

SUVA SANGAM COLLEGE

HOME ECONOMICS

YEAR 12

STRAND: FOOD AND NUTRITION

SUB STRAND: DIET AND HEALTH

WEEK: 1 (05/07 – 09/07)

Learning Outcome:

1. Identify the types and sources of micronutrients and discuss their functions in the body.

Micronutrients – are needed by the body in very small amounts e.g. vitamins and minerals.

Vitamins

The two classifications of vitamins are fat soluble and water soluble.

Fat soluble vitamins are usually absorbed in fat globules that travel through the lymphatic system of the small intestine and into the general blood circulation within the body. Examples of fat soluble vitamins are Vitamin A, D, E and K.

The **water – soluble vitamins** are absorbed through the walls of the stomach and intestines. Excess is eliminated through the kidneys. As water – soluble vitamins are not stored care should be taken to obtain a regular supply. Examples of water soluble vitamins are Vitamin B & C.

Activity:

1. Where are excess fat soluble vitamins stored in the body?

2. What happens as a result of too much of fat soluble vitamins in the body?

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WEEK: 2 (12/07 – 16/07)

Learning Outcome:

1. Identify the types and sources of micronutrients and discuss their functions in the body.

FAT SOLUBLE VITAMINS

Chemical Name	Dietary Sources	Functions	Characteristics
Vitamin A Retinol Carotene	Retinol – Cod liver, oil, liver, butter. Carotene – carrot, spinach, watercress	It regulates growth. It promotes healthy skins. Maintenance of epithelial (lining) membranes such as the cornea and bronchial tubes	A yellow fat soluble alcohol. Insoluble in water. Can be destroyed by oxygen, as when exposed to air and light.
Vitamin D Calciferous	Sunlight is a major source. Cod liver oil. Oily fish (herrings) Margarine Eggs	Necessary for the absorption and lying down of calcium and phosphorus in bones and teeth. Regulates calcium balance between skeleton and blood. Prevents rickets	Heat stable unaffected by cooking or preserving. Unaffected by oxidation, acids or alkalis. Insoluble in water; unaffected by steeping or moist cooking methods.
Vitamin E Tocopherols	Most foods contain a little vitamin E. the best sources are: Eggs Cereals Wheat – germ	Thought to be necessary for metabolism. Acts as an antioxidant, both in cell membrane and commercially.	A yellow, fat – soluble alcohol. Insoluble in water. Stable to heat and acids. Unstable to alkalis and ultra – violet light.
Vitamin K Quinone's	Liver Green vegetables Fish Fish liver oil	Necessary for blood clot. Vitamin K is a component of prothrombin (a protein in the blood).	Fat – soluble Insoluble in water Affected by irradiation

ACTIVITY:

Match the functions in List B with the fat soluble vitamins in List A.

- | List A | | List B | |
|---------------|-----------------|---------------|--|
| (a) | Vitamin A _____ | A. | Regulates calcium balance between skeleton and blood. |
| (b) | Vitamin D _____ | B. | Necessary for blood clot. |
| (c) | Vitamin E _____ | C. | Maintenance of epithelial (lining) membranes such as the cornea and bronchial tubes. |
| (d) | Vitamin K _____ | D. | Thought to be necessary for metabolism. |

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WEEK: 3 & 4 (19/07 – 23/07), (23/07 – 30/07)

Learning Outcome:

1. Identify the types and sources of micronutrients and discuss their functions in the body.

Vitamin B Group

Functions	Dietary Sources	Characteristics
Thiamine B1 * Essential for release of energy from carbohydrates. * Essential for upkeep of nerves * Necessary for appetite.	* Unprocessed cereals, wheat germ. * Yeast, breakfast cereals (fortified) * Heart, liver, kidney, carcass meat. * Milk, eggs, vegetables.	* Extremely water soluble * Unstable at high temperature * Sensitive to alkalis * 70% loss during milling/ processing
Riboflavin (B2) * Involved in metabolism of proteins, lipids, and carbohydrates. * Essential for up – keep of tissues – e.g. skin, eyes tongue * Necessary for growth and good health.	* Beef, liver, kidney, heart. * Yeast, yeast extract. * Milk, eggs, cheese * Green and sprout vegetables and seeds.	* Water soluble * Fairly stable to heat. * Destroyed by alkalis * Affected by light e.g. milk in bottles
Nicotinic acid (Niacin) * Involved in energy release from food. * Essential for healthy skin * Prevents pellagra	* Meat, offal, meat extract. * Yeast, bran, wheat germ, flour * Fish, pulses, dried fruits * Some manufactured by bacteria	* Water soluble * Stable to heat * Fairly stable to acids and alkalis * 80 – 90% loss in milling
Pyridoxine (B6) * Acts as co – enzymes in the metabolism of protein * Assists in the formation of haemoglobin and structural proteins	Most foods: liver, cereals, wheat germ, fish, yeast, seeds are good sources.	* Water soluble * Reasonably heat stable * Affected by high temperatures * Sensitive to oxidation
Folic acid Involved in the formation of red blood cells (works with vitamin B12)	* Offal, wholegrain cereals * Dark green vegetables * Pulses * Some are manufactured in the gut	* Water soluble * Stable in an acid environment * Fairly heat stable * Sensitive to light and

		oxidation
(Cyano) Cobalamin B12 * Essential for formation of red blood cells * Helps form protective myelin sheath around the nerves * Helps treat pernicious anaemia.	* Plentiful in animal foods such as liver, kidney and other meat, fish, cheese. * No B12 in plant foods, therefore there is a high risk of deficiency among vegans and vegetarians.	* Water soluble * Stable in heat up to 100°C * Affected by strong acids and alkalis * Affected by light
Vitamin C (ascorbic acid) * Necessary for the connective tissues and collagen which binds cells of skin, bones etc. together. It is therefore important for growth. * Essential for formation of strong blood vessels. * Helps wounds heal. * Necessary for proper absorption of iron. * Necessary for proper absorption of iron. * Necessary for proper cell metabolism. * Prevents scurvy. * Acts as antioxidant. * It helps prevent infection.	* Capsicum * Watercress * Citrus fruits * Broccoli, cabbage and other greens * Tomatoes * Bean sprouts	* It is an acid, crystalline substances with a sweet – sour taste. * It is water soluble. * Ascorbic acid is reducing agent and acts as an antioxidant. * Being water soluble, it is not stored by the body. A regular supply is therefore essential for good health.

ACTIVITY:

1. Match the chemical names in List B with the water soluble vitamins in List A.

List A		List B	
(a)	Vitamin B ₁	_____	A. Niacin
(b)	Vitamin B ₂	_____	B. Ascorbic acid
(c)	Vitamin B ₆	_____	C. Thiamine
(d)	Vitamin B ₁₂	_____	E. Riboflavin
(e)	Nicotinic Acid	_____	F. Pyridoxine
(f)	Vitamin C	_____	G. Cyanocobalamin

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WEEK: 5 (02/08 – 06/08)

Learning Outcome:

1. Identify the types and sources of micronutrients and discuss their functions in the body.

Minerals

Functions of minerals	Dietary Sources	Factors which help absorption
<p>Calcium</p> <ul style="list-style-type: none"> * Necessary for development of strong bones and teeth. * Necessary for normal clotting of blood. * Necessary for normal functioning of muscles and nerves. 	<p>Milk Cheese Tinned fish (of which bones are eaten) Green vegetables Fortified flour Hard water.</p>	<ul style="list-style-type: none"> * Vitamin D-ample supply through diet/sunlight is necessary. * Phosphorous, an essential ingredient in calcium phosphate, must be available in correct proportion * Vitamin C (ascorbic acid) is useful in absorption because acid environment improves solubility.
<p>Phosphorous</p> <ul style="list-style-type: none"> * Necessary for bone and tooth formation. * Essential component of DNA which determines heredity. * Essential component of cell, blood, many enzymes and hormones. * Necessary for all metabolism. * Forms part of the ATP and ADP which are involved in energy in the cells. 	<p>Meat Fish Eggs Dairy product Whole cereals Green vegetables</p>	<ul style="list-style-type: none"> * Absorbed more efficiently than calcium, 70% is absorbed through intestine. * Needs calcium, vitamin D and activity of parathyroid hormone (PTH) which regulates metabolism of phosphorous and calcium. * Most is deposited in the bones, a little goes to the teeth. Rest is contained in the Red Blood Cells. * Absorption may be decreased by antacids, iron, aluminium, magnesium which may form insoluble phosphates and be eliminated in the faeces, * Caffeine causes increased phosphorous excretion.
<p>Iron</p> <p>Necessary for the formation of haemoglobin in red blood cells. This is necessary to pick up oxygen in the lungs and transport it to the tissues for oxidation</p>	<ul style="list-style-type: none"> * liver, kidney and red meat * whole cereals, brown bread. * Dark green leafy vegetable. 	<p>Only 10% of iron is absorbed based on the following factors: Vitamin C, because it is a reducing agent hence increase the absorption of iron by reducing it from the ferric state found in most foods to its absorbable ferrous state.</p>
<p>Iodine</p>	<ul style="list-style-type: none"> * In soil with high iodine 	<p>Iodine is easily absorbed in the form of iodide</p>

Essential for manufacture of thyroxin – a hormone produced by thyroid gland which controls the rate of metabolism.	content, it will be present in vegetables, cereals and milk. * Sea fish, seaweed and iodized salt.	ions through the walls of digestive tract in the stomach and small intestine. After it is absorbed, most of it concentrates in the thyroid gland. Some of it also accumulates in the ovaries, skin and salivary glands, gastric juice and mammary glands.
Sodium * Essential for correct water balance of the body. * Keeps blood and body fluid alkaline. * Maintains osmotic pressure in body fluids.	* Common salt, added at cooking or at table. * Bacon, smoked fish, cheese and snack foods.	Over 95% is absorbed.
Sulphur	From dietary protein such as fish. It is also available in lower amounts in eggs and vegetables.	
Potassium Maintains optimum cell environment. Necessary for cell formation.	Most foods, good sources – soya beans, nuts, fish, bacon, bread.	

ACTIVITY:

1. Explain the relationship between
(a) Vitamin C and calcium.

- (b) Vitamin C and iron

2. List five dietary sources of

- (a) Magnesium

- (b) Chlorine
