

<u>GCSE AQA</u> Biology core knowledge

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Bold questions and answers including B12 are for separate science only.

Alderman Peel High School

B1 Cell structure and transport

Question	Answer
1. How much can a light microscope magnify by?	X2000
2. How much can an electron microscope magnify by?	X2,000,000
3. What is resolving power?	How much detail an image has
4. What resolving power can a light microscope have?	200nm
5. What resolving power can an electron microscope have?	0.2nm
6. How do you calculate magnification?	Magnification = <u>size of image</u> size of real object
7. What features do animal cells contain?	A nucleus, cytoplasm, cell membrane, mitochondria, ribosomes
8. What do ALL plant and algae cells contain along with the features of an animal cell?	A cellulose cell wall
9. What do all plant cells contain that animal cells do not?	Chloroplasts and a permanent vacuole
10. What is the function of the nucleus?	To control the activity of the cell and to contain all the genetic material (DNA)
11. What is the function of the cytoplasm?	Where a lot of chemical reactions take place
12. What is the function of the cell membrane?	To control what substances move in and out of the cell
13. What is the function of the mitochondria?	The site of aerobic respiration
14. What is the function of the ribosomes?	Where proteins are made (protein synthesis)
15. What is the function of the cell wall?	To provide strength and support
16. What is the function of the chloroplasts?	They contain chlorophyll which absorbs light for photosynthesis
17. What is the function of the permanent vacuole?	To store cell sap and keeps the cell rigid
18. What do all eukaryotic cells have?	A nucleus containing genetic material
19. What do prokaryotic cells have?	Genetic material loose in the cell with no nucleus
20. Are bacteria eukaryotes or prokaryotes?	Prokaryotes

B1 Cell structure and transport

Question	Answer
21. Which are larger? Eukaryotic cells or prokaryotic cells	Eukaryotic cells
22. What is cell differentiation?	When cells undergo change to become specisalised
23. What cell is specialised to carry electrical impulses?	Nerve cells
24. How is it specialised?	They have lots of dendrites to connect to other cells and a long axon with synapses at the end to pass messages on
25. Define diffusion	Diffusion is the spreading out of substances from an area of high concentration to an area of low concentration, down a concentration gradient
26. What can affect the rate of diffusion?	Temperature, concentration difference, surface area and distance to travel
27. Where does diffusion occur?	Gases in the lungs to the blood in the alveoli, gases in leaves, glucose into cells, urea out of cells
28. What is osmosis?	The movement of water from a dilute solution to a concentrated solution through a partially permeable membrane
29. What does isotonic mean?	A solution that contains the same concentration as the cell contents
30. What does hypotonic mean?	A solution that is less concentrated than the cell contents
31. What does hypertonic mean?	A solution that is more concentrated than the cell contents
32. What is active transport?	Active transport is where substances move from a more dilute solution to a more concentrated solution, against the concentration gradient
33. Where does active transport occur?	Getting mineral ions into root hair cells and moving glucose from the intestine into your blood

B2 Cell division

Question	Answer
1. Where are chromosomes found?	In the nucleus of cells
2. How are chromosomes arranged?	In pairs
3. How many chromosomes do humans have in their body cells?	46 (23 pairs)
4. What happens in the first stage of the cell cycle?	The cell grows, DNA is replicated and new subcellular structures are made
5. What happens in the third stage of the cell cycle?	The replicated chromosomes line up in the middle of the cell and are pulled to opposite sides of the cell and the nucleus divides
6. What are the two new cells made in cell division called?	Daughter cells
7. What is cell division by mitosis used for?	Growth, repair of tissues and development of multicellular organisms
8. Where does mitosis happen in a plant?	In the meristems
9. What is a stem cell?	A cell that can differentiate into any type of cell
10. How are adult stem cells different?	They can only differentiate into a few types of cell
11. When do most animal cells differentiate?	During early development as an embryo or foetus
12. When can most plant cells differentiate?	Throughout their lives
13. Why is cloning in plants easy?	Their cells can differentiate into different types of cells throughout their life
14. What do we call the cell formed when an egg and sperm cell fuse?	A zygote
15. How can stem cells be used in medicine?	To replace damaged cells
16. What conditions could be helped using stem cells?	Paralysis and diabetes
17. Why is cloning plants useful?	You can produce large numbers of rare or desirable plants reliably and safely for use in research or horticultural industry

B2 Cell division

Question	Answer
18. What are the risks with using stem cell therapy?	They could cause cancer through rapid growth, they could carry viruses or they could be rejected from the body
19. Why are some people against the use of stem cell therapy?	Too much money is being spent on it, or they object to the use of embryos for ethical or religious reasons

B3 Organisation and the digestive system

Question	Answer
1. Define a tissue	A group of similar cells working together
2. Define an organ	A collection of tissues working together to perform a specific function
3. Define an organ system	A group of organs working together to perform a specific function
4. Define an organism	A group of organ systems working together to perform a specific function
5. What is the purpose of the digestive system?	To break down large insoluble molecules into small soluble molecules that can be absorbed by the body
6. Where is saliva produced?	In the salivary glands
7. Where are soluble food molecules absorbed into the body?	In the small intestine
8. Where is water absorbed into the body?	In the large intestine
9. How is food moved along the digestive system?	It is lined with muscle which push the food along in a process called peristalsis
10. Where is bile produced?	In the liver
11. Where is bile stored?	In the gall bladder
12. What is the function of bile?	To emulsify lipids and neutralize stomach acid
13. What digestive chemicals are produced by the pancreas?	Enzymes
14. What are carbohydrates broken down into?	Simple sugars
15. What are lipids broken down into?	Fatty acids and glycerol
16. What are proteins broken down into?	Amino acids
17. What is the chemical test for starch?	Iodine which turns blue/black
18. What is the chemical test for sugar?	Benedicts solution which turns red when heated in the presence of sugar
19. What is the chemical test for protein?	Turns biuret solution from blue to purple

B3 Organisation and the digestive system

Question	Answer
20. What is the chemical test for lipids?	Ethanol will go cloudy when shaken
21. What is an enzyme?	A protein that acts as a biological catalyst
22. How does an enzyme work?	A substrate binds to the active site of the enzyme
23. Why are enzymes specific to certain reactions?	The active site is a specific shape
24. What reactions do enzymes work on?	Metabolic reactions
25. What is metabolism?	The sum of all biological reactions in the body
26. Why do high temperatures stop enzymes working?	The active site changes shape and becomes "denatured"
27. What substance does the enzyme amylase work on?	Starch
28. Where is amylase produced?	In the salivary glands

B4 Organising animals and plants

Question	Answer
1. What are the parts of circulatory system?	Blood, blood vessels and the heart
2. What are the components of blood?	Plasma, red blood cells, white blood cells and platelets
3. What is transported in the plasma?	Waste carbon dioxide, urea and soluble products of digestion
4. How are red blood cells adapted for their function?	They have a biconcave shape to increase surface area, they contain haemoglobin and have no nucleus.
5. What is the role of the white blood cells?	To protect against infections
6. What is the function of the platelets?	To form clots at wound sites
7. What are the three types of blood vessel?	Arteries, veins and capillaries
8. Where do arteries carry blood?	Away from the heart
9. Where do veins carry blood?	Towards the heart
10. Where do capillaries carry blood?	In between arteries and veins to deliver and collect substances from cells and tissues
11. What is the structure of an artery?	Small lumen, thick muscular walls
12. What is the structure of a vein?	Large lumen, thin walls and valves to prevent backflow
13. What is the structure of a capillary?	Very narrow lumen and very thin walls (one cell thick)
14. Why do capillaries have thin walls?	To allow substances to move in and out easily
15. Why are human circulatory systems called a double circulatory system?	It pumps blood twice, once to the heart and once around the body
16. Which blood vessel takes deoxygenated blood from the body to the heart?	Vena cava
17. Which blood vessel takes deoxygenated blood away from the heart?	Pulmonary artery
18. Which blood vessel takes oxygenated blood from the lungs to the heart?	Pulmonary vein

B4 Organising animals and plants

Question	Answer
19. Which blood vessel takes oxygenated blood from the heart to the body	Aorta
20. Which chamber of the heart receives blood from the body?	Right atrium
21. Which chamber of the heart pumps blood to the lungs?	Right ventricle
22. Which chamber of the heart receives blood from the lungs?	Left atrium
23. Which chamber of the heart pumps blood to the body?	Left ventricle
24. What structure in the heart stops blood flowing the wrong way?	Valves
25. What blood vessel provides the heart muscle with blood?	Coronary arteries
26. How can we help treat damaged heart valves?	Replace damaged heart valves using biological or mechanical heart valves
27. Where is the natural pace maker found?	By a group of cells found in the right atrium
28. Why would you use an artificial pacemaker?	To help correct irregular heartbeat rhythm
29. Where does gas exchange occur?	In the alveoli in the lungs where oxygen enters the blood as carbon dioxide exits the blood
30. What are the names of the tissues in the leaf?	Upper and lower epidermis, palisade mesophyll, spongy mesophyll
31. Name the organs of a plant	Roots, stem and leaves
32. What cells surround stomata?	Guard cells

B5 Communicable disease

Question	Answer
1. Define health	A state of physical and mental wellbeing?
2. What is a communicable disease?	A disease caused by a micro organism that can be passed from person to person
3. What is a pathogen?	A micro organism that causes disease
4. What are the names of the pathogens?	Virus, bacteria, fungi and protists
5. What factors can affect our health?	Diet, stress and life situations
6. What is the main cause of allergies?	Over active immune response
7. How do bacteria make us ill?	They reproduce rapidly in our bodies and produce toxins that damage our tissues
8. How do viruses make us ill?	They reproduce inside our cells which causes them damage
9. What ways can viruses be spread?	Air (droplets), contact and water
10. How can bacteria be grown in the lab?	In sterile conditions using an inoculating loop and agar gel in a petri dish
11. Why should bacteria be incubated at a maximum of 25°C in schools?	To reduce the chance of dangerous bacteria growing
12. How do bacteria reproduce?	Binary fission
13. How fast can bacteria reproduce?	Up to once every 20 minutes
14. How can the spread of disease be prevented?	Simple hygiene, destroying vectors, isolation of infected individuals and vaccination
15. What type of pathogen causes measles?	Virus
16. What are the symptoms of measles?	Fever and rash, can be fatal
17. How is measles spread?	Air droplets
18. How is measles prevented?	Vaccination
19. What type of pathogen causes HIV/AIDS?	Virus
20. What are the symptoms of HIV/AIDS?	Flu like symptoms initially followed by damage to the immune system which causes other illnesses

B5 Communicable disease

Question	Answer
21. What is the treatment for HIV/AIDS?	Antiretroviral drugs
22. What pathogen causes TMV?	Virus
23. What are the symptoms of TMV?	Mosaic colour of discolouration on the leaf which negatively affects photosynthesis
24. How is TMV spread?	Contact and by vectors
25. How is TMV treated?	Good hygiene, pest control and removal and destruction of infected leaves
26. What pathogen causes salmonella and gonorrhea?	Bacteria
27. What does STD stand for?	Sexually transmitted disease
28. What are the symptoms of salmonella?	Fever, abdominal cramps, diarrhoea and vomiting.
29. What are the symptoms of gonorrhea?	Discharge from penis/vagina, pain from urination
30. What pathogen causes rose black spot?	Fungus
31. What are symptoms of rose black spot?	Leaves turn yellow and drop early, lack of growth and reduced flowers
32. What pathogen causes malaria?	Parasitic protists
33. How is malaria spread?	By the bite of female mosquitos which act as vectors
34. How does your body prevent entry to pathogens?	 Skin Hair in your nose, trachea and bronchi Stomach acid
35. How do white blood cells help defend you against pathogens?	 Engulfing pathogens (phagocytosis) Producing antibodies Producing antitoxins
36. What is chlorosis?	Yellowing of leaves in a plant due to lack of magnesium ions
37. What does a nitrate deficiency in plants cause?	Stunted growth
38. Name some physical and chemical plant defences	 Cellulose cell walls, tough waxy cuticles, bark Antibacterial chemicals, poisons

B6 Preventing and treating disease

Question	Answer
1. What system tries to destroy pathogens if they get into the body?	The immune system
2. What is contained within a vaccine?	Small quantities of dead or inactive forms of a pathogen
3. How does a vaccine work?	It stimulates white blood cells to produce antibodies for a specific pathogen so that if an active form enters the body, antibodies are produced quickly to prevent illness
4. What is herd immunity?	When a large enough proportion of the population are immune to a disease to reduce the spread
5. What do painkillers do?	Relieve symptoms of a disease
6. What do antibiotics do?	Kill bacterial pathogens
7. What was the name of the first antibiotic?	Penicillin
8. Why can antibiotics not be used to treat viral infections?	They do not kill viruses, just bacteria
9. Why is it difficult to develop drugs to destroy viruses?	Because they live inside your body cells, so drugs would also damage your cells
10. Why do antibiotics not work on some bacteria?	Some antibiotic resistant strains have evolved
11. What plant is the drug digitalis extracted from?	Foxglove
12. What is digitalis used to treat?	Heart conditions/problems
13. What plant is the drug aspirin originally from?	Willow tree bark
14. What does aspirin help treat?	Pain
15. Where is penicillin from?	Penicillium mould
16. How are new drugs made?	They are synthesized by scientists
17. What are all new drugs tested for in clinical trials?	Toxicity, efficacy and dose
18. How are drugs tested before being tested on humans?	In the lab using cells, tissues and animals

B6 Preventing and treating disease

Question	Answer
19. What is a double blind trial?	A test where neither the patient nor the doctor know who is given the drug or the placebo to avoid bias results
20. What is a placebo?	A dummy/fake drug that does not contain the drug being tested
21. Why are placebos used?	As a control
22. How is a hybridoma produced?	Combining a mouse lymphocyte with a tumour cell
23. How are hybridomas used to make monoclonal antibodies?	Stimulating the mouse lymphocyte to produce a specific antibody and then the tumour cell produces these in large numbers
24. How do monoclonal antibodies help in pregnancy tests?	They are used to detect the hormone HCG which is made in the early stages of pregnancy
25. What are monoclonal antibodies used for?	The treatment of disease including cancer

B7 Non-communicable disease

Question	Answer
1. Define a non communicable disease	A disease that cannot be passed from one person to another
2. What is a risk factor?	Something linked to an increased rate of disease
3. What are the two types of risk factor?	Aspects of lifestyle and substance present in a persons body or environment
4. What is alcohol a risk factor for?	Issues with liver and brain function
5. What is smoking a risk factor for?	Lung cancer and lung disease
6. What are smoking and alcohol both risk factors for?	Issues with unborn babies
7. What are diet, smoking and lack of exercise all risk factors for?	Cardiovascular disease
8. What is obesity a risk factor for?	Type 2 diabetes
9. What is a carcinogen?	Something that is a risk factor for causing cancer
10. What is a tumour?	Cells dividing in an uncontrollable way
11. What is a benign tumour?	When abnormal cell growth is restricted to one place
12. What is a malignant tumour?	Undifferentiated and uncontrolled growth cells that can spread to other parts of the body to cause secondary tumours
13. How can cancer be treated?	Radiotherapy, chemotherapy and surgery
14. What can increase the chance of getting cancer?	Ionising radiation, viruses, carcinogens and genetics

B8 Photosynthesis

Question	Answer
1. What is the word equation for photosynthesis?	Water + carbon dioxide → glucose + oxygen
2. What chemicals can be made using the glucose from photosynthesis?	Starch, cellulose, protein, fats
3. Where in a cell does photosynthesis occur?	In the chloroplasts
4. What chemical in a plant absorbs light?	Chlorophyll
5. How are leaves adapted for photosynthesis?	They are thin, broad, have air spaces, lots of chlorophyll and stomata
6. How does a leaf being thin help it with photosynthesis?	Less distance for substances to travel via diffusion
7. How does it being broad help the leaf with photosynthesis?	Larger surface area to absorb light
8. How do air spaces help with photosynthesis?	Easier for gases to move and diffuse
9. How does a leaf containing lots of chlorophyll help with photosynthesis?	Chlorophyll absorbs light for photosynthesis
10. What are the limiting factors that affect the rate of photosynthesis?	Light intensity, temperature, carbon dioxide concentration, amount of chlorophyll
11. What is xylem tissue?	Vessels that carry water and minerals upwards in a plant
12. What is phloem tissue?	Vessels that carry nutrients like glucose around a plant
13. What is translocation?	The movement of sugar around a plant to where it is needed
14. What is transpiration?	The movement of eater upwards from the roots to the leaves
15. What can increase the rate of evaporation from leaves?	Lower humidity, higher temperature, higher wind speed, more light intensity.
16. What do plants need nitrate ions for?	To build amino acids and proteins from
17. Why are greenhouses important for farmers to grow plants?	To help maintain optimum growing conditions by providing heat, light and carbon dioxide

B9 Respiration

Question	Answer
1. What is the word equation for aerobic respiration?	Glucose + oxygen → carbon dioxide + water
2. What is the balanced symbol equation for aerobic respiration?	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
3. Where in a cell does aerobic respiration occur?	Mitochondria
4. Why do living things need to respire?	To release energy to carry out life functions
5. How is glucose stored in muscle cells?	Glycogen
6. What happens to your heart and breathing rate when you exercise?	They increase
7. Why does your breathing and heart rate change whilst you are exercising?	To provide more glucose and oxygen to working muscles and to remove waste carbon dioxide at a faster rate.
8. What is anaerobic respiration?	Respiration without oxygen
9. What is the word equation for anaerobic respiration in animals?	Glucose → lactic acid
10. What is the word equation for anaerobic respiration in plants and yeast?	Glucose $ ightarrow$ lactic acid + carbon dioxide
11. What type of respiration transfers more energy?	Aerobic respiration
12. What is "oxygen debt"?	The amount of extra oxygen the body needs after exercise to react with and therefore remove lactic acid
13. What is metabolism?	The sum of all the body's chemical reactions
14. What are the main roles of the liver?	 Detoxifying poisonous substances Passing the breakdown products into the blood Breaking down old worn out red blood cells and storing iron Removing lactic acid

B10 The human nervous system

Question	Answer
1. Define homeostasis	The regulation of internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes
2. Why is homeostasis necessary?	To maintain optimal conditions for enzyme action
3. What conditions are controlled in the human body?	Blood glucose concentration, water levels, temperature
4. What are the key features of the body's control systems?	Receptors, coordinators centers and effectors
5. What is the job of a receptor?	To detect changes in the environment (stimuli)
6. What is the job of the coordination centers?	To receive and process information from receptors
7. What is the job of the effectors?	To bring about responses which restore optimum levels
8. What is the function of the human nervous system?	To enable humans to react to their surrounding
9. How are messages carried around the human nervous system?	Electrical impulses along neurons
10. Draw a flow diagram showing how a stimulus results in a response in the human nervous system	Stimulus \rightarrow receptor \rightarrow coordinator \rightarrow effector \rightarrow response
11. Name the neuron that carries impulses from a receptor to the coordinator?	Sensory neuron
12. Name the neuron that carries impulses in the coordinator	Relay neuron
13. Name the neuron that carries an impulse from the coordinator to the effector	Motor neuron
14. How are impulses passed between neurons?	As chemical messengers across a synapse
15. How is a reflex action different to other neurons responses?	They are automatic, rapid and do not involve the conscious part of the brain
16. What is the function of the cerebral cortex of the brain?	Consciousness, intelligence and language
17. What is the function of the cerebellum in the brain?	Coordinating muscular activity and balance

B10 The human nervous system

Question	Answer
18. What is the function of the medulla in the brain?	Unconscious activity such as heartbeat, gut movement and breathing
19. Why is it difficult to study the brain?	It is very highly complex and delicate and not easy to study without damaging it
20. How have scientists been able to study the brain?	By electrically stimulating parts of the brain, studying the brains of people with brain damage using scanners such as MRI
21. What is the job of the eye?	It is a sense organ containing receptors sensitive to light intensity and colour
22. What is the function of the sclera?	Protecting the eye from damage
23. What is the function of the pupil?	A hole which allows light to enter the eye
24. What is the function of the lens?	It focuses light by refraction onto the retina
25. What do the ciliary muscles and suspensory ligaments do?	Change the shape of the lens to fine focus light onto the retina
26. What does the optic nerve do?	Carries electrical impulses from the retina to the brain
27. What is accommodation?	The process of changing the shape of the lens of the eye to focus on near or far objects
28. What is myopia?	Where you can see close objects but not distant objects
29. What is hyperopia	Where you can see distant objects but not close objects
30. How can poor eyesight be corrected?	 Spectacle lenses Contact lenses Laser eye surgery Replacement lenses for the eye
31. What type of lens is used to correct myopia?	Concave lens
32. What type of lens is used to correct hyperopia?	Convex lens

B11 Hormonal coordination

Question	Answer
1. What is the endocrine system?	A system of glands that secrete chemicals into the bloodstream that have an affect on a target organ
2. How do messages in the endocrine system compare to messages in the nervous system?	Messages in the endocrine system are slower but have a longer lasting effect
3. Where is the pituitary gland?	In the brain
4. What does the pituitary gland control?	Growth in children and the thyroid, ovaries and testes to produce hormones. It is referred to as the master gland
5. Where is the thyroid gland?	In the neck
6. How does the thyroid gland work?	It is stimulated by the thyroid gland to produce thyroxine which controls metabolism
7. How does the pituitary gland control the thyroid gland?	It produces thyroid stimulating hormone (TSH) to make the thyroid release more thyroxine
8. Where is the pancreas?	Next to the stomach
9. What does the pancreas control?	Blood sugar concentration
10. Which hormone is produced by the pancreas if blood glucose concentration is too high?	Insulin
11. What does insulin do?	Causes glucose to be removed and stored as glycogen in the liver
12. Which hormone is produced by the pancreas if blood glucose concentration is too low?	Glucagon
13. What does glucagon do?	Allows glycogen to be converted back into glucose
14. Where are the adrenal glands?	Above the kidneys
15. What do the adrenal glands control?	The hormone adrenaline responsible for fight or fight response
16. What hormone is produced in the testes?	Testosterone
17. What does testosterone control?	The development of male secondary sexual characteristics (puberty) and the production of sperm

B11 Hormonal coordination

Question	Answer
18. What hormones do the ovaries produce and release?	Oestrogen and progesterone
19. What does oestrogen control?	Female secondary sexual characteristics (puberty)
20. What is type 1 diabetes?	When the pancreas does not produce enough (or any) insulin
21. What is type 2 diabetes?	When the pancreas doesn't produce enough insulin or the cells stop responding to insulin
22. How is type 1 diabetes treated?	Insulin injections
23. How is type 2 diabetes treated/controlled	By diet and exercise
24. What is the release of an egg called?	Ovulation
25. What are the roles of FSH?	 Causes eggs to mature Stimulates ovaries to produce oestrogen
26. What are the roles of LH?	Triggers ovulation
27. What are the roles of Oestrogen?	 Causes the lining of the uterus to develop Inhibits the release of FSH Stimulates the release of LH
28. What are the roles of Progesterone?	Maintains the lining of the uterusInhibits the release of FSH and LH
29. Name some hormonal contraceptives	Oral contraceptives, implants, hormone injections, patches
30. Name some non hormonal contraceptives	Condoms, diaphragms, IUD's, abstinence, surgical sterilisation
31. What is IVF?	In vitro fertilization, used when natural fertility is reduced
32. Name the main plant growing hormone	Auxins
33. What is the response of plant to light called?	Phototropism
34. What is the response of plant to gravity called?	Gravitopism
35. What does ethene do in plants?	Controls the ripening of fruit
36. What do gibberellins do for plants?	Increase fruit size, end seed dormancy and promotes flowering

B12 Homeostasis in action

Question	Answer
1. Where in the brain is body temperature monitored and controlled?	The thermoregulatory centre
2. What kind of receptors are in the thermoregulatory centre?	Receptors sensitive to the temperature of the blood
3. How else does the thermoregulatory center receive information about body temperature?	Temperature receptors in the skin send nervous impulses to it
4. What is vasodilation?	When blood vessels supplying capillaries near the skin get wider allowing more blood to flow near the skin
5. How does vasodilation impact our temperature?	It allows heat from the blood to be transferred to the surrounding faster, cooling us down
6. Where is sweat produced?	In sweat glands
7. How does sweat cool us down?	When sweat evaporates from our skin it transfers energy to the environment
8. What is vasoconstriction?	When blood vessels supplying capillaries near the skin get narrower allowing less blood to flow near the skin
9. How does vasoconstriction impact our temperature?	It prevents heat from the blood being transferred to the surroundings as much, keeping us warmer
10. What is shivering?	The uncontrollable rapid contraction and relaxation of skeletal muscle
11. How does shivering warm us up?	The muscle contractions require respiration to occur which is exothermic and heats up surrounding cells
12. What waste products need to be removed from your body?	Carbon dioxide and urea
13. What is urea?	A waste product formed by excess proteins and worn out tissue
14. Where and how is urea made?	In the liver, by removing the amino group (deamination) from a protein to form toxic ammonia which is then converted into urea, which is also toxic but can be removed
15. What ways of losing water, ions and urea do we have no control over?	From the lungs during breathing and through the skin in sweat

B12 Homeostasis in action

Question	Answer
16. What ways of losing water, ions and ammonia do we have control over?	Urine production
17. Which organ is responsible for maintaining water and ion balance, as well as excreting urine?	The kidneys
18. What substance in the blood does not pass through the filtration into the kidney because they are too big?	Proteins and blood cells
19. What is selective reabsorption?	The process in the kidney where required materials such as glucose and water are reabsorbed back into the blood from the filtrate
20. How would people with kidney failure be treated?	By regular dialysis or a kidney transplant
21. How is kidney rejection avoided in kidney transplants?	Tissue types between donor and recipient are matched as closely as possible and immunosuppressant drugs are also used

B13 Reproduction

Question	Answer
1. What is sexual reproduction?	Reproduction that involves the joining (fusion) of male and female gametes
2. What are the gametes in animals?	Sperm and egg cells
3. What are the gametes in plants?	Pollen and egg cells
4. What type of cell division forms gametes?	Meiosis
5. What causes variation in the offspring from sexual reproduction?	The missing of genetic information
6. What is asexual reproduction?	Reproduction involving only one parents and no fusing of gametes
7. What type of cell division occurs in asexual reproduction?	Mitosis
8. How many chromosomes are there in cells produced by meiosis?	Half that of the parent cell (n)
9. Where does meiosis take place?	In the reproductive organs, e.g. testes and ovaries
10. What happens during meiosis?	The chromosomes are copied and then the cell divides twice to make four gametes, each with a single set of chromosomes (n)
11. How do the gametes produced by meiosis compare to each other?	They are genetically different from one another
12. What happens to the number of chromosomes during fertilsation?	It is restored to the full amount (2n)
13. What happens to the cells as the embryo develops?	By mitosis
14. What are the advantages of sexual reproduction?	 It produces variation which gives a survival advantage if the environment changes Allows humans to speed up natural selection by selective breeding to increase food production
15. What are the advantages of asexual reproduction?	 Only one parent is required More time and energy efficient as there is no need to find a mate Faster than sexual reproduction Many identical offspring can be produced in favourable conditions

B13 Reproduction

Question	Answer
16. How do malarial parasites reproduce?	Asexually in a human host, sexually in a mosquito
17. How do many fungi reproduce?	Asexually by spores but asexually to give variation
18. How do many plants reproduce?	Sexually producing seeds, but also asexually by producing runners (like strawberries) or bulbs (daffodils)
19. What does DNA stand for?	Deoxyribonucleic acid
20. Describe the structure of DNA	Two strands of a polymer in a twisted helix shape made of repeating bases with a sugar phosphate backbone
21.Name the four DNA bases	A, T, C, G
22. What does a sugar, a phosphate and a base make up?	A nucleotide
23. What is an allele?	A different form of a gene
24. When is a dominant allele expressed?	When at least one is present in the genotype
25. When is a recessive allele expressed?	Only expressed if two are present in the genotype
26. Define phenotype	The physical representation of a characteristic
27. What sex is an individual with XX chromosomes	Female
28. What sex is an individual with XY chromosomes	Male
29. What is polydactyly?	A dominant disorder where babies are born with extra fingers or toes
30. What is cystic fibrosis?	A recessive disorder of cell membranes that prevents the movement of certain substances, effects respiratory, digestive and reproductive systems

B14 Variation and Evolution

Question	Answer
1. What is variation?	Differences in the characteristics of individuals of a population?
2. What causes variation?	Inherited genes, conditions in which they develop or a combination of both (genetic and environmental)
3. Where does variation in a species come from?	Mutations
4. Define evolution	A change in the inherited characteristics of a population over time through a process called natural selection which can result in the formation of new species
5. What does the theory of evolution say about the origin of current species	They have all evolved from simple life forms more than 3 billion years ago
6. Describe the key stages in natural selection	 Individuals in a species show a range of variation Individuals most suited to the environment are more likely to survive, breed successfully The genes that enabled them to survive are passed onto the next generation
7. How are new species formed?	If two populations of one species become so different that they can no longer interbreed to produce fertile offspring
8. Define selective breeding	The process by which humans breed plants and animals for particular genetic characteristics
9. Which desired characteristics can be selectively bred?	Disease resistance in food crops, animals to produce more milk or meat, domestic dogs with a gentle nature and large or unusual flowers
10. Describe the process of selective breeding	Parents with the chosen characteristics are chosen and bred together, offspring with the desired characteristics are selected and bred and this is repeated over many generations
11. What are the problems with selective breeding?	Inbreeding can lead to breeds that are prone to disorders or certain diseases.
12. What is genetic engineering?	A process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic
13. How have plants been genetically engineered?	To be resistant to diseases, insect attacks, herbicides of to produce bigger, better fruits

B14 Variation and Evolution

Question	Answer
14. How have bacterial cells been genetically engineered?	To produce useful substances such as human insulin to treat diabetes
15. What is the advantage of using genetically modified (GM) crops?	They generally produce bigger yields
16. What concerns to people have about using GM?	They are concerned that they could effect wild populations
17. How can plants be cloned?	By taking cuttings and carrying out a tissue culture
18. How can animals be cloned?	Embryo transplant and adult cell cloning

B15 Genetics and Evolution

Question	Answer
1. What did Gregor Mendel discover?	That genetic information is passed on in "units" from parents to offspring
2. When were chromosomes first observed during cell division?	The late 19 th century
3. When was it realized that chromosomes contained Mendel's units?	The early 20 th century
4. What do we call these units Mendel discovered?	Genes
5. When was the structure of DNA discovered?	The mid 20 th century
6. What was Jean Baptiste Lamarck's theory of evolution?	That changes that occur during an organisms lifetime can be inherited by its offspring
7. How did Darwin come up with his theory of evolution by natural selection?	Observations made on a round the world expedition (studying finches), backed by years of experimentation and discussion linked to geology and fossils
8. What was the name of the book that Darwin published his ideas in?	On the origin of species
9. Why were Darwin's ideas controversial?	 It challenged the idea that God created the animals and the plants There was insufficient evidence The mechanism of inheritance has not yet been discovered (genes)
10. What other scientist proposed a theory of natural selection with Darwin?	Alfred Russel-Wallace
11. How did Wallace come up with his theory of evolution by natural selection?	He gathered evidence worldwide and did a lot of research on animal colouration
12. What is speciation?	The formation of new species
13. What steps are involved in speciation?	 Isolation of two populations of a species Variation between the two populations Natural selection occurring on both populations Variation between the two populations becomes so great that they can no longer interbreed
14. What is a fossil?	The "remains" of an organism from millions of years ago

B15 Genetics and Evolution

Question	Answer
15. How can fossils be formed?	 Parts of an organism that have decayed Parts of an organism replaced by minerals Traces of an organism such as footprints
16. Why is the fossil record incomplete, especially for very early lifeforms?	 Soft bodied organisms rarely leave fossils Geological activity has destroyed many Many have not been discovered
17. What is extinction?	The permanent loss of all members of a species
18. What can cause extinction?	 New predators New diseases Competition Asteroid impact Volcanic activity
19. What is mass extinction?	Huge numbers of species go extinct in a relatively short time period
20. What are the causes of antibiotic resistant bacteria?	 Overuse of antibiotics (agriculture) Not finishing the prescribed course Mutations
21. What is classification?	The organisation of organisms intro groups according to their similarities
22. Who came up with classification?	Carl Linnaeus
23. What is the order of classification?	Kingdom, phylum, class, order, family, genus species
24. What makes up the three domain system?	Archaea, bacteria, eukaryota

B16 Adaptations, interdependence and competition

Question	Answer
1. What is an ecosystem?	The interaction of a community of living organisms (biotic) with the non living (abiotic) parts of the environment
2. What do organisms required to survive and reproduce?	A supply of materials from their surroundings and from the other living organisms there
3. What do plants compete for in a community?	Light, space, water and mineral ions (nutrients)
4. What do animals compete for in a community?	Food, mates and territory
5. What is interdependence?	Species depending on each other for food, shelter and pollination among other things, where the removal of one species can impact the whole community
6. What is a stable community?	One where the species and environmental factors are in balance so that the populations can remain fairly stable
7. What non living (abiotic) factors can affect a community?	Light intensity, temperature, moisture levels, soil pH and mineral content, wind intensity and direction, carbon dioxide levels for plants and oxygen concentrations for aquatic organisms
8. What living (biotic) factors can affect a community?	Availability of food, new predators arriving, new pathogens, species out competing others.
9. What are adaptations?	Features that enable organisms to survive in the conditions that they normally live
10. What types of adaptation are there?	Structural, behavioural or functional
11. What are extremophiles?	Organisms adapted to live in extreme conditions such as high pressure, high temperature or salt concentrations
12. Give an example of an extremophile	Bacteria living in deep sea vents
13. What is meant by abundance of a species?	How many of the species there are (population)
14. What is meant by the distribution of a species?	Where in the ecosystem the species lives
15. What experimental methods are used by ecologists to measure abundance and distribution of a species in an ecosystem?	Quadrats and transects

B17 Organising an ecosystem

Question	Answer
1. What are the producers of all biomass on Earth?	Photosynthetic organisms
2. What do we use to represent feeding relationships within a community?	Food chains
3. What do all food chains begin with?	A producer (usually plants or algae)
4. What do we call an organism that eats a producer?	A primary consumer
5. What do we call an organism that eats a primary consumer?	A secondary consumer
6. What do we call an organism that eats a secondary consumer?	A tertiary consumer
7. What is a predator?	A consumer that kills and eats other animals
8. What does an arrow show in a food chain or web?	The direction of energy
9. What do we call the animals that are killed and eaten by predators?	Prey
10. What happens to the number of prey and predators in a stable community?	They rise and fall in cycles
11. Why must materials be recycled in the living world?	To provide the building blocks for future organisms
12. How does the decay of dead organisms recycle materials?	It returns carbon dioxide to the atmosphere and mineral ions to the soil
13. How is carbon returned to the atmosphere?	Respiration of all living organisms, burning or fossil fuels (combustion)
14. How is carbon removed from the atmosphere?	Photosynthesis
15. Why is the water cycle important?	It provides fresh water for plants and animals before it flows into the seas/oceans
16. How is water returned to the atmosphere?	Evaporation and transpiration from plants
17. How does fresh water return to the land from the atmosphere?	It condenses and falls as precipitation
18. What factors effect the rate of decomposition?	Temperature, water and oxygen availability

B17 Organising an ecosystem

Question	Answer
19. Why do gardeners and farmers try to provide optimum conditions for decay?	The compost produced can be used as a natural fertilizer
20. What does anaerobic decay produce?	Methane gas
21. What are biogas generators?	Equipment that produced methane from decay to be used as fuel

B18 Biodiversity and ecosystems

Question	Answer
1. What is biodiversity?	The variety of all the different species of organisms on Earth, or within an ecosystem
2. Why is it good to have high biodiversity?	To ensure the stability of ecosystems by reducing the dependence of one species on another for food, shelter and maintenance of the physical environment
3. How do humans reduce the amount of land available for other animal and plants?	Building, quarrying, farming and the dumping of water
4. How has human population growth damaged the environment?	More resources are needed and used and more waste is produced
5. How does improperly handled waste pollute water?	Sewage, excess fertiliser and toxic substances run into water systems
6. How does improperly handled waste pollute the land?	Waste in landfill and toxic chemicals
7. How does improperly handled waste pollute the air?	Smoke from combustion and acidic gases
8. Why has large scale deforestation in tropical areas occurred?	To provide land for cattle and various crops for food or fuel production
9. Why are peat bogs being destroyed?	To produce garden compost
10. What are the negative impacts of destroying peat bogs?	It reduces the area of a habitat, reducing the variety of organisms that live there
11. How does the use of peat cause air pollution?	Burning and decay of peat releases carbon dioxide into the atmosphere
12. High levels of which gases contribute to global warming?	Carbon dioxide and methane
13. What are the potential consequences of global warming?	 Loss of habitat due to flooding because of sea level rises Changes to distribution of species where temperature and rainfall have changed
14. What environmental changes can impact the distribution of a species in an ecosystem?	Temperature, availability of water and composition of atmospheric gases
15. What can cause environmental changes?	The changes of the seasons, the geography of an area as a result of human interaction

B18 Biodiversity and ecosystems

Question	Answer
16. What measures have been taken by scientists and citizens to reduce the negative effect of humans on biodiversity?	 Breeding programs for endangered species Protection and regeneration of rare habitats Reintroduction of field margins and hedgerows where farmers grow only one crop (monoculture)
17. How much energy from the sun is absorbed and used by producers?	About 1% (incident energy)
18. How much biomass is passed onto each trophic level?	About 10%
19. In what ways is biomass lost?	 Not all material is consumed Some is egested as faeces Some is lost as carbon dioxide and water Large amounts used in respiration for life functions
20. Name some factors that affect food security	 Increasing birth rate Changing diets New pests and pathogens Environmental change Costs Conflicts affecting access to water or food
21. How can we make food production more efficient?	Limiting animal movement and controlling the animals surrounding temperature