**Topic D.1: Human Nutrition**

**Essential Idea: A balanced diet is essential to human health.**

**Statements & Objectives:**

**D.1.U1 Essential nutrients cannot be synthesized by the body; therefore they have to be included in the diet.**

Define “essential” as related to dietary nutrients.

**(Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Define “non-essential” as related to dietary nutrients.

**(Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

**D.1.U2 Dietary minerals are essential chemical elements.**

State the difference between a vitamin and a mineral.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

List two example essential minerals.

(**List** Give a sequence of brief answers with no explanation.)

**D.1.U3 Vitamins are chemically diverse carbon compounds that cannot be synthesized by the body.**

Define vitamin.

**(Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Given a molecular diagram of a vitamin, determine if t is hydrophobic or hydrophilic.

(**Determine** Obtain the only possible answer.)

Compare the properties of water soluble and fat-soluble vitamins.

(**Compare** Give an account of the similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.)

List two example water-soluble vitamins and two example fat-soluble vitamins.

(**List** Give a sequence of brief answers with no explanation.)

**D.1.U4 Some fatty acids and some amino acids are essential.**

Outline the concept of “conditionally essential” using amino acid examples.

(**Outline** Give a brief account or summary.)

**D.1.U5 Lack of essential amino acids affects the production of proteins.**

Outline the effect of protein deficiency malnutrition on children and adults.

(**Outline** Give a brief account or summary.)

**D.1.U6 Malnutrition may be caused by a deficiency, imbalance or excess of nutrients in the diet.**

Outline two causes of malnutrition.

(**Outline** Give a brief account or summary.)

**D.1.U7 Appetite is controlled by a centre in the hypothalamus.**

Describe how hormones and the appetite control center regulate a desire to eat.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**D.1.U8 Overweight individuals are more likely to suffer hypertension and type II diabetes.**

Define hypertension.

**(Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Outline the reasons for the relationship between weight gain and hypertension.

(**Outline** Give a brief account or summary.)

Outline the causes of the two type of diabetes mellitus.

(**Outline** Give a brief account or summary.)

List risk factors associated with type II diabetes.

(**List** Give a sequence of brief answers with no explanation.)

State the symptoms of type II diabetes.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

List cardiovascular effects of type II diabetes.

(**List** Give a sequence of brief answers with no explanation.)

**D.1.U9 Starvation can lead to breakdown of body tissue.**

State the cause of starvation.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

Explain loss of muscle mass during starvation.

(**Explain**: Give a detailed account including reasons or causes)

**D.1.A1 Production of ascorbic acid by some mammals, but not others that need a dietary supply.​**

State the function of ascorbic acid, Vitamin C.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

Analyze a cladogram based on the mutations in the GLO gene, used in Vitamin C synthesis.

(**Analyze** Break down in order to bring out the essential elements or structure. To identify parts and

relationships, and to interpret information to reach conclusions)

Outline the cause, symptoms and treatment of scurvy.

(**Outline** Give a brief account or summary.)

**D.1.A2 Cause and treatment of phenylketonuria (PKU).**

Outline the genetic cause of phenylketonuria.

(**Outline** Give a brief account or summary.)

List consequences of phenylketonuria if untreated.

(**List** Give a sequence of brief answers with no explanation.)

State how phenylketonuria is treated.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**D.1.A3 Lack of Vitamin D or calcium can affect bone mineralization and cause rickets or osteomalacia.**

Explain the relationship between vitamin D, calcium, osteomalacia and skin cancer.

(**Explain**: Give a detailed account including reasons or causes)

**D.1.A4 Breakdown of heart muscle due to anorexia.**

List symptoms associated with anorexia nervosa.

(**List** Give a sequence of brief answers with no explanation.)

Outline the effect of anorexia nervosa on heart muscle tissue.

(**Outline** Give a brief account or summary.)

**D.1.A5 Cholesterol in blood as an indicator of the risk of coronary heart disease.**

Outline factors that indicate that dietary cholesterol may not be the exclusive cause of the correlation between blood plasma cholesterol levels and risk of coronary heart disease.

(**Outline** Give a brief account or summary.)

**D.1.S1 Determination of the energy content of food by combustion.**

Explain how a calorimeter can be used to determine the energy content in food.

(**Explain**: Give a detailed account including reasons or causes)

Calculate the energy content of a food sample using calorimetry data.

(**Calculate** Obtain a numerical answer showing the relevant stages in the working.)

**D.1.S2 Use of databases of nutritional content of foods and software to calculate intakes of essential nutrients from a daily diet.**

Use a computer application to keep a record of food consumed in a single day.

Compare tracked food intake to the recommended intake of nutrients.

(**Compare** Give an account of the similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.)

**D.1.NOS Falsification of theories with one theory being superseded by another—scurvy was thought to be specific to humans, because attempts to induce the symptoms in laboratory rats and mice were entirely unsuccessful.**

Based on cladistics, explain why some animals are poor models for the study of scurvy.

(**Explain**: Give a detailed account including reasons or causes)

**Key Terms**

Nutrient

amino acid

diet

fatty acid

mineral

melanoma

essential nutrients

​fat soluble

​diabetes mellitus

​cardiovascular

​osteomalacia

​bone mineralization

vitamin

non-essential

hydrophobic

​amino acids

​malnutrition

​starvation

calcium

​heart disease

iodine

thyroid gland

​thyroxin

scurvy

dietary supplement

food label

rickets

organic molecule

inorganic molecule

hydrophilic

​conditionally essential

ascorbic acid

​calorimeter

cholesterol

balanced diet

deficiency

Kwashiorkor

PKU

blood plasma

omega-6

​water soluble

protein deficiency

​diabetes

vitamin C

​vitamin D

appetite control

​hypothalamus

​hypertension

caladogram

​anorexia nervosa

edema

​wasting

IDD

HDL

​LDL