
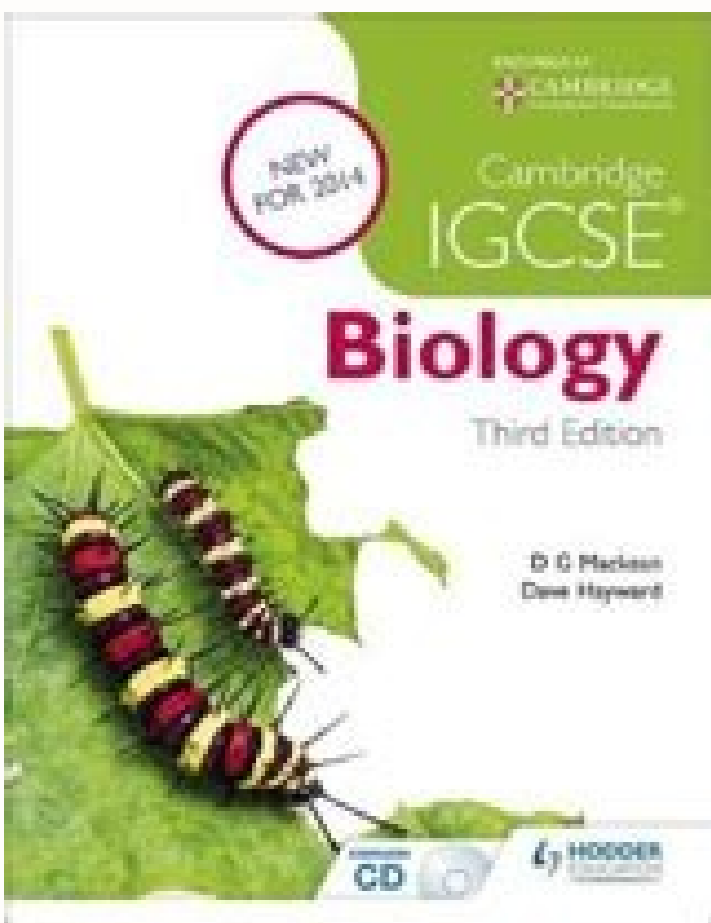


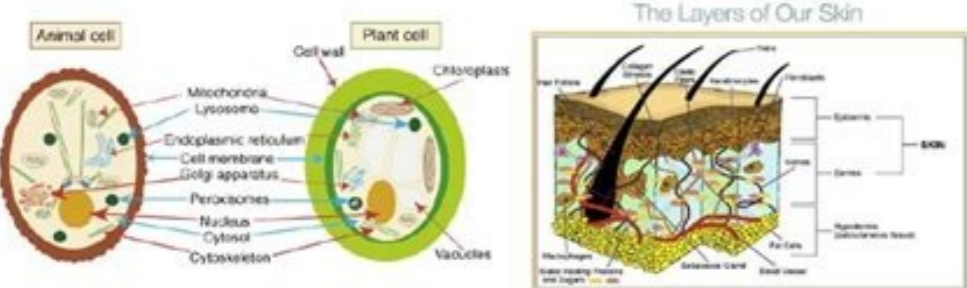
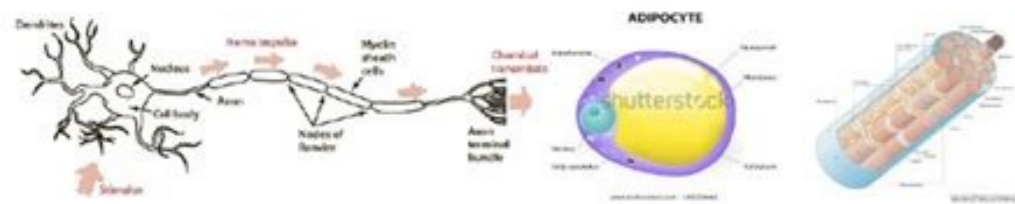
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Biology Notes 2016

Cell Structure



Cell Theory

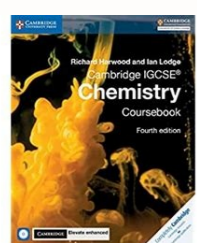
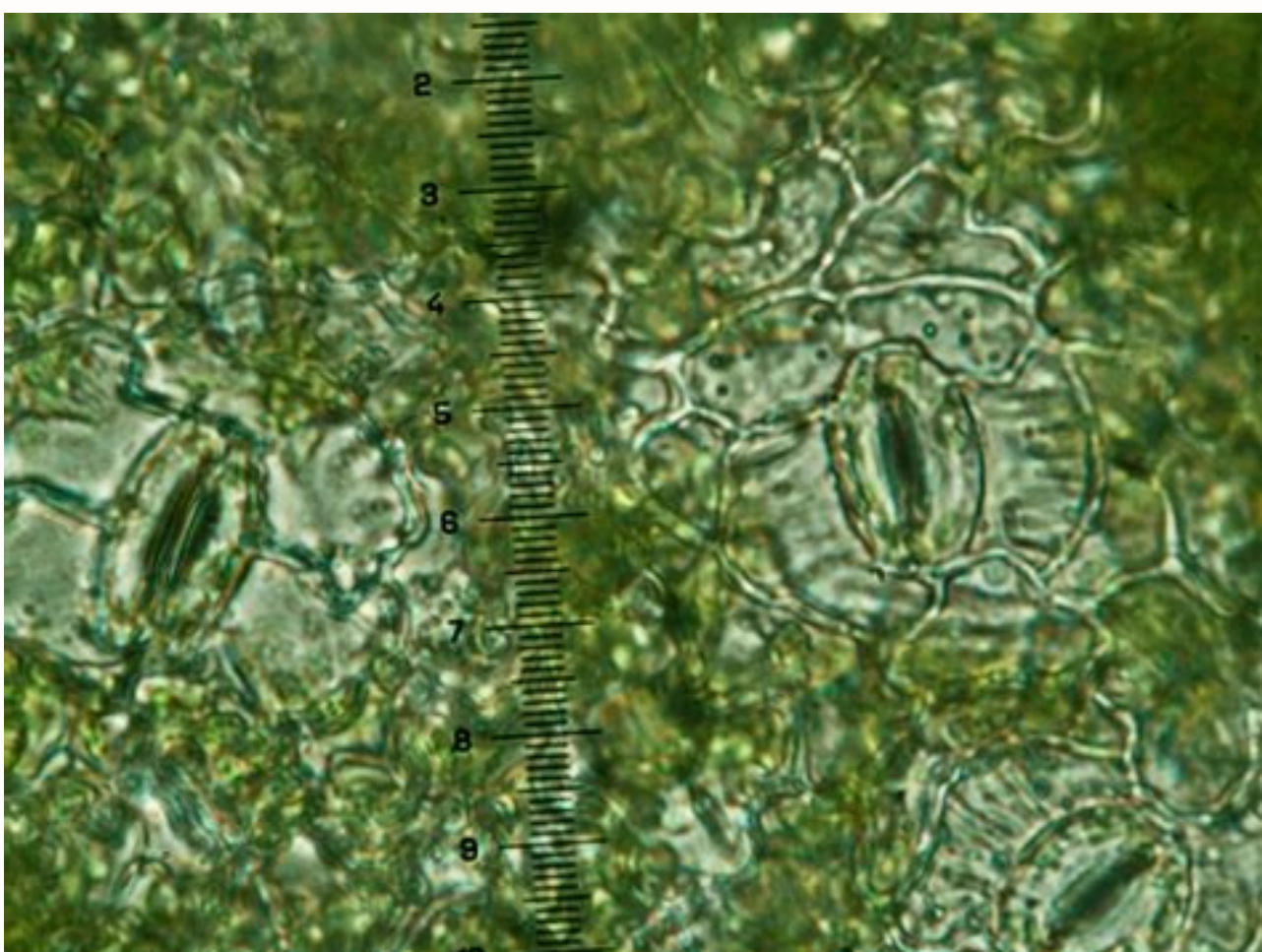
- Cell theory tells us three important things about cells.
- 1) All living things are made up of cells.
 - 2) A cell is the smallest unit in a living thing.
 - 3) All cells come from other cells.
- also includes
1. Energy flow occurs within cells.
 2. Hereditary information (DNA) is passed on from cell to cell.
 3. All cells have the same basic chemical composition.

What are Chromosomes

- Each species has a fixed number of chromosomes
- e.g Humans have 23 pairs of chromosomes
- Sperm cells have 23 chromosomes and egg cells have 23 chromosomes
- Somatic body cells are described as diploid because they have 2 sets of chromosomes (46)
- Gametes (sex cells) are described as haploid because they only have one set (23) of chromosomes.

Karyotypes

Chromosomes can be organised into a karyotype which is a map showing the chromosomes in matching pairs (homologous pairs) in order of size form



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Water is allowed to rise up columns of sand of different particle size and the height is measured. Nitrates are washed out of a soil sample and are shown to reappear after a few days, using diphenylamine sulphate as a nitrate indicator. Air from a can of soil is dislodged under water. Iodine solution reveals clear areas of starch-agar under the fruit 6.01 Starch-digesting enzymes in maize 6.02 Discussion 6.03 Discussion - answers 6.04 Enzymes in maize fruits - preparation All zipped Back to top The inability of air from germinating seeds to support combustion 1.01 Oxygen uptake 1.02 Discussion 1.03 Discussion - answers 1.04 Oxygen uptake - preparation All zipped 2 Carbon dioxide output The gas from germinating seeds turns lime-water milky 2.01 Carbon dioxide output 2.02 Discussion 2.03 Discussion - answers 2.04 Carbon dioxide output - preparation All zipped 3 Exhaled air (1) The last fraction of exhaled air will not support combustion 3.01 Exhaled air (1) 3.02 Discussion 3.03 Discussion - answers 3.04 Exhaled air (1) - preparation All zipped 4 Exhaled air (2) Atmospheric air and exhaled air are bubbled simultaneously through lime-water 4.01 Exhaled air (2) 4.02 Discussion 4.03 Discussion - answers 4.04 Exhaled air (2) - preparation All zipped 5 Respiration in living organisms A manometer reveals uptake of oxygen by germinating seeds Introduction to experiments on respiration 5.01 Respiration in living organisms 5.02 Discussion 5.03 Discussion - answers 5.04 Respiration in living organisms - preparation All zipped 6 Anaerobic respiration The gas produced by a yeast suspension from which air is excluded turns lime-water milky 6.01 Anaerobic respiration 6.02 Discussion 6.03 Discussion - answers 6.04 Anaerobic respiration - preparation All zipped 7 Energy release during respiration Germinating wheat is packed into vacuum flasks to see if there is any rise in temperature over a few days 7.01 Energy release in respiration 7.02 Discussion 7.03 Discussion - answers 7.04 Energy release in respiration - preparation All zipped 8 Changes in mass during germination Wheat is germinated for about two weeks. 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A control with plain lanolin is included 14.01 IAA on maize coleoptiles 14.02 Discussion answers and preparation All zipped 15 The effect of light on shoots Pea seedlings are grown for a week in light or darkness and their shoots compared 15.01 Effect of light on shoots 15.02 Discussion answers and preparation 15.03 Illustrations All zipped 16 Respiratory activity in maize seedlings Maize grains and seedlings are immersed in tetrazolium chloride solution for 30 minutes 16.01 Respiratory activity in maize 16.02 Discussion answers and preparation All zipped Back to top Soil These experiments are available as a PDF booklet which can be opened or downloaded here: Soil Experiments The experiments included are as follows: 1 To find the percentage of water in a sample of soil. 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The coarse sand and fine sand are allowed to settle and are dried and weighed. One of them contains a plant 14.01 Measuring the transpiration rate of an uprooted plant 14.02 Measuring the transpiration rate of an uprooted plant - preparation All zipped Back to top Germination and tropisms Introduction Resources list Germination times - peas and wheat Germination times - sunflower and maize Germination times - French bean All zipped 1 The need for oxygen Cress seeds are sown on moist cotton wool in 2 flasks one of which contains pyrogallic acid and sodium hydroxide 1.01 Need for oxygen 1.02 Discussion 1.03 Discussion - answers 1.04 Need for oxygen - preparation All zipped 2 Effect of temperature Maize fruits are germinated in moist blotting paper at different temperatures 2.01 Effect of temperature 2.02 Discussion 2.03 Discussion - answers 2.04 Effect of temperature - preparation All zipped 3 The need for water Seeds are left in moist, dry and waterlogged conditions for a week 3.01 Need for water 3.02 Discussion answers and preparation All zipped 4 The role of cotyledons Runner bean embryos attached to varying amounts of cotyledon are germinated on moist blotting paper in jars 4.01 Role of cotyledons 4.02 Discussion 4.03 Discussion - answers 4.04 Role of cotyledons - preparation All zipped 5 Use of food reserves in germination Coleoptiles and endosperm of cereal seedlings and grains are tested for starch and sugar 5.01 Use of food reserves 5.02 Discussion 5.03 Discussion - answers 5.04 Use of food reserves - preparation All zipped 6 Geotropism in radicles Pea seedlings are pinned to a clinostat, or a stationary base, with their radicles horizontal 6.01 Geotropism in radicles 6.02 Discussion 6.03 Discussion - answers 6.04 Geotropism in radicles - preparation All zipped 7 The region of growth and response in radicles Radicles are marked with equidistant lines and left horizontally or vertically for two days 7.01 Region of growth and response in radicles 7.02 Discussion 7.03 Discussion - answers 7.04 Region of growth and response in radicles - preparation All zipped 8 Region of detection and response to one-sided gravity in radicles Different lengths of root tip are excised to see if the radicles still grow and respond to gravity 8.01 Detection of unilateral gravity 8.02 Discussion 8.03 Discussion - answers 8.04 Detection of unilateral gravity - preparation All zipped 9 The effect of one-sided lighting on shoots Hypocotyls of sunflower seedlings are marked and illuminated from one side 9.01 One-sided lighting on shoots 9.02 Discussion 9.03 Discussion - answers 9.04 One-sided lighting on shoots - preparation All zipped 10 The effect of one-sided lighting on cress seedlings Cress seedlings, some of which are decapitated, are illuminated from the side or from above 10.01 One-sided lighting on cress 10.02 Discussion 10.03 Discussion - answers 10.04 One-sided lighting on cress - preparation All zipped 11 The region of detection and response to one-sided lighting in coleoptiles Coleoptiles of wheat seedlings, some covered by foil caps, some decapitated, are illuminated from the side 11.01 Region of detection and response 11.02 Discussion 11.03 Discussion - answers 11.04 Region of detection and response - preparation All zipped 12 Effect of indoleacetic acid on coleoptiles Indoleacetic acid in lanolin is applied to intact coleoptiles. 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Crumb structure is shown to be important. The volume of water passing through equal depths of topsoil of varying grades is measured. Acidity or alkalinity of soil samples is compared, using BDH soil indicator. The tubes are illuminated or darkened 7.01 Gaseous exchange in leaves 7.02 Discussion 7.03 Discussion - answers 7.04 Gaseous exchange in leaves - preparation All zipped 8 Gaseous exchange in pond-weed Leaves are enclosed in test-tubes containing hydrogencarbonate indicator. Download: Soil Experiments Back to top These are then examined and counted under the microscope. 12 The mineral composition of the soil. 4 A comparison of the permeability to water of different samples of soil. Water is poured through equal volumes of peat and sand. 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Air bubbles show the continuity of the vessels 12.01 Conducting pathways in the shoot 12.02 Discussion 12.03 Discussion - answers 12.04 Conducting pathways in the shoot - preparation All zipped 13 Measuring the transpiration rate of a potted plant Two potted plants, one in sunlight and one in shadow are weighed at intervals 13.01 Measuring the transpiration rate of a potted plant 13.02 Measuring the transpiration rate of a potted plant - preparation All zipped 14 Measuring the transpiration rate of an uprooted plant Two flasks of water are weighed at intervals. Soil is shaken with a clay-dispersing solution.

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