Food and Nutrition

Grade 10

Answers Tutorial 1

1a) Metabolism is the chemical process in the body to maintain life / use of food for (growth, repair and) energy.

b) Malnutrition is the incorrect intake of nutrients

c) Balanced diet comprises of balanced meals and healthy snacks followed by healthy dietary guidelines. All meals should contain nutrients needed by the body in correct proprtions.

2(i)

a) HBV contains all essential / indispensable amino acids

b) LBV lacks at least one essential / indispensable amino acid

c) foods which are good sources of HBV protein dairy foods e.g. cheese, milk, yoghurt; eggs; fish / seafood; meat; offal; soya / products e.g. tofu

2(ii)

a) functions of proteins: growth; repair; energy; renew cells in the body as they wear out / maintenance; production of antibodies / enzymes / hormones; facilitates transport in the body, e.g. haemoglobin is a transporting protein which carries oxygen;

b) Some proteins have a lower biological value than others as they lack one or more essential amino acids or they are incomplete. They are normally plant source of protein.

c) foods which are good sources of LBV protein: pulses e.g. peas / beans / lentils; legumes e.g. snow peas / long or green beans / French beans; cereals; nuts; gelatine; seeds.

d) carbon, oxygen, hydrogen, nitrogen, phosphorus and Sulphur

e) In the stomach **hydrochloric** acid creates a suitable medium for digestion of protein to begin. There are two enzymes in the stomach. Pepsin converts protein to **peptones/ peptides/ polypeptides** and **renin** clots milk. In the duodenum, the enzyme **trypsin** produced by the **pancreas** continues to convert protein to **peptones/ peptides/ polypeptides**. In the ileum, the enzyme **erepsin** from **intestinal** juice, completes the breakdown of protein to **amino acids**. .

3.a) Saucepans are available in a variety of sizes, for different quantities. Choice will depend on use, budget variety of types. Care and choice of saucepans **choice of saucepans** must suit cooking stove. Thick based saucepans for electric cooker as they retain heat and is well balanced to prevent tipping over. Saucepans should have insulated handles and knobs to prevent burning. Saucepans have well-fitting lids to prevent loss of heat and steam. Base should cover hotplate to prevent waste of heat, more economical. Saucepans with non-stick coating are easier to clean. The enamel outside designed to match kitchen décor. Buy the best saucepans that you can afford with less need to replace frequently. Saucepans with copper bases are good conductor of heat, more efficient with glass cover so that we can see what is

cooking. Stainless steel saucepans are hard wearing and easier to clean. Those made of iron are cheaper and stain. Aluminium saucepans are lightweight and dent when dropped and thus not balanced on stove. Choose a variety of saucepans sizes to suit uses and size of family

Care of saucepans:

Soak to remove burnt on food, wash in hot soapy water which removes grease, dry thoroughly to prevent rusting and to discourage smells and growth of bacteria. Do not stack to prevent scratching. Do not use steel wool or metal spoons on non-stick pans, it removes coating. Store in dry place to prevent rusting

3. b) Disposal of kitchen waste empty bin daily, wash daily, dry thoroughly / in the sun, do not leave water in bin, it attracts mosquitoes. Disinfect regularly and line with plastic bin liner as it is easier to empty and keeps bin cleaner .Wrap all waste and tie bags, pour away liquid, wrap broken glass, clear up spills and mess around bin to prevent attraction of flies / insects. Cover bin tightly to prevent flies / insects, rinse out and flatten tins to remove smell of food and it takes up less space. Recycle paper / glass / aluminium cans if possible. Use peelings for compost. Stand the outside bin on bricks to allow air to circulate underneath. Keep outside bin away from house and away from open windows so flies do not get into the house easily. Do not pour fat down drains, it blocks drains when it hardens. Make sure U-bend contains clean water, disinfect at night. Leave no scraps lying about on benches or floor,

it encourages vermin. Do not allow bin to overflow, it encourages vermin / insects.

4. Non-Starch Polysaccharide / NSP (dietary fibre) absorbs water in colon making faeces soft and bulky and easy to expel regularly. Helps to clear waste and binds food residues, stimulates peristalsis, gives muscles something to grip, prevents constipation, hernias, haemorrhoids, cancer of colon, diverticular disease, varicose veins etc. Helps to remove toxins and reduces cholesterol. Gives feeling of fullness
5. Sources of NSP: green, leafy vegetables – fruit skins – wholegrain cereals – bran – maize – wholemeal bread – wholemeal pasta – brown rice – pulses – nuts – potato skins – dried fruits – oats – oranges – wholemeal flour – celery – tomato seeds etc.
6.

Nutrients in vegetables

LBV protein –	growth, repair, energy –
e.g. pulses peas / beans / lentils –	
HBV protein –	growth, repair, energy –
e.g. soya beans –	
sugar –	energy –
e.g. beetroot, parsnips, onions –	
starch –	energy –
e.g. potatoes, turnips –	
beta-carotene / precursor of vitamin A –	mucous membranes / visual purple / night vision –
e.g. carrots, pumpkin green vegetables –	
vitamin C –	absorption of iron – teeth and gums, prevent scurvy – healthy skin –
e.g. green vegetables, tomatoes, new potatoes –	
vitamin E / antioxidants –	release of energy
vitamin K –	clotting
nicotinic acid –	
e.g. peas, beans	
calcium –	bones and teeth / clotting blood – function of nerves and muscles –
e.g. green, leafy vegetables –	
iron	formation of haemoglobin, – prevent anaemia –
e.g. green, leafy vegetables especially spinach –	
water soluble vitamins –	destruction of through cooking –

Other reasons for including vegetables in the diet: protein content important in vegetarian diets – filling – useful in weight-reducing diets – high water content – refreshing – quick snack – easy to carry – little or no preparation required – good source of NSP – for efficient working of digestive tract – filling if on weight-reducing diet – variety of flavour – variety of colour – variety of texture – can be eaten raw or cooked – many ways of serving – in sweet or savoury dishes – make meals attractive – can be preserved at home – cheap when in season – easily available – quick to prepare and cook – canned vegetables often cheaper than fresh – easily stored at home – used in emergencies – 5 a day guidelines – to adhere to government guidelines / advice

Ways of including vegetables in family meals

soup –	carrot / celery / potato / leek –
as a drink –	carrot juice / tomato juice –
snack –	carrot sticks / celery / green peppers –
main course –	stuffed peppers / butternut squash risotto, – vegetable burgers / cauliflower cheese –
cakes –	carrot –
accompaniments –	tomato sauce / onion gravy –
salads –	coleslaw / mixed leaves –
chutney –	green tomato –
pickles –	pickled onions / beetroot –
decoration –	sliced tomato / cucumber twists –

7a). Digestion in the small intestine:

In the duodenum, trypsin from pancreatic juice converts protein to (peptones)/peptides/polypeptides, bile stored in gall bladder made by liver emulsifies fat, breaks fat into small droplets, increases surface area, lipase converts fats to glycerol and fatty acids, amylase in pancreatic juice converts starch to maltose.

In the ileum erepsin from intestinal juice converts

(peptones)/peptides/polypeptides to amino-acids

lipase completes breakdown of fat to glycerol and fatty acids

maltase converts maltose to glucose

lactase converts lactose to glucose and galactose

sucrase converts sucrose to glucose and fructose

(b) Absorption in the small intestine

Walls of ileum lined thousands of villi finger-like projections

Each villus is surrounded by a wall of single cells/walls of villi are 1 cell thick

Nutrients pass through to reach centre where there is a lacteal connected to the lymphatic system

Lacteal surrounded by blood capillaries connected to larger blood vessels.

Glucose and amino-acids water soluble vitamins and minerals absorbed into blood capillaries dissolve in blood carried around the body

glycerol and fatty acids recombine in cells in wall of ileum, absorbed into lacteal, mix with lymphatic fluid pass around body in lymphatic system and join the blood circulation as insoluble fat which is converted to soluble in the liver, fat-soluble vitamins absorbed with fats and are taken to the liver

8. Root (yam), tuber (potato), fruit (tomato), flower (broccoli), Leafy (spinach)

9a). Dehydration

b) yellow/ dark urine, high temperature, increased heart beat, headache, lethargy /weakness / lack of energy / fatigue / tired, thirst, constipation, dry mouth, dizziness, faint, dry / loose skin, nausea/ vomiting, confusion

c). people who are ill – fluid needs to be replaced due to raised temperature/ sweating;

lactating mothers – water required for production of milk for baby;

manual workers – water lost in perspiration/to keep cool;

athletes / active people – to keep cool/replace water lost in perspiration;

those who live in hot climates – water evaporated from body to keep cool;

those who have lost blood in accidents / surgery – fluid volume replaced;

sufferers from diarrhoea/ vomiting – water loss must be replaced;

sufferers from constipation – process impacted faeces / allow faecal transit;

(select any 2)

d). watermelon, cucumber, oranges, vegetable soup