



Nutrients

Environmental
Chemistry Unit 5:
Topic 1

What will I be Learning?

- identify common organic and inorganic substances that are essential to the health and growth of humans and other living things, and illustrate the roles served by these substances
- Describe the forms of organic matter synthesized by plants and animals, including carbohydrates, proteins and lipids

Elements? In my body??

The four most common elements in your body are oxygen, carbon, hydrogen, and nitrogen with the remaining being composed of other elements.

***humans require 22 different elements for proper growth and functioning**

An



a day keeps the



away.

**But what does this
really mean??**

Nutrients

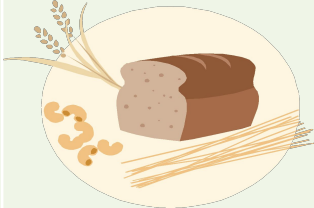
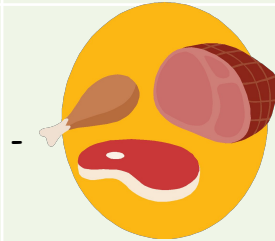

For our bodies to be maintained we need certain chemicals found in foods, known as nutrients. We use these for energy, growth, building, and repair.



These nutrients can be divided into two major groups:

1. Organics

- Organic nutrients contain carbon and are mainly produced by green plants and these nutrients are further modified by animals.
- Chemicals in the body transform these basic materials into more complex chemical materials.

Organic Molecule	Role in Nutrition	Typical Dietary Source
Carbohydrates	energy source for metabolism	 <ul style="list-style-type: none"> -rice -grains -potatoes -fruit
Proteins	structural molecule for the body and helps chemical reactions	 <ul style="list-style-type: none"> -meat -eggs -dairy products -nuts
Lipids	storage for unused chemical energy	 <ul style="list-style-type: none"> -vegetable oil -some dairy -nut oils

2. Inorganic

- Inorganic substances are materials that are not destroyed by cooking or exposure to air and are also referred to as minerals.
- What is the difference between **MACROMINERALS** and **TRACE ELEMENTS**?
 - Macrominerals: 100 mg/day or more
 - Trace Elements: 100 mg/day or less



These minerals (inorganic substances) are used to create **ENZYMES** and **VITAMINS** in the body.

Enzymes are:

special protein molecules that regulate
chemical reactions in living organisms

Vitamins are:

large molecules that help the enzymes
function
must get from food because the body does
not make them

Element	Symbol	Role in the Human Body
Calcium	Ca	crucial in nerve endings, muscle contractions, blood clotting and formation of teeth and bones
Sodium	Na	regulates nerve impulses in nerves and muscles
Potassium	K	regulate nerve signals and muscle activity, protein formation and acid/base balance in body
Iron	Fe	regulates oxygen transport in red blood cells
Zinc	Zn	component of enzymes that regulates protein formation and carbohydrate metabolism
iodine	I	regulates metabolism as part of thyroid hormone
Fluorine	F	regulates calcium deposition

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So why can't we just eat soil?

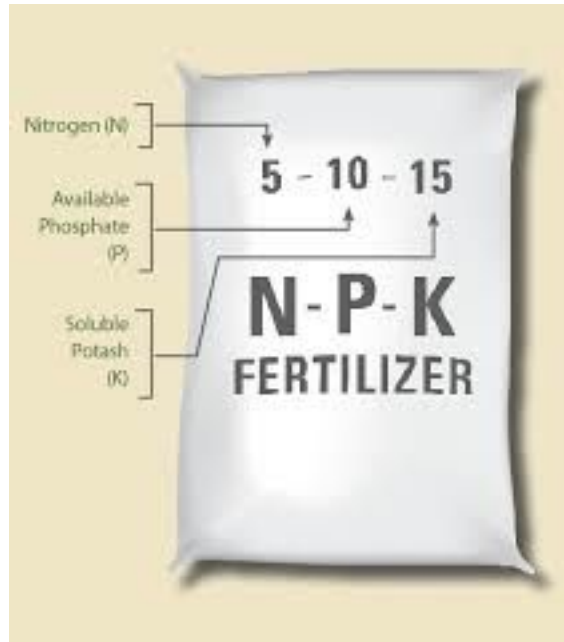
Because..... The elements are found in such low concentrations (amounts) that we would have to eat enormous amounts to get the minimum daily required amounts.

Nutrients are ingested, digested, then absorbed by the body

Plants are better at extracting the nutrients because of their root system:

- roots are covered in tiny hairs that branch out getting the most contact with water in the soil (where nutrients are found)
- once, in the roots the minerals move to other parts of the plant where they are used to build organic compounds like proteins, vitamins and carbohydrates





Commercial Fertilizers

The three numbers on a bag of commercial fertilizers are a convenient signal for gardeners. Each number represents the percentage of chemical found in the bag

Nitrogen – growth of leaves and stem;

Phosphorous – growth of roots and flower;

Potassium – stimulates early growth and protects against disease

How do each of
these chemicals
effect
plant
development?



Nitrogen (N)

Phosphorus (P)

Potassium (K)

***the order of elements is always the same**