

JSR IAS ACADEMY

GENERAL SCIENCE

BIOLOGY

Nutrition

முயற்சி - பயிற்சி - தேர்ச்சி

Classes of Nutrients

The Chemical constituents of food which **give us energy**, help to build our body and protect us from diseases are called Nutrients.

1. Carbohydrate
2. Proteins
3. Fats
4. Vitamins
5. Minerals
6. Water

Carbohydrates

Carbohydrates are organic compounds composed of **carbon, hydrogen and oxygen**.

Carbohydrate is an essential nutrient which provides the chief source of energy to the body.

- Glucose,
- sucrose,
- lactose,
- starch,
- cellulose

are examples for carbohydrates.

S.No.	Form of Carbohydrates	Sources
1	Sugar	Fruits, Honey, Cane Sugar, Sugar Beet
2	Starch	Rice, Wheat, Maize, Potato, etc.
3	Dietary fibre	Whole grain, nuts, etc.

Carbohydrates are classified as

1. monosaccharide (Glucose),
2. disaccharide (Sucrose)
3. polysaccharide (Cellulose).

The classification is based on **the number of sugar molecules present** in each group.

Proteins

Proteins are the essential **nutrients and also the building blocks of the body**.

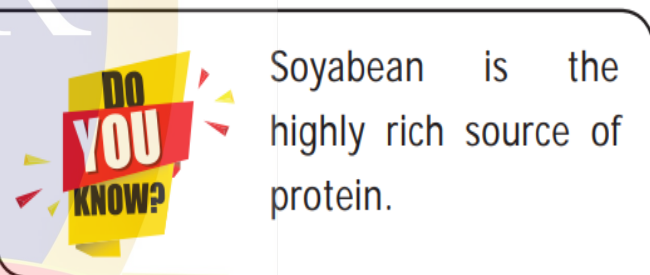
They are essential for **growth and repair of body cells and tissues**.

Proteins are made of **amino acids**.

Essential amino acids are those that cannot be biosynthesized by the body and must be obtained from the diet.

The nine essential amino acids are

1. phenylalanine,
2. valine,
3. threonine,
4. tryptophan,
5. methionine,
6. leucine,
7. isoleucine,
8. lysine
9. histidine.



Fats

- Fat in the diet **provides energy**.
- Fat provides more energy than Carbohydrates.
- Some important sources of fats are butter, ghee, milk, cheese, paneer, nuts, meat, fish, egg yolk etc. Apart from giving energy, they insulate our body and protect the cells.
- They **maintain cell structures and are involved in metabolic functions**.
- Essential fatty acids cannot be synthesized in the body and are provided through diet.
- Essential fatty acids required in human nutrition are **omega fatty acids**.

Vitamins

Vitamins are the vital nutrients, **required in minute quantities to perform specific physiological and biochemical functions**.

Fat Soluble Vitamins

Vitamin A (Retinol)	Carrot, papaya, leafy vegetables, fish liver oil, egg yolk, liver, dairy products	Xerophthalmia Nyctalopia (Night blindness)	Dryness of Cornea Unable to see in the night (dim light) Scaly skin
Vitamin D (Calciferol)	Egg, liver, dairy products, Fish, synthesized by the skin in sunlight	Rickets (in children)	Bow legs, defective ribs, development of pigeon chest
Vitamin E (Tocopherol)	Whole wheat, meat, vegetable oil, milk	Sterility in rats, Reproductive abnormalities	Sterility
Vitamin K (Derivative of Quinone)	Leafy vegetables, soyabeans, milk	Blood clotting is prevented	Excessive bleeding due to delayed blood clotting

Water Soluble Vitamins

Vitamin B1 (Thiamine)	Whole grains, yeast, eggs, liver, sprouted pulses	Beriberi	Degenerative changes in the nerves, muscles become weak, paralysis
Vitamin B2 (Riboflavin)	Milk, eggs, liver, green vegetables, whole grains	Ariboflavinosis (Cheilosis)	Irritation in eyes, dry skin, inflammation of lips, fissures in the corners of the mouth
Vitamin B3 (Niacin)	Milk, eggs, liver, lean meat, ground nuts, bran	Pellagra	Inflammation of skin, loss of memory, diarrhoea
Vitamin B6 (Pyridoxine)	Meat, fish, eggs, germs of grains and cereals, rice polishings	Dermatitis	Scaly skin, nervous disorders
Vitamin B12 (Cyanocobalamine)	Milk, meat, liver, pulses, cereals, fish	Pernicious anaemia	Decrease in red blood cell production, degeneration of spinal cord
Vitamin C (Ascorbic acid)	Leafy vegetables, sprouts, citrus fruits like goose berry (Amala), lemon, orange	Scurvy	Swollen and bleeding gums, delay in healing of wounds, teeth and bones malformed

Dr. Funk introduced the term vitamin. Vitamin A was given the first letter of the alphabet, as it was the first vitamin discovered.

The **microminerals** required by the human body also called trace elements are sulfur, iron, chlorine, cobalt, copper, zinc, manganese, molybdenum, iodine and selenium.

Minerals	Functions
Calcium	Strong bones and teeth, clotting of blood
Phosphorus	Strong bones and teeth
Iodine	Synthesis of thyroid hormone
Iron	Formation of haemoglobin and brain development

Minerals

Minerals are inorganic substances required as an essential nutrient by organisms **to perform various biological functions** necessary for life.

The **macrominerals** required by the human body are calcium, phosphorus, potassium, sodium and magnesium.

Minerals	Sources	Functions	Deficiency disorders
Macronutrients			
Calcium	Dairy products, beans, cabbage, eggs, fish	Constituent of bones and enamel of teeth, clotting of blood and controls muscle contraction.	Bone deformities, poor skeletal growth, osteoporosis in adults.
Sodium	Common salt	Maintains fluid balance and involved in neurotransmission.	Muscular cramps, nerve impulses do not get transmitted.
Potassium	Banana, sweet potato, nuts, whole grains, citrus fruits	Regulates nerve and muscle activity.	Muscular fatigue, nerve impulses do not get transmitted.
Micronutrients			
Iron	Spinach, dates, greens, broccoli, whole cereals, nuts, fish, liver	Important component of haemoglobin.	Anaemia
Iodine	Milk, Seafood, Iodised salt	Formation of thyroid hormones.	Goitre

More to know: Water, is measured in litre and millilitre. Gallon is also a measure of volume of liquids.

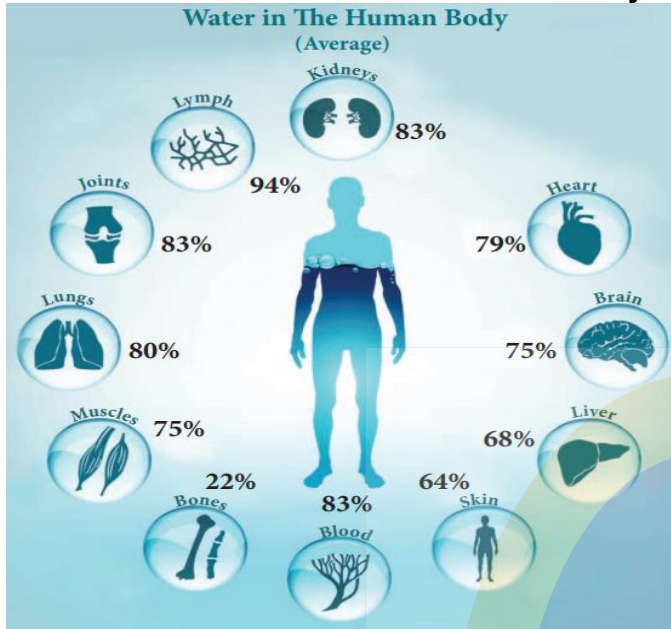
1 Gallon = 3.785 litre

Water level in the reservoirs is measured in TMC/feet. Water released from dams is measured in cusec (cubic feet/sec).



Coovam is an estuary!

Estuaries are wetlands where water bodies meet the sea. It is a combination of fresh water from land meeting the salty seawater. **Estuaries** are home to unique plants and animal species.



Oral Rehydration Solution – ORS.

- Vomiting or loose motions result in loss of water and cause salt imbalance in the body.
- Loss of water (dehydration) can lead to serious problems.
- This can be prevented by consuming ORS at short intervals.

Follow the steps to make ORS at home:

- Take a litre of boiled water. Cool it.
- Add half a teaspoon of salt and six teaspoons of sugar to it.
- You can also add a few drops of lemon juice to it. Stir it and give it to the person suffering from vomiting, loose motions or dehydration.

Major food stuffs	Dietary sources	Daily requirements (grams)
Carbohydrates	Honey, sugarcane, fruits, whole grains, starchy vegetables, rice	150-200
Proteins	Legumes, pulses, nuts, soya bean, green leafy vegetables, fish, poultry products, egg, milk and dairy products	40
Fats	Egg yolk, saturated oil, meat	35