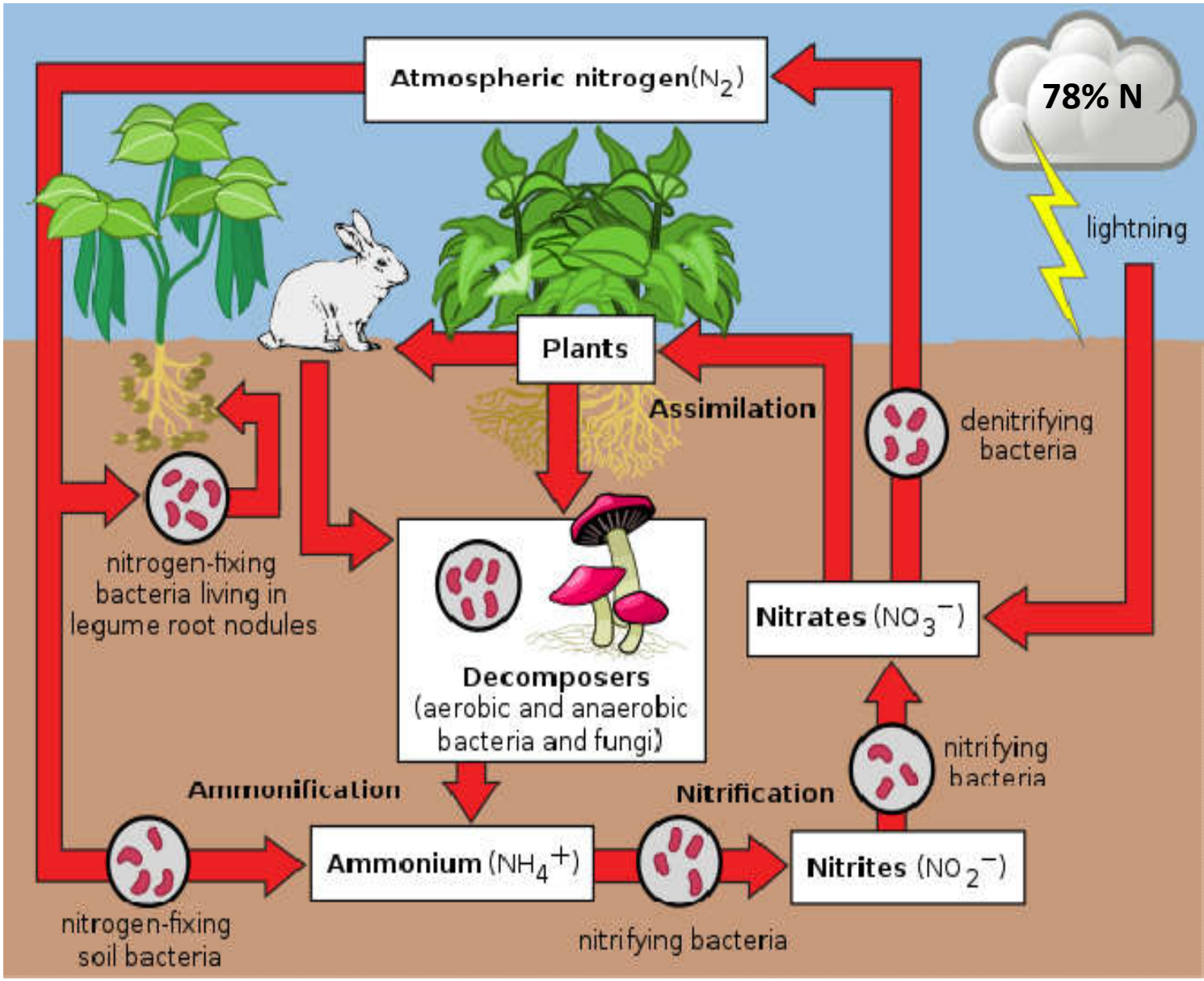
PROCESSES

✓ Nitrogen Fixation

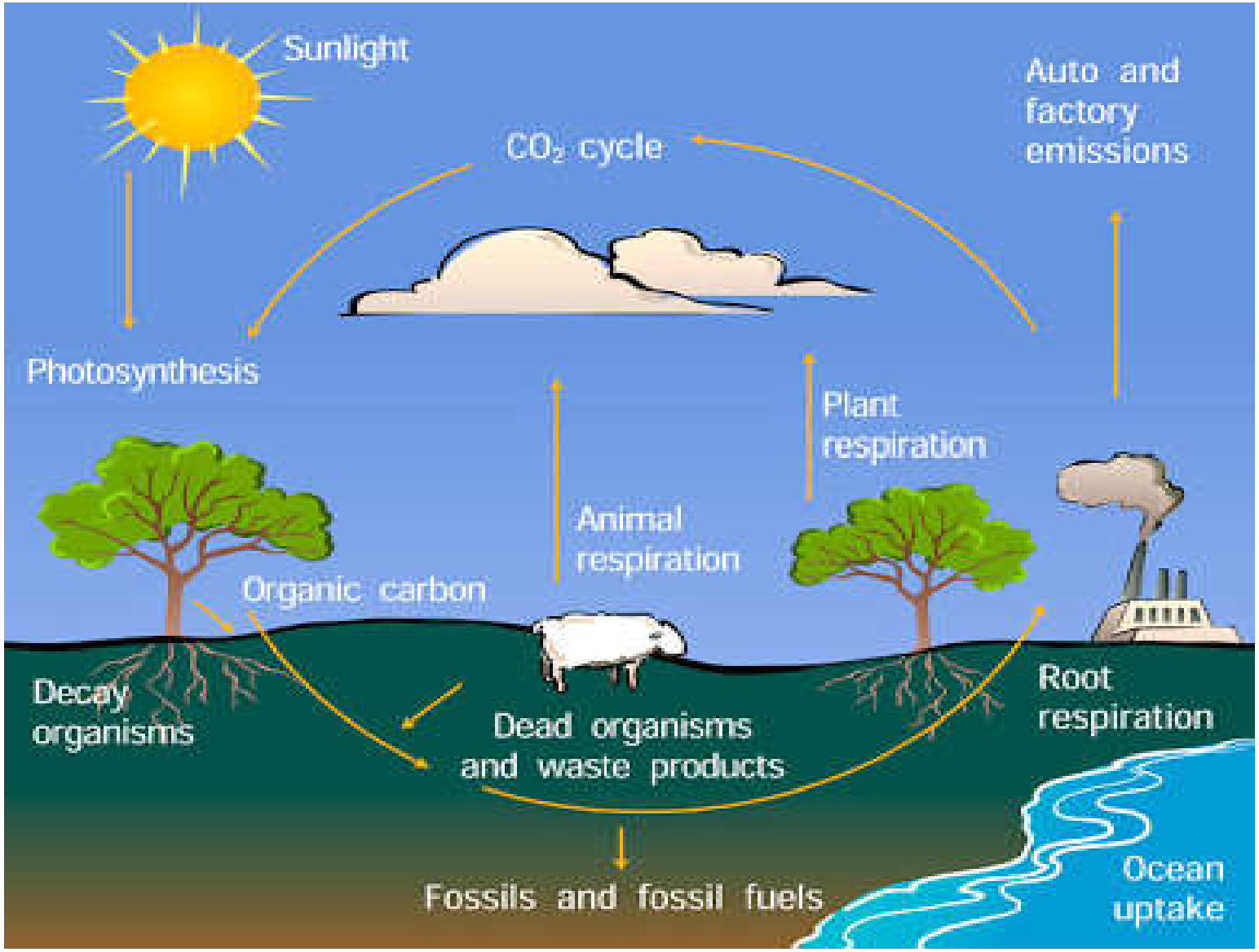
✓Ammonification/ Mineralization

✓Nitrification

✓Denitrification



THE CARBON CYCLE



PROCESSES

- Photosynthesis
- Respiration
- Decomposition
- Combustion

The need for fertilisers

In the human world, when one is malnourished there is a recommendation of food supplements to return such person to a good state of health.

This also applies to plants that lose the nutrients in their ecosystem through different means such as (Crops harvesting OR livestock (animals) removal, Nutrients loss through leaching and other means) resulting in deficiency, hence the need for replacement through ***fertilizer application.***

Hence, fertilisers improve the efficiency of energy transfer (more energy can be used for growth) by providing nutrient supplements leading to increased agricultural productivity.

EVALUATION

What are the major classification of plant nutrients and give at least three examples of each.

Mention the key processes involved in the Nitrogen cycle.

ASSIGNMENT

a. Define Macronutrients and Micronutrients.
b. With the aid of an annotated diagram describe the Nitrogen Cycle.