



- Topic:**
- 1 What is the main difference between a prokaryotic and eukaryotic cell?
 - 2 Give an example of a eukaryotic cell.
 - 3 Give an example of a prokaryotic cell.
 - 4 Eukaryotic cells have which sub-cellular structures?
 - 5 What is the function of cell wall?
 - 6 What is the function of mitochondria?
 - 7 What is the function of the nucleus?
 - 8 What is the function of cell membrane?
 - 9 What is the function of the vacuole?
 - 10 What is the function of chloroplasts?
 - 11 What is the function of cytoplasm?
 - 12 What is the approximate size of a prokaryotic cell
 - 13 What is the approximate size of a eukaryotic cell?
 - 14 Which is bigger? A prokaryotic or eukaryotic cell?
 - 15 What is meant by 'micro'?

Types of cells (B.1)

Eukaryotic have their DNA contained within a nucleus
 Animal and plant cells
 Bacteria
 Cell membrane, cytoplasm and genetic material in a nucleus.
 Supports/ Strengthens the cell
 Where respiration takes place
 Controls the activities of the cell
 Controls what enters/exits the cell
 Store sugars and salts
 Absorb light for photosynthesis
 Where chemical reactions of the cell takes place
 0.1-5.0 µm
 10-100µm
 Eukaryotic

1/1,000,000th (1 millionth)

- Topic:**
- 1 Define 'cell differentiation'
 - 2 Define 'cell division'
 - 3 Name 3 specialised cells found in the animals and 3 in plants
 - 4 State the function of a muscle cell
 - 5 State one adaptation of a muscle cell
 - 6 State the function of a sperm cell
 - 7 State three adaptations of a sperm cell
 - 8 State the function of a nerve cell
 - 9 State two adaptations of a nerve cell
 - 10 State the function of a root hair cell
 - 11 State two adaptations of a root hair cell
 - 12 State the function of a xylem cell
 - 13 State two adaptations of a xylem cell
 - 14 State the function of a phloem cell
 - 15 State two adaptations of a phloem cell

Specialised cells (B.2)

A cell becoming specialised to perform a particular function
 The splitting of a cell into two genetically identical daughter cells
 Animals: Muscle cell, nerve cell, sperm cell
 Produce movement
 Lots of mitochondria for releasing energy
 Fertilise the female egg
 *Tail for movement
 Carry information from one part of the body to another
 *Dendrites to connect to other neurones
 Absorb water and minerals from the soil
 *Large surface area
 Carry water from roots to leaves
 *Lignin to strengthen cells
 Transport glucose within a plant
 *less sub-cellular structures

- Topic:**
- 1 How do you calculate the magnification?
 - 2 Which microscope has the highest magnification?
 - 3 Which microscope has the lowest resolution?
 - 4 Which microscope produces 3D images?
 - 5 Which microscope shows colours?
 - 6 Which microscope allows to see inside an object?
 - 7 Which microscope shows black and white images?
 - 8 Which sub-cellular structures can you see with a higher resolution?
 - 9 Define 'tissue'
 - 10 Define 'organ'
 - 11 Define 'organ system'
 - 12 Put into order of size (smallest to largest): cell, organism, nucleus, tissue, organ system, organ
 - 13 What is meant by 'centi'?
 - 14 What is meant by 'milli'
 - 15 What is meant by 'nano'

Microscopy (B.3)

magnification = size of image/size of object
 electron microscopes
 Light microscope
 Scanning and transmission Electron microscope
 Light microscope
 Transmission Electron Microscope
 Scanning and transmission electron microscope
 Mitochondria and ribosomes
 A group of similar specialised cells working together to fulfil a function
 A group of different tissues working together to fulfil a function
 A group of different organs working together to fulfil a function
 nucleus, cell, tissue, organ, organ system, organism
 1/100th (1 hundredth)
 1/1000th (1 thousandth)
 1/1,000,000,000th (1 billionth)

- Topic:**
- 1 Put in order of size (smallest to largest): genes, chromosomes, DNA, cell, nucleus
 - 2 Name the 3 stages of the cell cycle
 - 3 Describe the three things that happen during interphase
 - 4 Describe what happens during mitosis
 - 5 Describe what happens during cytokinesis
 - 6 State why the cell cycle is important
 - 7 State what is produced in the cell cycle
 - 8 Mitosis produces which type of cells?
 - 9 Define 'stem cell'
 - 10 Name 3 places where stem cells can be found in humans
 - 11 State two conditions that stem cells can be used to treat in humans
 - 12 State two uses of stem cells in plants
 - 13 Describe what is meant by 'therapeutic cloning'
 - 14 Which cells are required for therapeutic cloning?
 - 15 State two objections to using stem cells in treatment

Cell division (mitosis) (B.4)

DNA, gene, chromosome, nucleus, cell
 Interphase, Mitosis, Cytokinesis
 1) The cell grows. 2) chromosomes are copied. 3) more mitochondria and ribosomes are made
 Chromosomes pulled to opposite ends of the cell
 Cell membrane and cytoplasm split in two
 More cells are made for growth and repair
 Two genetically identical daughter cells
 Diploid cells
 An undifferentiated cell
 Embryos, adult bone marrow, meristem
 Paralysis and type 1 diabetes
 1) Clone rare species 2) produce disease resistant crops
 Using clones of a patient's own stem cells to treat them
 Egg cell and a normal body cell from patient
 Potential transfer of viral infections and ethical/religious objections

- Topic:**
- 1 Another word for sex cells is...
 - 2 State the 2 gametes in animals
 - 3 State the 2 gametes in flowering plants
 - 4 State the number of parents involved in sexual reproduction
 - 5 State the number of parents involved in asexual reproduction
 - 6 Describe the cells produced from mitosis
 - 7 Describe the cells produced from meiosis
 - 8 What is mitosis used for?
 - 9 What is meiosis used for?
 - 10 Define 'diploid cell'
 - 11 Define 'haploid cell'
 - 12 How many divisions occur in mitosis?
 - 13 How many divisions occur in meiosis?
 - 14 Are haploid or diploid cells produced during mitosis?
 - 15 Are haploid or diploid cells produced during meiosis?

Sexual and asexual reproduction (meiosis) (B.5)

gametes
 Sperm & egg cells
 Pollen & egg cells

2 genetically identical daughter cells
 4 genetically different daughter cells

Growth and repair
 Making gametes
 A cell with a full set of chromosomes
 A cell with half of the number of chromosomes

Diploid
 Haploid

2
1

1
2

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Topic:

- 1 State the name of the genetic material found in the nucleus of a cell
- 2 Describe the structure of DNA
- 3 State the name given to one molecule of DNA
- 4 State the name of a small section of DNA
- 5 What does a gene code for?
- 6 Define the "human genome"
- 7 State 3 reasons for mapping the human genome
- 8 Define "homozygous"
- 9 Define "heterozygous"
- 10 Define "dominant"
- 11 Define "recessive"
- 12 Define "genotype"
- 13 Define "phenotype"
- 14 Is cystic fibrosis caused by a dominant or recessive allele?
- 15 Is Huntington's caused by a dominant or recessive allele?

The DNA code (B.6)

DNA
 Double helix
 Chromosome
 A gene
 A sequence of amino acids which join to form a specific protein
 The sequence of the human DNA
 1) locating disease causing genes 2) treating inherited disorders 3) tracing human migration patterns
 two of same alleles e.g. BB
 Two different alleles e.g. Bb
 always expressed
 Expressed only with 2 of this allele present
 The 2 alleles present e.g. Bb
 The characteristic expressed e.g. brown eyes
 Recessive
 Dominant

Topic:

- 1 How do bacterial cells multiply?
- 2 How do you calculate the number of bacteria in a culture?
- 3 What equipment is required to grow a culture of bacteria?
- 4 Why is the inoculating loop passed through a flame?
- 5 What is used to dispose of the used agar plate?
- 6 How do we calculate the size of a clear zone?
- 7 How can you decide by looking at the clear zone which is the best antibiotic/antiseptic
- 8 Why is it important to only allow the culture to grow for a few days?
- 9 How frequently do bacteria (on average) multiply?
- 10 What is needed for bacteria to be able to multiply?
- 11 Why must the petri dish be sterilised before use?
- 12 Why is the lid of the petri dish sealed with tape?
- 13 Why are spaces left in the adhesive tape?
- 14 What temperature is the bacteria cultured at?
- 15 Why is the petri dish stored upside down?

Investigating bacterial cells (separate only) (B.37)

Binary fission
 2 to the power of the number of divisions
 Agar gel, petri dish, inoculating loop, bacteria sample, disinfectant
 To sterilise it (kill any other bacteria)
 Place it into an autoclave
 Area = πr^2
 It has the biggest clear zone

Every 20 minutes
 Enough nutrients and suitable temperature
 To prevent contamination
 To prevent contamination
 To allow oxygen in to the petri dish
 25°C
 To prevent condensation from dripping onto culture

Topic:

- 1 Name 4 methods of cloning
- 2 Which methods of cloning tend to take place in animals?
- 3 Which methods of cloning tend to take place in plants
- 4 Which type of cloning is old and commonly carried out at home by gardeners
- 5 Define "clone"
- 6 Describe step one of "tissue culture"
- 7 Describe step two of "tissue culture"
- 8 Describe step three of "tissue culture"
- 9 Describe step four of "tissue culture"
- 10 Describe the process of "embryo transplant"
- 11 Describe the process of taking "cuttings"
- 12 Step 1 of "adult cell cloning"
- 13 Step 2 of "adult cell cloning"
- 14 Step 3 of "adult cell cloning"
- 15 Step 4 of "adult cell cloning"

Methods of cloning (separate only) (B.38)

Tissue culture, cuttings, embryo transplant, adult cell
 Embryo transplant and adult cell
 Cuttings and tissue culture
 Cuttings
 A genetically identify offspring
 1) Remove a small group of cells from a plant
 2) place on agar with nutrients & auxin,
 3) grow into plantlets
 4) plant in compost
 Splitting an embryo and implanting into multiple surrogates
 1) remove part of parent plant, 2) place in compost
 1) Remove nucleus from unfertilised egg
 2) insert nucleus of adult body cell into empty egg
 3) give egg cell electric shock (to make it divide into embryo)
 4) place embryo into a womb

Topic:

- 1 What is the aim of the investigation?
- 2 What type of microscope is used to view the cells?
- 3 What type of tissue is used?
- 4 How is the slide prepared?
- 5 What do we need to ensure is not present on the slide?
- 6 Why is iodine used to prepare the slides?
- 7 Which magnification is used to first view the cells?
- 8 How do you first find the cells under the microscope?
- 9 How do you see the cell in more detail?
- 10 Which sub-cellular structures should you be able to identify?
- 11 Which structures cannot be seen with a light microscope?
- 12 What type of microscope would you need to use to improve the resolution of the image?
- 13 What is the formula to calculate the magnification?
- 14 How do you rearrange the formula to find the size of the real object?
- 15 How do you convert from mm to μm ?

RP: Microscopy (B1) (B.41)

To investigate and view the sub-cellular structures of plant and animal cells using a microscope.
 Light microscope
 A thin layer of onion skin
 1) Cut up the onion skin to glass slide
 2) Thin layer of onion skin placed onto glass slide
 3) Drop of iodine added onto the onion skin
 Air bubbles
 To dye the sub-cellular structures and make them easier to see
 $\times 10$
 By turning the coarse-focusing wheel
 By turning the fine-focusing wheel
 nucleus, cell wall, vacuole, cell membrane and cytoplasm
 ribosomes, mitochondria
 electron microscope
 magnification = size of image / size of real object
 size of real object = size of image / magnification
 \times by 1000

Topic:

- 1 What is the independent variable?
- 2 What is the dependent variable?
- 3 Name 5 control variables
- 4 Why is the equipment sterilised before use?
- 5 What is the purpose of the nutrient agar?
- 6 Why must the lid of the petri dish be secured using masking tape?
- 7 Why must the lid not be completely sealed?
- 8 Why is the petri dish placed upside down?
- 9 Why is the petri dish incubated at a maximum temperature of 25°C?
- 10 How is the petri dish and bacteria destroyed once the investigation is complete?
- 11 How is the area of the clear zone calculated?
- 12 Which is the most effective antibiotic?
- 13 Why is there a clear zone around the discs?
- 14 Why should one disc be soaked in distilled water?
- 15 What is a possible variation on this method?

RP: Microbiology (B2) (separate only) (B.42)

The type of antibiotic/antiseptic
 Area of "zone of inhibition"/"clear zone"
 1) Size of initial antibiotic disk
 To prevent contamination of unwanted bacteria
 To provide nutrients so that bacteria can grow.
 To stop bacteria from the air growing on the culture medium.
 To allow oxygen in for respiration and growth..
 To stop condensation falling on the agar and bacteria.
 To prevent the growth of pathogens/bacteria that might be harmful to humans.
 Using an autoclave
 area = πr^2
 The one with the largest clear zone
 The antibiotic has destroyed the bacteria in these zones
 As a control to compare the results with.
 1) Investigate the effect of disinfectant sprays

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