(a) Carbon, Hydrogen, Oxygen (C,H,O)

(b) Fats are solids at room temperature, oils are liquids at room temperature

(c) Phospholipids have a phosphate group and two fatty acids, Triglycerides do not have a phosphate group and have three fatty acids

(d) Stores energy

(e) Cell membrane

(f) A, D, E or K

(a) Educated guess based on observations

(b) Random selection/ No bias/ Repitition/ Large sample size/ Double-blind testing

(c) Carry out the experiment, gather your data, interpret the results, form a conclusion, compare your conclusion to existing knowledge, publish online

(d) Feeding level or energy level in a food chain

(e) Human error/ Bias/ Extent of knowledge

(a) A: Oesophagus

B: Liver

C: Pancreas

(b) Transports food to the stomach

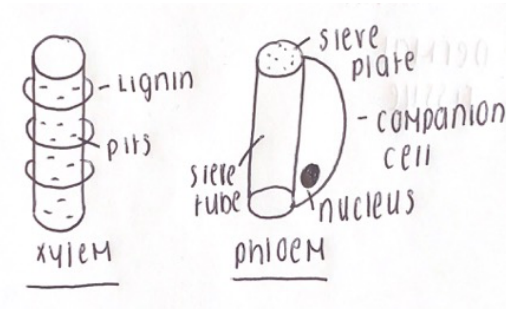
(c) Produces bile/ stores vitamins/ stores minerals

(d) Produces pancreatic juices

(e) Thin walls/ has villi/ long structure

(f) Aids in the digestion process/ competes with pathogens/ responsible for the production of vitamin B and K

(a)



(b) Vascular tissue

(c) Transports water

(d) Transports food

(e) 1: Monocot

2: Scattered vascular bundles

(f) Centre

(a) False

(b) False

(c) True

(d) False

(e) False

(f) True

(g) True

(a) Ectotherm: Animals body temperature varies depending on the environmental temperature

Endotherm: Animals body temperature is consistent

(b) Ligament: Joins bone to bone

Tendon: Joins muscle to bone

(c) Carpal: Bone found in the wrist

Carpel: Female part of the flower

(d) Haploid: One set of chromosomes

Diploid: Two sets of chromosomes

(e) Systole: Heart muscle is contracting

Diastole: Heart muscle is relaxing

(a) Genetic engineering: Artificial alteration or manipulation of a specific gene

(b) X: Cutting

Y: Transformation

Z: Expression

(c)

(i) Plant: Vegatative propagation

(ii) Animal: Disease resistant animals

(iii) Micro-organism: Production of insulin

(a) Coding DNA: Has instructions to produce a specific protein

Non-coding DNA: Has instructions that do not produce a specific protein

(b)

Plant: Onion/kiwi

Method:

1. Chop tissue, with knife, in order to break the cell walls.
2. Blend, if necessary, with blender (for 3 seconds).
3. Add salt (to clump the DNA) and add washing up liquid (to breakdown cell membranes).
4. Heat to 60°C for 15 minutes.
5. Filter solution using coffee filter paper.
6. Add protease (to digest proteins).
7. Add ice-cold ethanol to allow DNA to become visible.

(a)

(i) Enzyme: Biological catalyst

(ii) Pure product or reuseable

(b)

(i) Cell: Yeast or Enzyme: Sucrase

(ii)

1. Mix sodium alginate with water and yeast.
2. Using a syringe, draw the mixture and add droplets into calcium chloride.
3. Allow beads to harden, then rinse beads with water (removes excess free yeast).

(iii)

1. Add immobilized enzymes into separating funnel with sucrose solution (substrate). Test for glucose (product) using glucose test strips.
2. Control: non-immobilised enzymes (free yeast) with the sucrose solution.
3. Results: In the actual experiment, the immobilised enzymes are separated from the product (pure). In the control, the free yeast and product are mixed together (non-pure).

(a)

(i) Dormancy: Period of no growth in seeds

(ii) Gives time for dispersal or allows for survival in adverse conditions

(b)

(i)

1. Soak seeds and sterilise the seeds.
2. Split seeds using a scalpel
3. Place seeds into the starch agar plates and ensure the flat side is faced down on agar.
4. Place in incubator for 4-7 days.
5. Control: use boiled seeds (denatured).

(ii) Iodine solution.
Agar underneath seeds remained clear (no stain): Digestion occurred
Agar underneath control seeds showed positive test result (blue-black stain): No digestion occurred.