

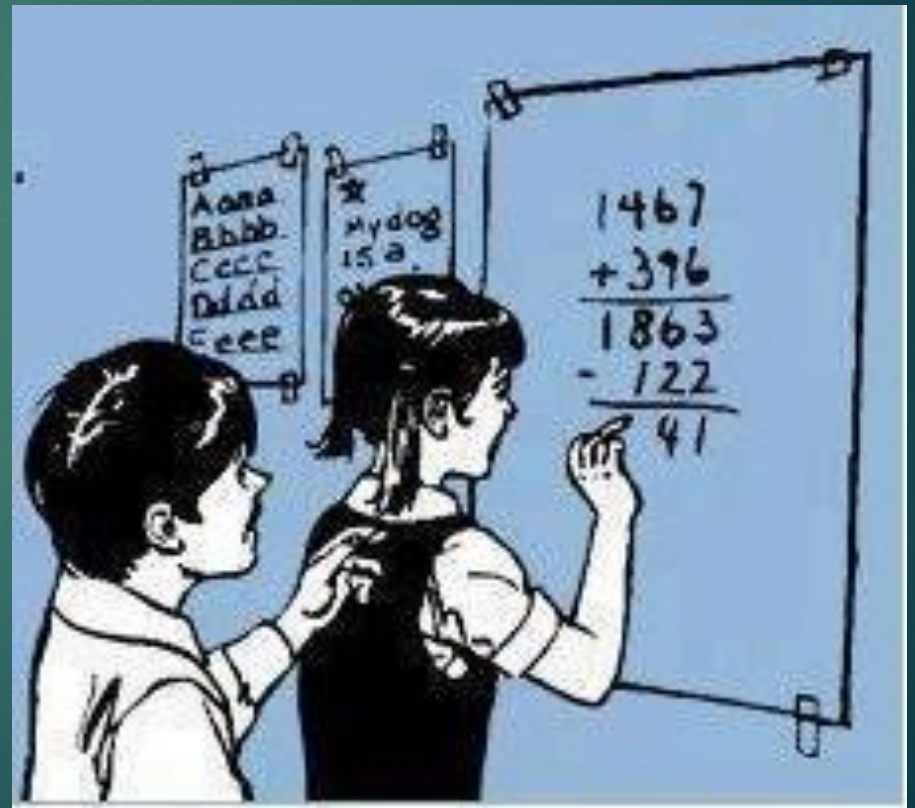
Life Processes: Nutrition.

# Lesson Objectives:

- Distinguish between macro and micro nutrients and list their functions
- State the cause, symptoms and treatment of deficiency diseases;
- Discuss the importance of a balanced diet
- Discuss the effects of malnutrition on the human body
- Determine Body Mass Index

If Billy has 32 candy bars  
and he Eats 28, what does  
Billy have now?

Diabetes






# Definition

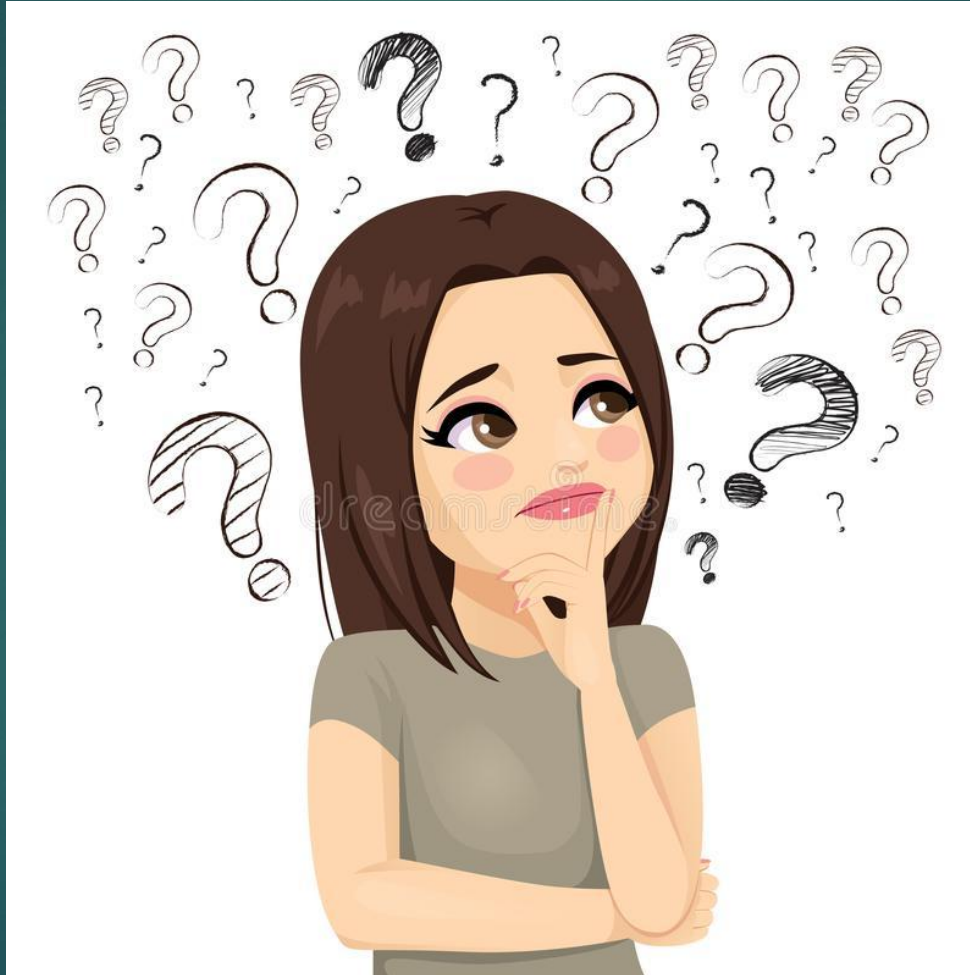
Nutrition is the process by which organisms make or obtain food.





Or Nutrition can be described as, the science of food the nutrients in food and how the body uses those nutrients. It includes the process of ingestion, digestion, absorption, metabolism, transport, storage and excretion of those nutrients.

# How do we acquire food?





## Definition

Diet is the food an organism eats on a continuous basis. In other words, the food we eat everyday.

I'm on a 'seafood' diet.

I see food, I eat it.



somee cards  
user card





# The human Diet must consist of the following:

- **Carbohydrates**
  - **Proteins**
  - **Lipids (fats)**
  - **Vitamins**
  - **Minerals**
  - **Water**
  - **Fibre**
- MACRONUTRIENTS
- MIRCONUTRIENTS
- ROUGHAGE



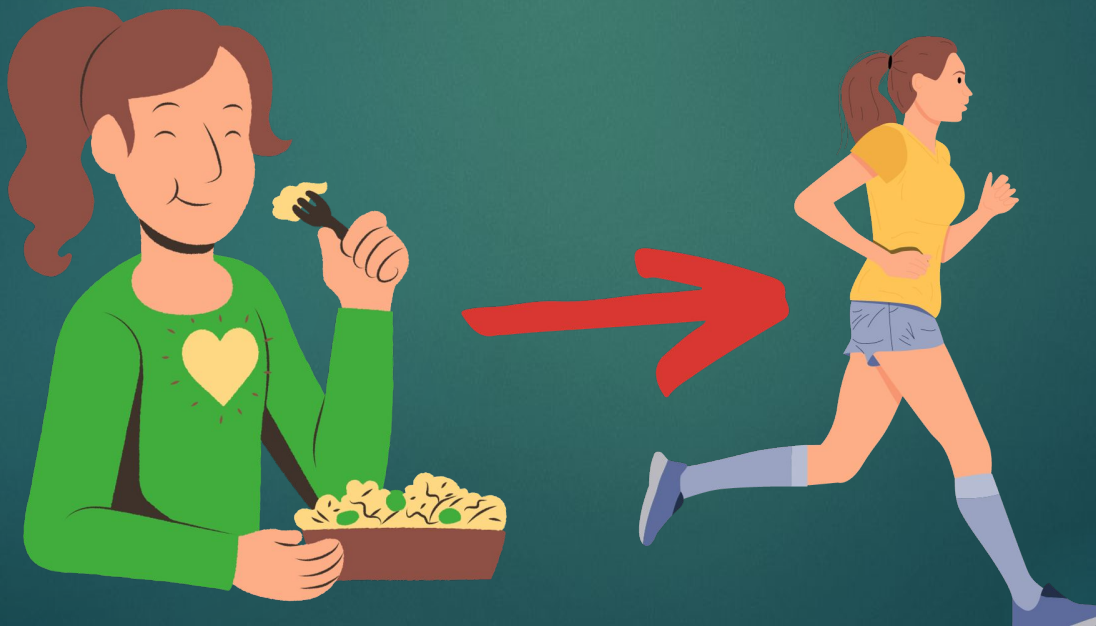
**Macronutrients:** These are required in relatively large quantities.

- ▶ Carbohydrates
- ▶ Proteins
- ▶ Lipids (Fats)



# Carbohydrates

These are the foods that supply the most of our **energy**. Carbohydrates contains the elements carbon, hydrogen and oxygen.





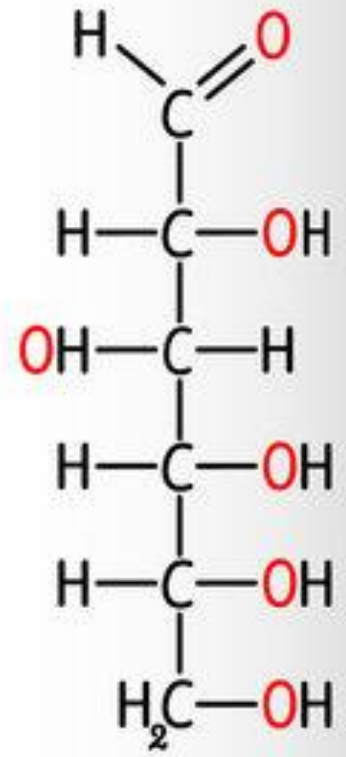
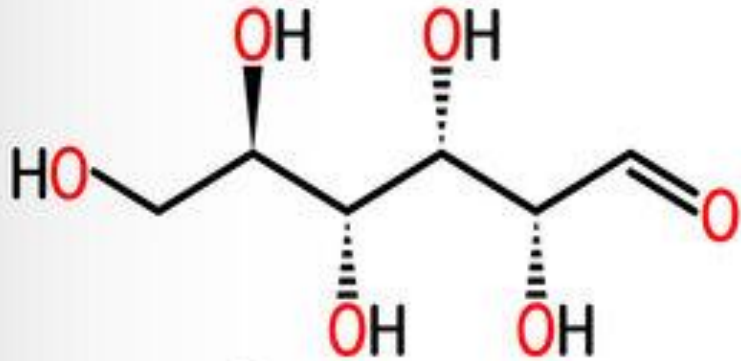
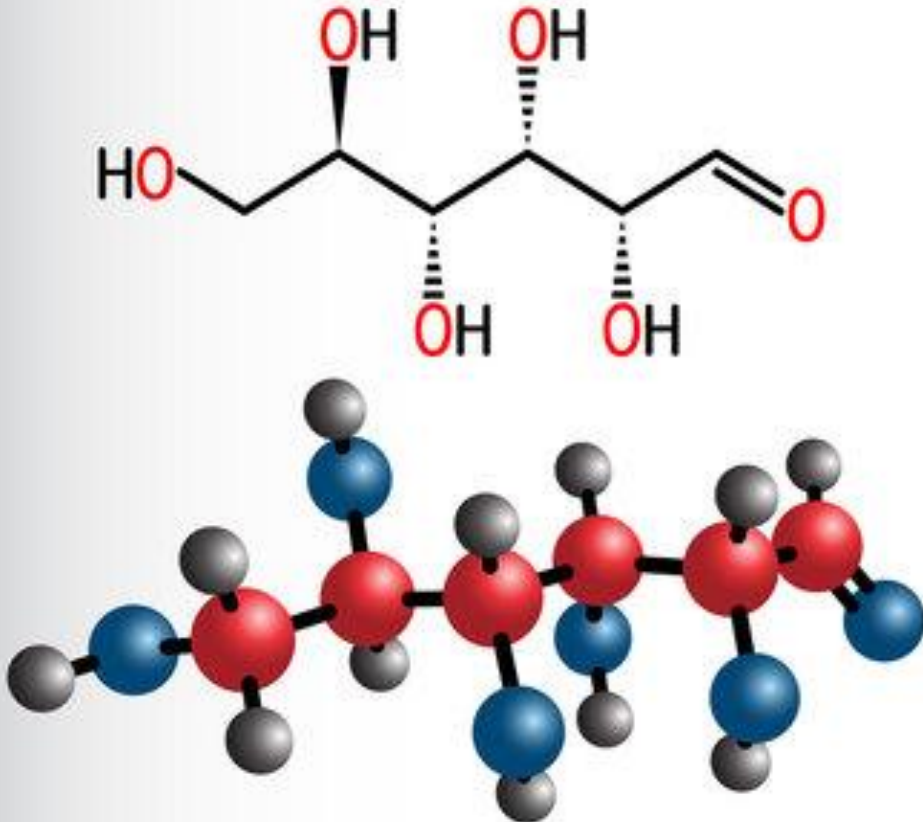
# Carbohydrates

Carbohydrates can be classified as:

(i) **Monosaccharide** or single sugar units . They are made up of the elements Carbon, Hydrogen and Oxygen. They include the sugars **fructose** **glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)** and **galactose**.

Another name for monosaccharide are –  
reducing sugars or simple sugars

# Glucose





# Carbohydrates

(ii) **Disaccharide** – These are two monosaccharides linked together they are soluble and sweet. Used as a source of energy include **maltose, sucrose (cane sugar ) and lactose (milk sugar).**

# DAILY DIET ESSENTIALS | TYPES OF SUGARS

## MONOSACCHARIDES

GLUCOSE



FRUCTOSE



GALACTOSE



## DISACCHARIDES

SUCROSE



LACTOSE



MALTOSE



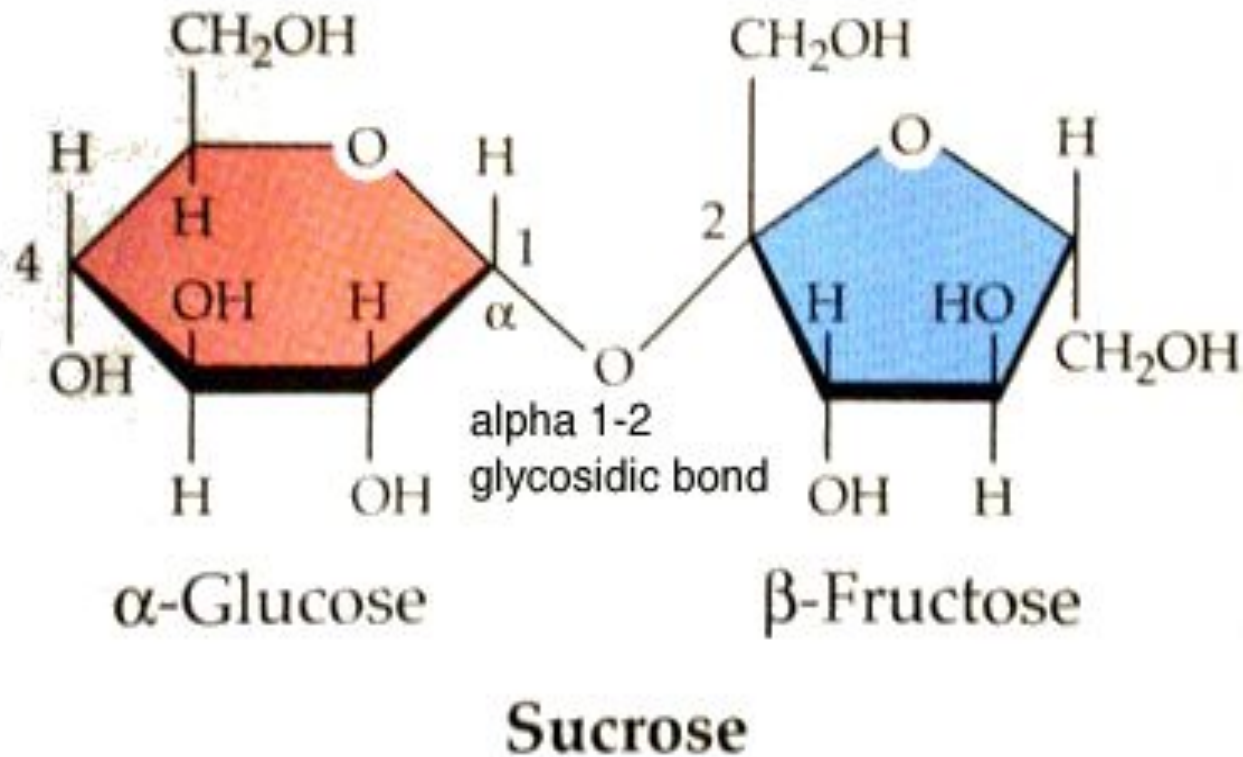


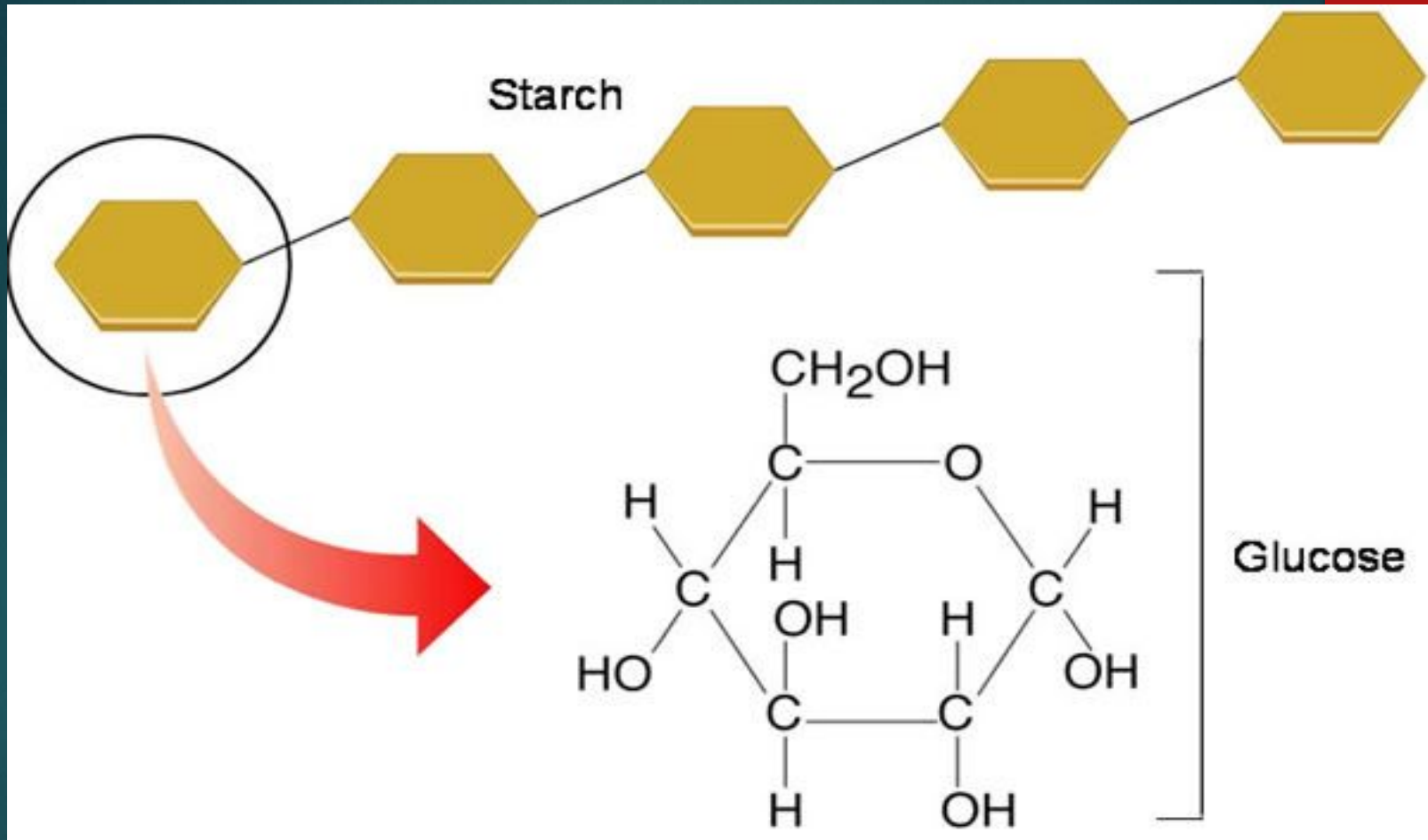
# Carbohydrates

(iii) **Polysaccharides** – These are made up of many simple sugar molecules joined together. They are insoluble they are used as energy storage compounds. They include **starch and cellulose (in plants) and glycogen in animals.**



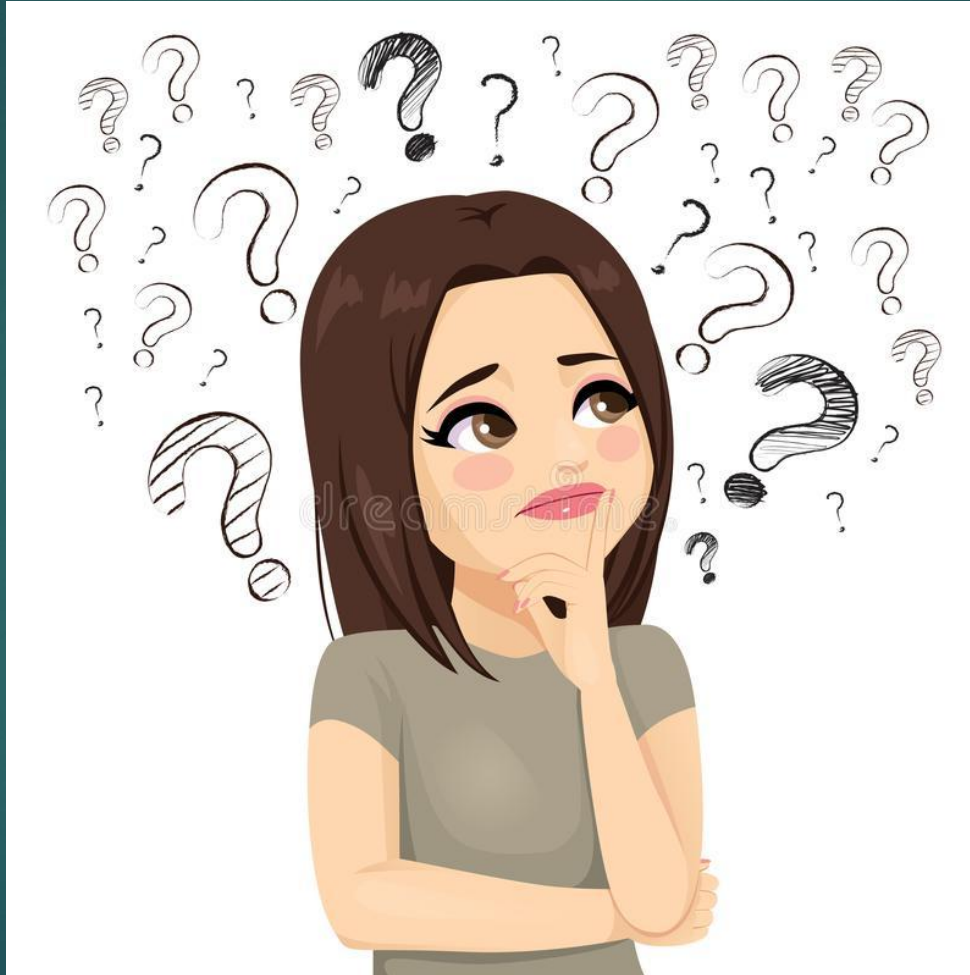
Sucrose has the molecular formula  $C_{12}H_{22}O_{11}$





## POLYSACCHARIDE MOLECULE

# What are the three classifications of Carbohydrates?





# Sources of Carbohydrates

- ▶ Bread
- ▶ Cereal
- ▶ Pasta
- ▶ Rice
- ▶ Potatoes
- ▶ Yam
- ▶ Sweet foods

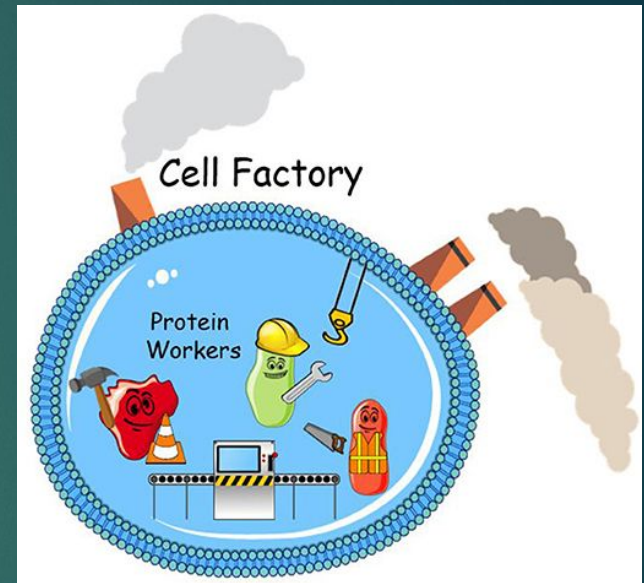




# Proteins

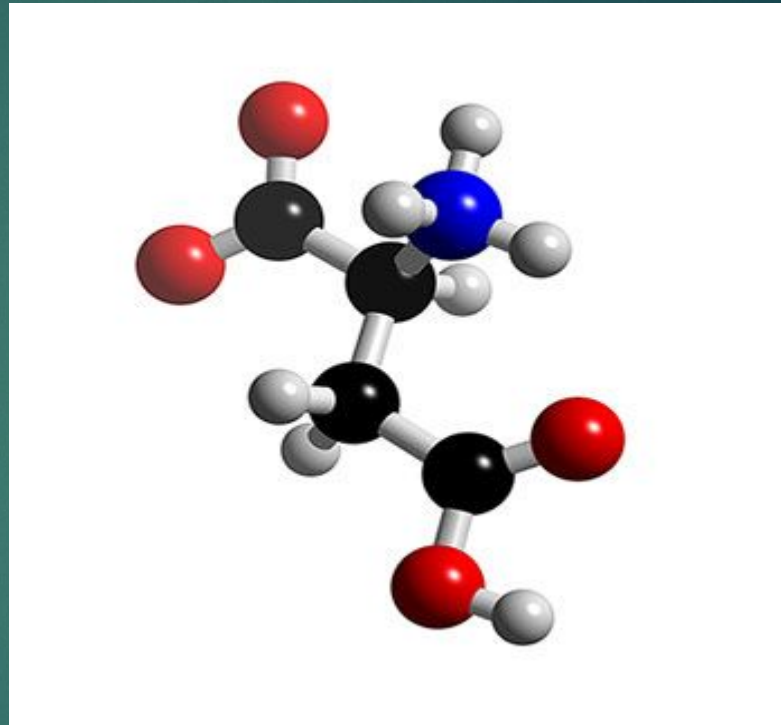
Proteins are used to repair cells and for growth of new cells.

Proteins are molecules made up of long chains of amino acids, these amino acids are held together by peptide bonds. **Amino acids are the basic building blocks of proteins.**





Proteins are also used as a Energy back up, if Carbohydrates aren't available.



Amino Acid Molecule.



# Sources of Protein

- ▶ Meat
- ▶ Fish
- ▶ Milk
- ▶ Eggs
- ▶ Cheese
- ▶ Peas
- ▶ Beans





## Lipids (fats)

**Their main function include energy storage and as components of cell membranes. Lipids** constitute a broad group of naturally occurring molecules that include fats, waxes, sterols. Some dietary fat is also necessary to facilitate the absorption of fat soluble vitamins A, D, E and K.



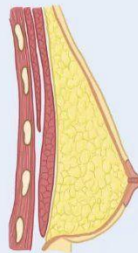
# FATS



**MAJOR SOURCE  
of ENERGY**



**COMPONENT of  
CELLS & TISSUES**



**ABSORB  
VITAMINS**



**CONVERTED into  
OTHER MOLECULES**



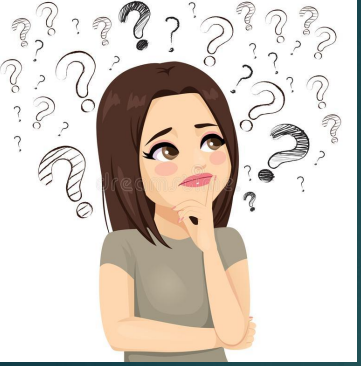
**e.g. PROSTAGLANDINS**



# Sources of Lipids (fats)

- ▶ Butter
- ▶ Vegetable oils
- ▶ margarine
- ▶ Nuts
- ▶ Fatty meats
- ▶ Avocado





Jane is preparing to run a marathon, which of the following items would provide Jane the most energy for the before race?

- A. A Fruit Salad
- B. Eggs and sausage
- C. Plain toast
- D. Oatmeal



**Micronutrients:** These are required in relatively small quantities.

- ▶ Vitamins
- ▶ Minerals



# Vitamins

These are organic compounds required as a vital nutrient in tiny amounts by an organism.



Vitamin	Sources	Function	Symptoms of deficiency
A	Liver, cod liver oil, yellow and orange vegetables and fruits, e.g. carrots and pumpkin, green leafy vegetables, e.g. spinach	Helps to keep the skin, cornea and mucous membranes healthy. Helps vision in dim light (night vision). Strengthens the immune system	<b>Night Blindness</b> Poor vision in dim light. Vision adapts slowly between bright and dim conditions.
B1	Whole-grain cereals and bread, brown rice, peas, beans, nuts, yeast extract, lean pork	Aids in respiration to produce energy. Important for the proper functioning of the nervous system.	<b>Beriberi:</b> Loss of muscle function or paralysis of the lower legs. Speech difficulties. Mental confusion.

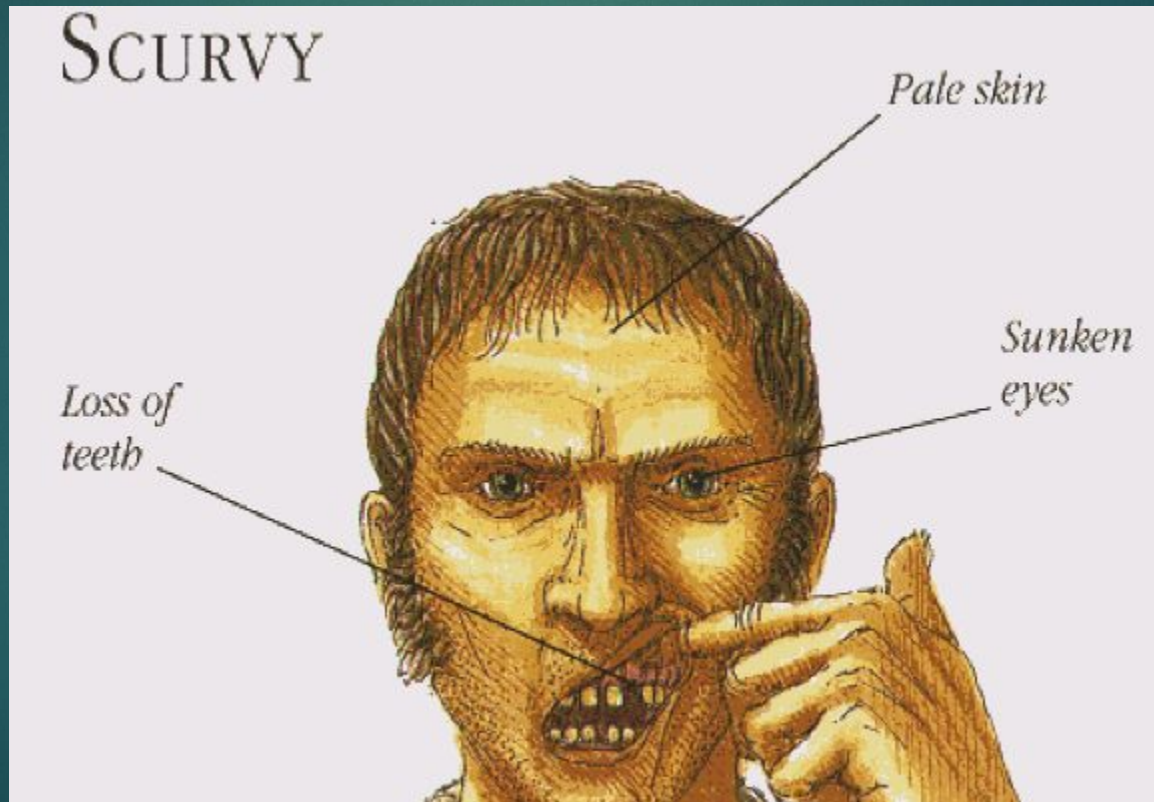


Vitamin

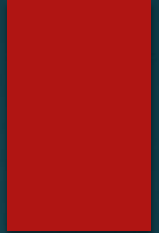
Vitamin	Sources	Function	Symptoms of deficiency
C	Citrus, fruits, Barbados cherry, raw green vegetables	Keeps tissues healthy, especially skin and connective tissue	<b>Scurvy:</b> Bleeding from gums and other membranes, loss of teeth, wounds do not heal, painful muscles and joints
D	Animal fats, Manufactured in the body by action of sunlight on skin	Aids absorption of calcium and phosphorus from ileum, important in formation of bones and teeth	<b>Rickets:</b> soft, weak bones, with swollen ends especially, leg bones bow legs, Poor teeth
K	Liver, green vegetables.	Aids in blood clotting	Prolonged bleeding when out, Blood fails to clot easily.



Pirates often suffered from Scurvy, due to the lack of availability to fresh fruits while at sea.







# Minerals

Required in small amounts for healthy growth and development.



Mineral	Sources	Functions	Symptoms of deficiency
Calcium (Ca)	Milk, cheese	Formation of bones and teeth. Aids in blood clotting	Brittle bones and teeth. Possible causes rickets
Iron (Fe)	Liver, kidney, red meat, egg yolk, green leafy vegetables	Formation of haemoglobin	<b>Anaemia:</b> reduction in number of red blood cells, tiredness, lack of energy

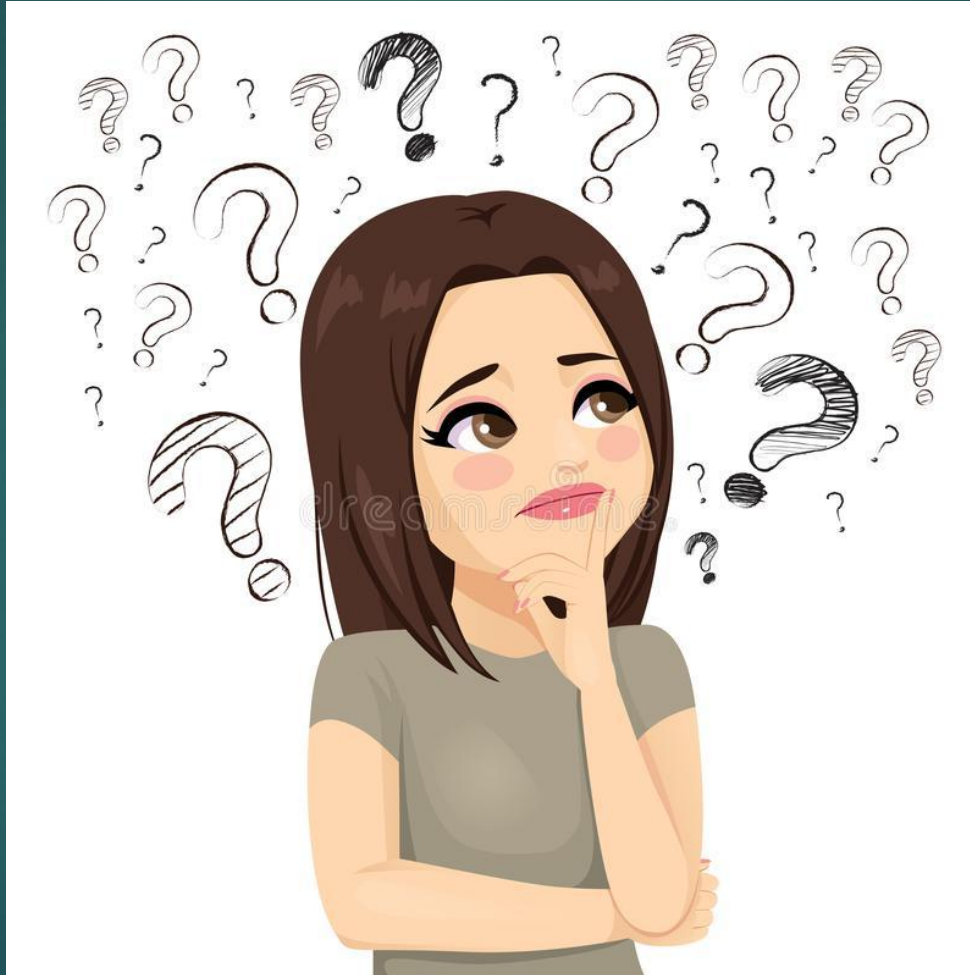


Mineral	Sources	Functions	Symptoms of deficiency
Sodium (Na)	Table salt	Transmission of nerve impulses and muscle contraction	Muscular cramps
Potassium (K)	Meat, vegetables, banana	maintenance of correct concentration of body fluids	
Chlorine (Cl)	Table salt		
Fluorine (F)	Fluorinated tap water, fluoride toothpaste	Increases resistance to tooth enamel to decay	More rapid tooth decay



Mineral	Sources	Functions	Symptoms of deficiency
Iodine (I)	Sea foods, iodised table salt	Formation of thyroxine	<b>Goitre</b> in adults swelling of thyroid gland in neck, reduced metabolic rate

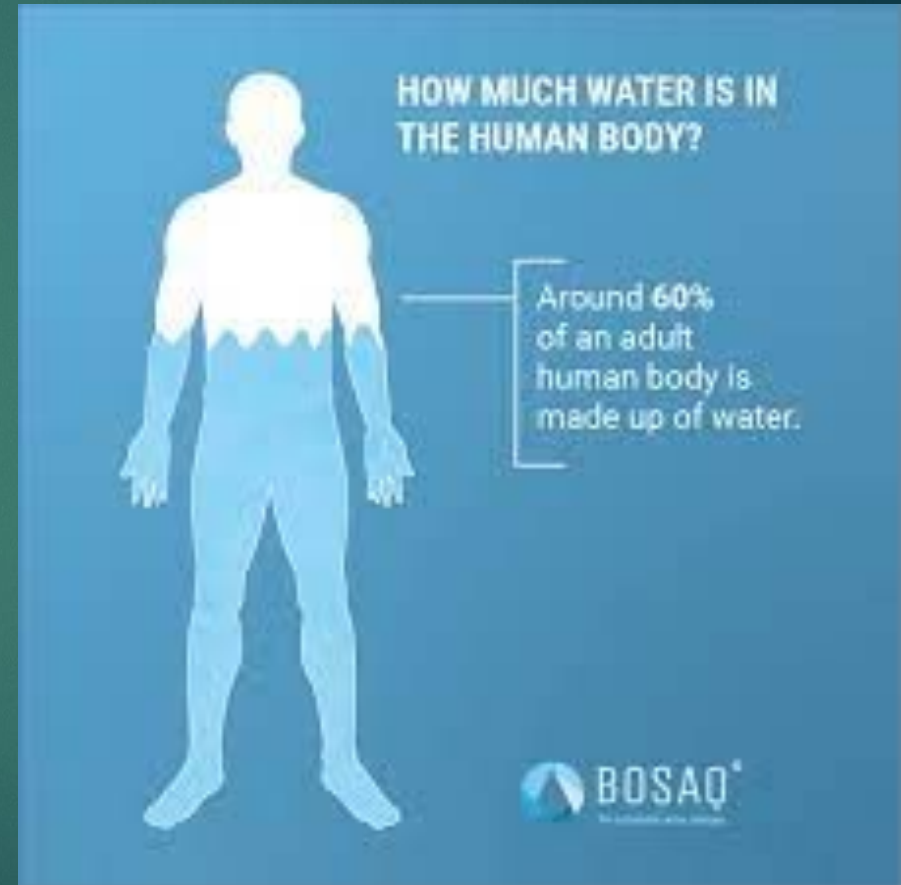
State three vitamins, three minerals and their deficiencies.





# Water

Water is essential in the diet since the human body is about 60% water.





# Functions of Water

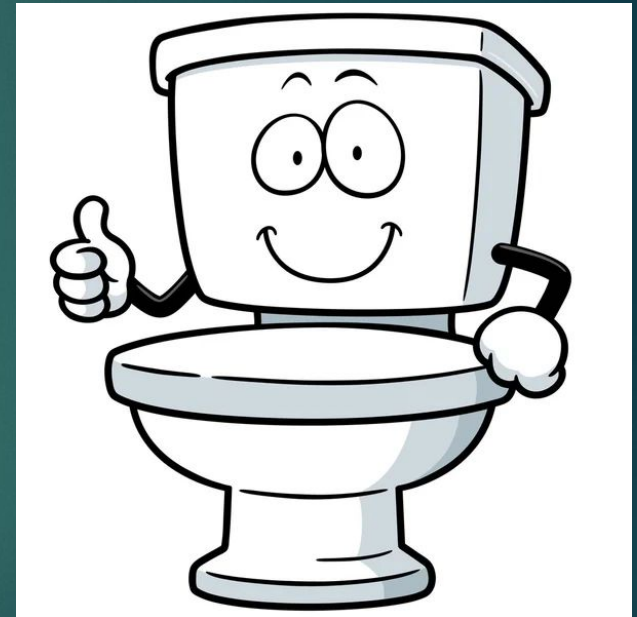
- ▶ Water acts as a solvent to dissolve chemicals in cells so that they can react.
- ▶ Water acts as a solvent to dissolve waste substances so that they can be excreted from the body, e.g. urine contains dissolved urea.
- ▶ Water acts as a coolant, removing heat from the body when it evaporates from sweat.



# Dietary Fibre

Dietary fibre is food that cannot be digested. Dietary fibre adds bulk to the food which stimulates peristalsis so that food is kept moving through the digestive system.

This helps prevent constipation and reduces the risk of colorectal (bowel) cancer.







# Sources of Dietary Fibre

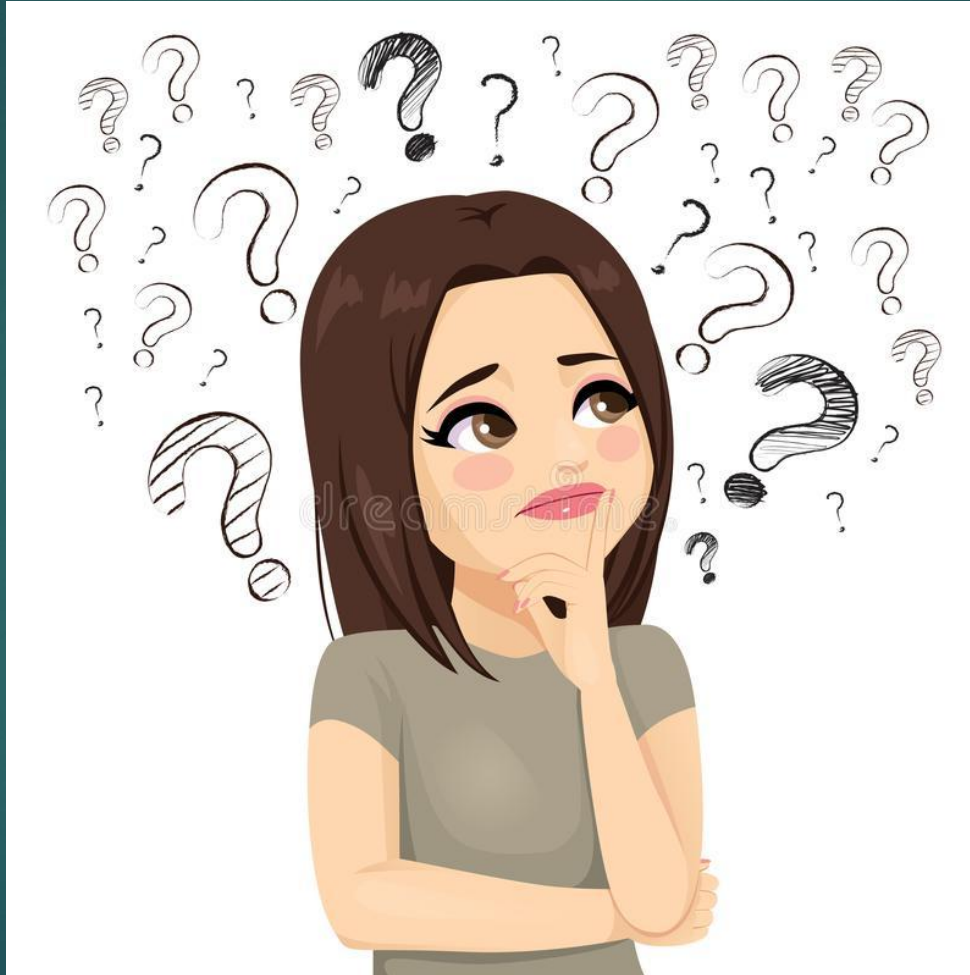
- ▶ Beans
- ▶ Whole grains
- ▶ Brown rice
- ▶ Nuts
- ▶ Berries
- ▶ Bran cereal
- ▶ Oatmeal
- ▶ Vegetables





# Balanced Diet

# Can a balanced diet look differently for different people?

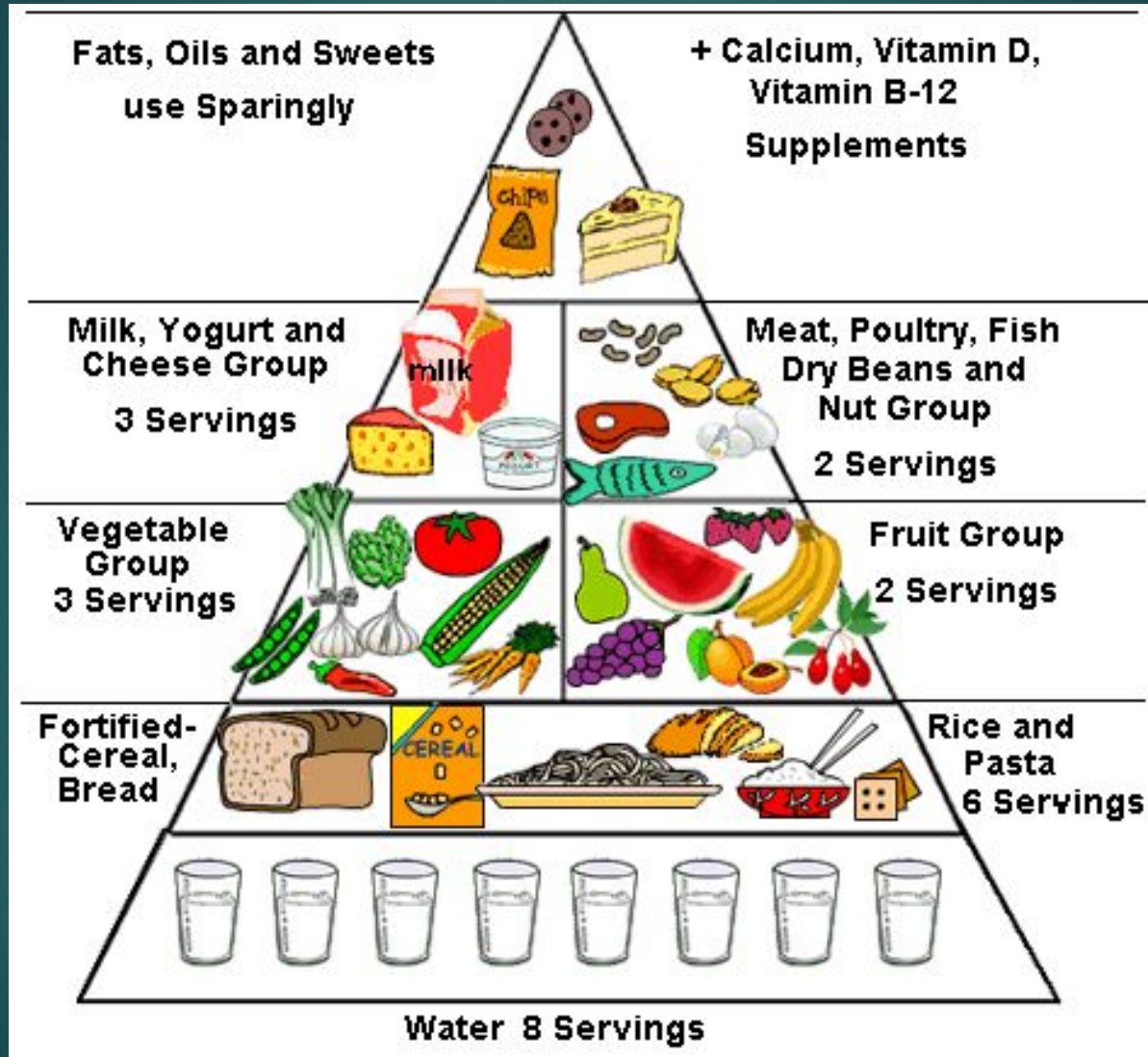


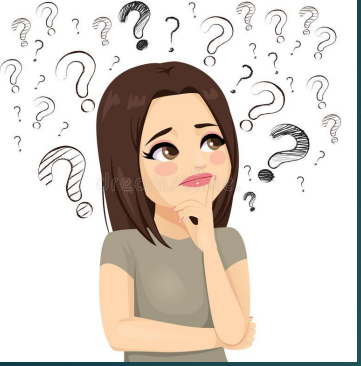


# Balanced Diet

Humans must consume a **balanced diet** each day. This must contain carbohydrates, proteins, lipids, vitamins, minerals, water and dietary fibre in the **correct proportions** to supply the body with enough energy for daily activities and the correct materials for growth and development, and to keep the body in a healthy state.

# Food Pyramid





# Assignment

Keri is 4 months pregnant, create a 3-day meal plan (breakfast, lunch and dinner) for Keri.



# Malnutrition



# Malnutrition

Malnutrition is defined as the condition that results from taking an unbalanced diet in which certain nutrients are lacking or are in excess.

i.e. over and under malnutrition.





# Protein deficiency diseases include:

**Marasmus** – A disease caused by a severe deficiency of protein. It affects infants and young children. People with marasmus appear bony with little muscle tissue. (Deficiency diseases linked to carbohydrate deficiency can also be marasmus)



Child suffering from  
Marasmus



□ **Kwashiorkor** – Severe deficiency of protein in diets that contain mostly calories from carbohydrates. It affects older children. Symptoms are a puffy abdomen from the retention of fluid, fatigue, stunted growth, diarrhea and impaired mental health.



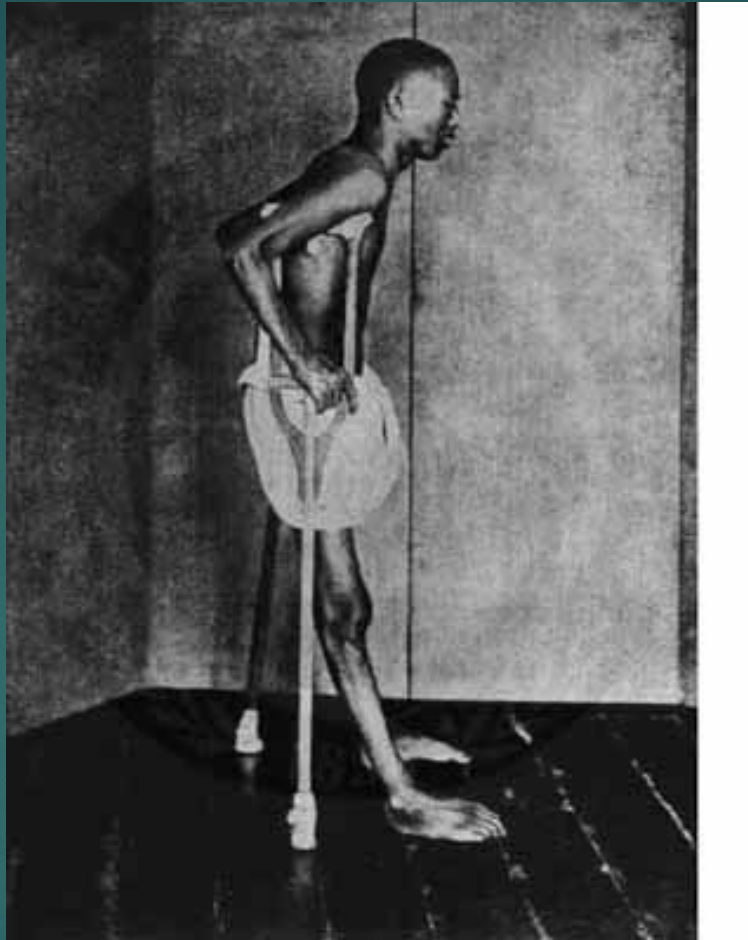
A child suffering from Kwashiorkor



Child Suffering from Kwashiorkor



**Beriberi** is a nervous system ailment caused by a **thiamine (vitamin B<sub>1</sub>) deficiency** in the diet.



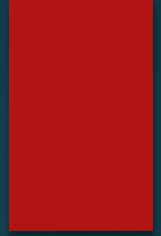
Person suffering from - Beriberi




**Anemia:** This condition develops when there are not enough healthy red blood cells to carry oxygen to the body tissues.

The types of anemia are related to the shape of the blood cells, levels of **iron** in the blood diet, nutrient deficiency and underlying medical problems.





**Obesity** is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems.



For adults, overweight and obesity ranges are determined by using weight and height to calculate a number called the "body mass index" (BMI). BMI is used because, for most people, it correlates with their amount of body fat.

An adult who has a BMI between 25 and 29.9 is considered overweight.

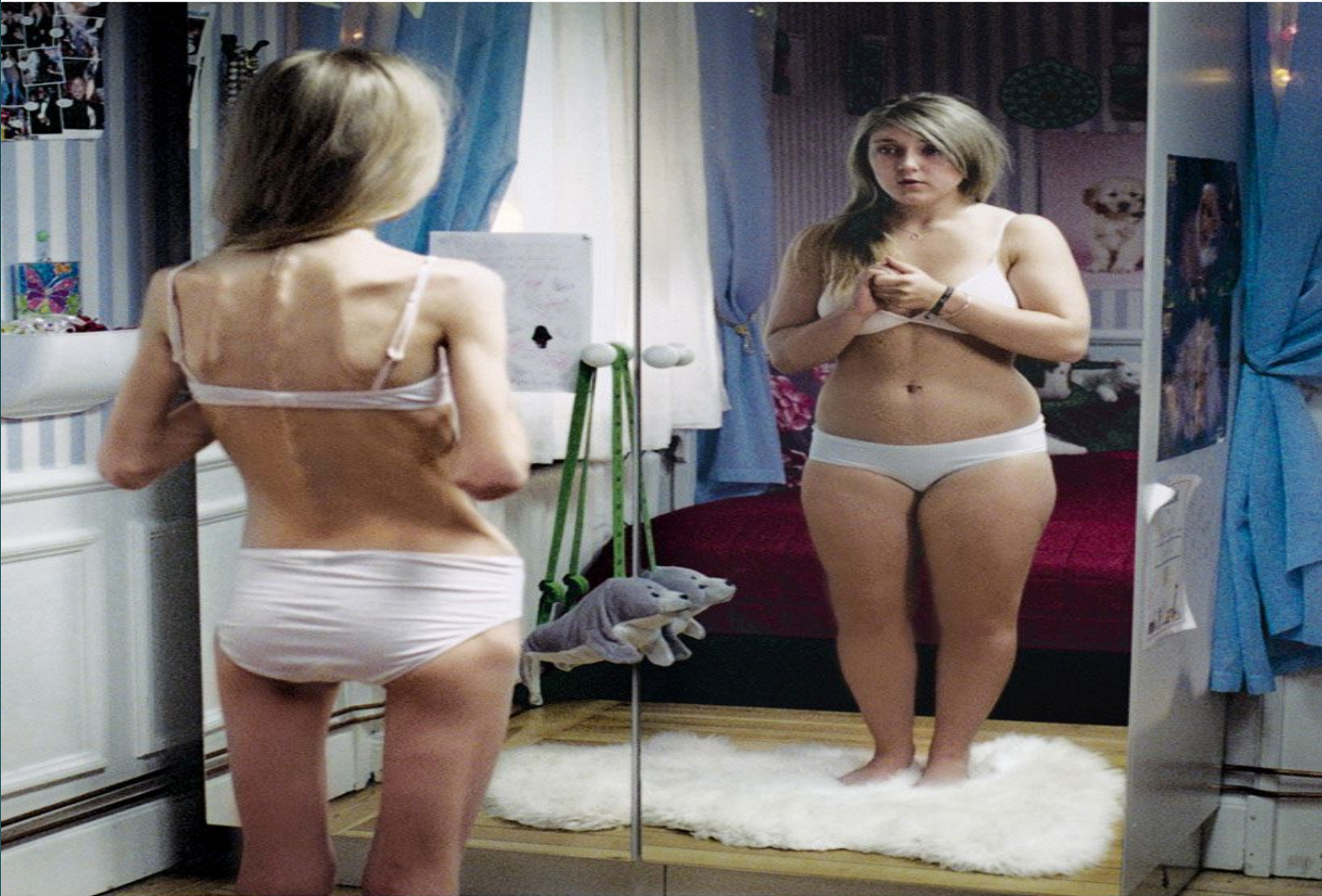
An adult who has a BMI of 30 or higher is considered obese.





**Anorexia Nervosa**, mental illness in which a person has an intense fear of gaining weight and a distorted perception of their weight and body shape.

People with this illness believe themselves to be fat even when their weight is so low that their health is in danger. A person with anorexia nervosa severely restricts food intake and usually becomes extremely thin.



Support for people with eating disorders.





# Effects Of Anorexia:

Undernourishment usually causes females with anorexia nervosa to stop menstruating.

\* Dry yellow skin, brittle hair, change in the function of the kidney, gastrointestinal disorders, osteoporosis (loss of bone mass), changes in the function of the heart, low blood pressure, dizziness, fainting.







# Bulimia

This is an eating disorder in which persistent concern about body weight and shape leads to repeated episodes of bingeing (consuming large amounts of food in a short time) associated with induced vomiting, use of laxatives, fasting and or excessive exercise.

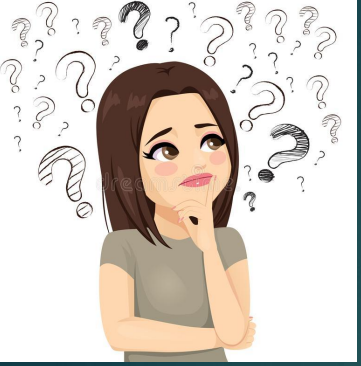


Bulimia may directly cause a whole host of medical complications.

These are – gastric reflux, dehydration, oral trauma, constipation, infertility, peptic ulcers, severe dental erosion and swollen salivary glands.

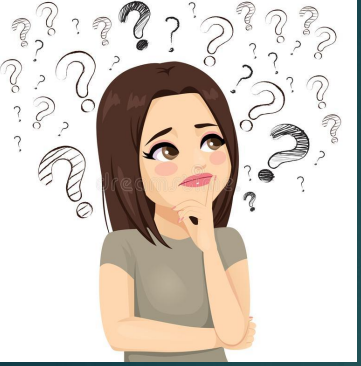


Erosion of the lower teeth caused by Bulimia. The upper teeth have been restored with porcelain veneers.



# Consider the following Situations

1. A fifteen year old girl with anorexia.
2. A twenty year old football player with Aneamia
3. A 5 year old girl with obesity
4. A nine year old boy who doesn't like vegetables
5. A sixteen year old girl who has goitre.



Answer the following questions for the situations on the previous slide

1. What is the Disease?
2. What are the symptoms and signs of the disease?
3. How did the individual get the disease?
4. How does the disease mentally affect the individual?
5. How does the disease affect the individual's social life?
6. What is a possible treatment for the disease?

# DON'T FORGET YOUR ASSIGNMENT!!



# Lesson Sources:

- ▶ Concise Revision Course - Human and Social Biology - a Concise Revision Course for CSEC®  
Textbook by Anne Tindale and Shaun deSouza
- ▶ Human & Social Biology for CSEC®  
Examinations 6th Edition Student's Book by Phil Gadd