

Biology - Syllabus First Exams May 2016

Syllabus Statements involving Draw or Annotate

Statement	Guidance
Topic 1 - Cell Biology	
1.2 Drawing of the ultrastructure of prokaryotic cells based on electron micrographs	Drawings of prokaryotic cells should show the cell wall, pili and flagella, and plasma membrane enclosing cytoplasm that contains 70s ribosomes and a nucleoid with naked DNA
1.2 Drawing of the ultrastructure of eukaryotic cells based on electron micrographs	Drawings of eukaryotic cells should show a plasma membrane enclosing cytoplasm that contains 80s ribosomes and a nucleus, mitochondria and other membrane-bound organelles are present in the cytoplasm. Some eukaryotic cells have a cell wall
1.3 Drawing of the fluid mosaic model	Drawings of the fluid mosaic model of membrane structure can be two dimensional rather than three dimensional. Individual phospholipid molecules should be shown using the symbol of a circle with two parallel lines attached. A range of membrane proteins should be shown including glycoproteins
Topic 2 - Molecular Biology	
2.1 Drawing molecular diagrams of glucose, ribose, a saturated fatty acid and a generalized amino acid.	Only the ring forms of D-ribose, alpha-D-glucose and beta-D-glucose are expected in drawings. The variable radical of amino acids can be shown as R
2.4 Drawing molecular diagrams to show the formation of a peptide bond.	
2.6 Drawing simple diagrams of the structure of single nucleotides of DNA and RNA, using circles, pentagons and rectangles to represent phosphates, pentoses and bases	In diagrams of DNA structure, the helical shape does not need to be shown, but the two strands should be shown antiparallel. Adenine should be shown paired with thymine and guanine with cytosine, but the relative lengths of the purine and pyrimidine bases do not need to be recalled, nor the numbers of hydrogen bonds between base pairs
2.9 Drawing an absorption spectrum for chlorophyll and an action spectrum for photosynthesis	

Topic 3 - Genetics

- 3.3 Drawing diagrams to show the stages of meiosis resulting in the formation of four haploid cells

Drawings of the stages of meiosis do not need to include chiasmata.

Topic 4 - Ecology

- 4.3 Construct a diagram of the carbon cycle.

Topic 5 - Evolution and Biodiversity

- 5.3 Construction of dichotomous keys for use in identifying specimens.

Topic 6 - Human Physiology

- 6.1 Production of an annotated diagram of the digestive system.
Identification of tissue layers in transverse sections of the small intestine viewed with a microscope or in a micrograph
- 6.2 Identification of blood vessels as arteries, capillaries or veins from the structure of their walls.
Recognition of the chambers and valves of the heart and the blood vessels connected to it in dissected hearts or in diagrams of heart structure
- 6.4 Students should be able to draw a diagram to show the structure of an alveolus and an adjacent capillary
- 6.6 Annotate diagrams of the male and female reproductive system to show names of structures and their functions

Tissue layers should include longitudinal and circular muscles, mucosa and epithelium

Topic 8 - Metabolism, Cell Respiration, and Photosynthesis

- 8.2 Annotation of a diagram of a mitochondrion to indicate the adaptations to its function
- 8.3 Annotation of a diagram to indicate the adaptations of a chloroplast to its function

Topic 9 - Plant Biology

- 9.1 Drawing the structure of primary xylem vessels in sections of stems based on microscope images

- 9.4 Drawing internal structure of seeds.
Drawing of half-views of animal-pollinated flowers.

Topic 10 - Genetics and Evolution

- 10.1 Drawing diagrams to show chiasmata formed by crossing over.

Diagrams of chiasmata should show sister chromatids still closely aligned, except at the point where crossing over occurred and a chiasma was formed

Topic 11 - Animal Physiology

- 11.2 Annotation of a diagram of the human elbow

Elbow diagram should include cartilage, synovial fluid, joint capsule, named bones and named antagonistic muscles.

Drawing labelled diagrams of the structure of a sarcomere.

Drawing labelled diagrams of the structure of a sarcomere should include Z lines, actin filaments, myosin filaments with heads, and the resultant light and dark bands

- 11.3 Drawing and labelling a diagram of the human kidney.

Annotation of diagrams of the nephron.

The diagram of the nephron should include glomerulus, Bowman's capsule, proximal convoluted tubule, loop of Henle, distal convoluted tubule; the relationship between the nephron and the collecting duct should be included

- 11.4 Annotation of diagrams of seminiferous tubule and ovary to show the stages of gametogenesis.

Annotation of diagrams of mature sperm and egg to indicate functions.

OPTION D - Human Physiology

- D.2 Identification of exocrine gland cells that secrete digestive juices and villus epithelium cells that absorb digested foods from electron micrographs

- D.6 Identification of pneumocytes, capillary endothelium cells and blood cells in light micrographs and electron micrographs of lung tissue