BIOLOGY

SUB-COUNTY MOCK MARKING SCHEMES

1. (a) K- Pleural membranes L- Alveolus
M- Intercostal muscles

(b) Has c- shaped cartilage rings that support it preventing it from collapsing and allow free flow of air
- Inner lining has secreting cells that trap fine dust particles and micro- organisms
- Inner lining has hair like structures called cilia that enhance upward movement of the mucus to the larynx

(c) Diffusion

(d) Mycobacterium tuberculosis

2.i) Primary consumer

ii) Primary consumer / Secondary consumers;

a) Green plants → Caterpillars → Small insects → lizard
Decaying leaves → Caterpillars → Small insects → lizard

b) i) Hawks;

ii) At each trophic level energy is lost as heat / respiration; and during decomposition; or lost in defecation/ feces/ waste products of metabolism/ excretion; some parts of the organism are not eaten; (hence less biomass as one moves up the tropic levels.

3.(a) Photosynthesis

(b) Light (energy)
Chlorophyll

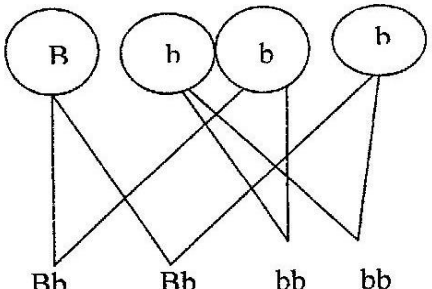
(c) Oxygen – used in respiration, oxidation
Released into the atmosphere
Glucose – used in respiration
Converted to sucrose or starch for storage
Used in formation of sturdiness cellulose cell wall/ cytoplasm

4. (a) Albinism; sickle cell anaemia; Haemophilia; colour blindness

(b) (i) Occurs when chromatids/ chromosomes break at 2 places and when rejoining the Middle piece rotates and joins in an inverted position.

(ii) Occurs when a section of chromatid break off and becomes attached to another chromatid of another chromosome

Parental genotype gametes Bb x bb if other letters are used, penalize at parental genotype



	B	b
b	Bb	bb
b	Bb	bb

$\frac{2}{}$ x 100 = 50%

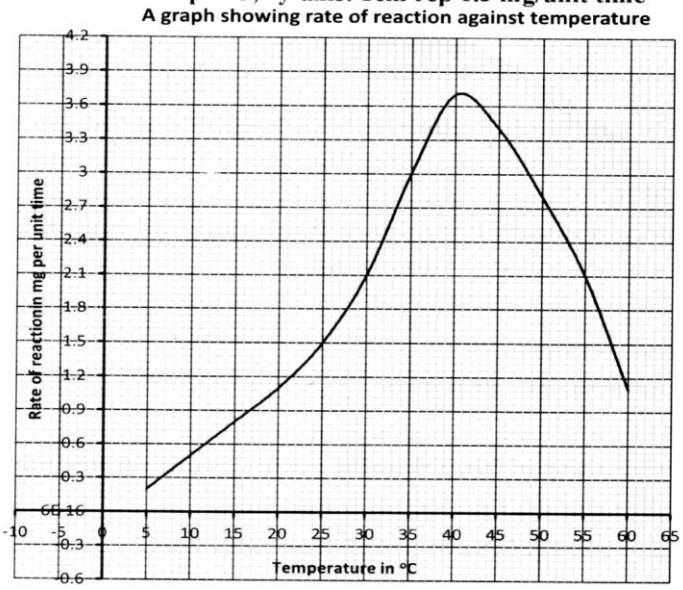
5. (a) K- Root hair
L- Xylem vessel

(b) Water moves from the soil into the root hair by osmosis; because concentration of cell sap is higher than water in the soil; the cell sap in the root hair is diluted, thus making it less concentrated than neighbouring cell; therefore water moves into the neighbouring cell; it is actively secreted into structure L.

(c) Active transport/ diffusion

6.(a)

(a) Scale: x-axis: 1cm rep 5°C, y-axis: 1cm rep 0.3 mg/unit time



Axis =2mks
Scale=2mks ,plotting =1mk,curve=1mk

(b) 33˚C and 51.5 (±0.5˚C)
32.5 – 33.5 AND 51.0 - 52.0)

(c) (i) As temperature is increased, rate of reaction is increased / more products are formed (per unit time), because enzymes become more active.

(ii) As temperatures increase rate of reaction decreases less products are formed (unit per time) because enzymes become denatures, by high temperature

(d) Increase in enzyme concentration and substrate concentration

Rej: increasing number of enzymes
Acc: increasing number of enzymes

(a) (i) Pepsin, rennin/chymosin
(ii) Wall of stomach / gastric glands / oxyntic / pariental / cell, produced hydrochloric acid

(b) (i) Duodenum

(ii) Bile juice /SANS *Acc: any correct salt e.g. NaHCO*
Acc: Bile

Indole acetic acid/IAA/ Auxins

- Promote cell division tropic responses, (accept cell division in cambium)
- Promote formation of absecission layers/ bring abrupt leaf – fall
- Promote fruit formation (parthenocarpy)
- Promotes cell differentiation (of vascular tissue)
- Causes apical dominance/ inhabit growth and development of lateral buds
- Promote growth of adventitious roots (on stems)
- IAA + cytokine induce formation of callus tissue (during healing of wounds)

N.B if this point for cytokines it should be ma

GIBBERELINS (accept GA3)

- Promotes cell division / cell elongation in dwarf varieties
- Parthenocapy/ initiating formation of IAA/ setting of fruits after fertilization
- Formation of side branches (of stems) and dormancy (in buds); inhibit growth of adventitious roots.
- Activates (hydrolytic) enzymes during germination/ promotes germination of seeds/ breaks seed dormancy.
- Affects leaf expansion and shapes / retard leaf absecission

CYTOKININS' Accept any correct example kinetin 8 zeatin

- Breaks dormancy (in some species); promotes flowering in some species
- Promotes cell division (in presence of IAA)
- Stabilizes proteins and chlorophyll
- Promotes root formation
- Low concentration encourages leaf senescence/ high concentration protein increased cell enlargement
- Promotes flowering (in some species)

Ethylene / Ethene / C2114 (reject ethane)

- Stimulate lateral bud development
- Ripening of bananas/ fruits
- Induces thickening of stem/ inhabits stem elongation
- Promotes germination of certain seeds/ acc promotes flowering in pineapples
- Causes abscission pf leaves/ fruits/ leaf fall abscisic acid / ABA
- High concentration of ABA stomata closure (by interfering with uptake of potassium ions
- Inhibits germination/ growth of embryo/ cause seed dormancy
- Causes abscission of leaves/ fruits / leaf fall
- Inhibit elongation growth, inhibit sprouting of bud/ induces dormancy in buds (accept Dormin causes/ dormancy in buds/ seeds

Traumatin

- Heal wounds by callus tissue formation

Florigens

- Promote flowering

8.Evidence of organic evolution in life forms – **Fossil record** (palaentology);

- Fossils are remains of organisms that existed long time ago that have been preserved in plant resins and sedimentary rocks;
- These remains include bones, artfacts and teeth, cellulose cell walls in plants;
- Fossils are important because:-
  i. They show an evidence of the type of organisms that existed long time ago.
  ii. They show gradual change from one form to another over long periods of time.
  iii. They show evolutionary relationship between organisms.
  iv. Fossils have been used to construct evolutionary history of organism's like human beings, horse etc. (6 max 4)

Comparative anatomy;

- It involves comparison of the internal structures of various organisms.
- Those organisms with similar structures are believed to share a common origin. The structure can be grouped into;

i. Homologous structures – these are structures with common embryonic origin but modified within the course of evolution to perform different functions due to adaptation of the organisms to different habitats leading to divergent evolution or adaptive radiation ;examples pentadactyl limbs in vertebrates. Beaks in birds.

ii. Analogous structures; – these are structures with different embryonic origin but have been modified within the course of evolution to perform similar functions due to adaptation and exploitation of the same ecological niche. This type of evolution is called convergent evolution; examples:- wings in birds and wings in insects – Those of birds originate from endoskeleton while those of insects from exoskeleton but they perform same functions of flight. Eye in human being and that of Octopus.

iii. Vestigial organ structures – reduced in size and have become functionless in course of evolution but were functional in ancestral forms e.g. reduced wings in Kiwi bird, Appendix, Coccyx in human beings. (12 max 4)

Comparative embryology;

- Embryology is the study of formation and development of an embryo;
- Embryos of different vertebrate group have been found to have similar morphological features during their early stages of development;
- This suggests a common ancestry;
- The closer the resemblance between embryos in early stages the closer the phylogenetic relationship between organisms; (4 max 2)

Geographical distribution (continental drift);

- It is believed that long time ago all the continents formed one large land mass (single mass)
- The mass later broke and the pieces moved away from each other; forming present day continents in a process called continental drift;
- Closely related organisms were separated and isolated from one another ;leading to evolution and subsequent different species;
- Different species of organisms inhabit different continents;
- Thus although certain climatic conditions are similar in the same latitudes of different continents, their flora and fauna are not identical. Examples:- Monkeys with long tails live in Amazon forest in South America while in African forests there are monkeys with short tails.
- Australia drifted before evolution of placental mammals hence presence of marsupials.
- Isolated oceanic islands evolved their own characteristic plants and animals e.g. Galapagos Islands has both giant Iguana lizards which are terrestrial and marine.(9 max 5)

Comparative serology;

- Analysis of blood proteins and the antigens show phylogenetic relationship
- Species more phylogenetically related contain more similar blood proteins.
- The amount of immunological reaction that form a precipitate can be used to used to show relationship between organisms.
- The greater the amount of precipitate the closer the phylogenetic relation relationship between the animals. (5 max 2)

Cell biology;

- Cells of all organisms show basic similarities in their structure and function
- All these cells contain cell membranes, ribosomes, and Golgi bodies and mitochondria they also have biological chemicals in common e.g. ATP and DNA.
- This strongly indicates that all cell types have a common ancestral origin.
- There are also some differences between plant and animal cells e.g. plant cells contain cellulose cell wall, cell sap, chloroplast, starch, chlorophyll all these features are absent in animal cells.
- In animals blood pigments are of universal occurrence e.g. haemoglobin widely in vertebrate and invertebrate; haemoglycnin in annelids.
- These differences in plants and animals indicate that from the common ancestral stock plants and animals separated and evolved along different lines.(9 max 3)