CB1 Core Knowledge

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| 1 | What is the function of the nucleus in cells? | Contains DNA |
| 2 | What is the function of the cell membrane? | To control which substances enter and exit the cell. |
| 3 | What is the function of the mitochondria in cells? | Releases energy. Where aerobic respiration occurs. |
| 4 | What is the function of the ribosome in cells? | Making proteins. |
| 5 | Name three structures that you might find inside a plant cell but *not* inside an animal cell. | Cell wall, vacuole, chloroplast. |
| 6 | What is the function of the chlorophyll in cells? | Traps light energy to be used in photosynthesis. |
| 7 | What is the function of the vacuole in plant cells? | Stores cell sap. |
| 8 | What is the function of the cell wall in plants? | Contains cellulose to provide support. |
| 9 | Prokaryotic cells (e.g. bacteria) differ from eukaryotic cells (e.g. animal) in what way? | Prokaryotic cells don’t have a nucleus (they have chromosomal and plasmid DNA instead ) |
| 10 | What are the small loops of DNA in bacteria called? | Plasmid DNA |
| 11 | In what way are sperm and eggs cells similar to each other but different to body cells? | Haploid nucleus. They contain half as many chromosomes as body cells. |
| 12 | List four ways that sperm cells are adapted for their function. | They have an acrosome, haploid nucleus, many mitochondria and a tail |
| 13 | List three ways that egg cells are adapted for their function. | They hold nutrients in their cytoplasm, have a haploid nucleus and changes occur in the cell membrane after fertilisation |
| 14 | How are the cells that line the small intestine specialised for their function of absorbing food? | They have many tiny folds called microvilli that give them a large surface area. |
| 15 | How have developments in microscope technology helped us understand more about cells? | A higher magnification using electron microscopes has allowed us to see more detail including more sub-cellular structures. |
| 16 | What is 30 µm in mm? | 0.03 mm (be ready for other examples) |
| **17 H** | **What is 1150000 m in standard form?** | **1.15 x 106 m (be ready for other examples)** |
| 18 | How do you calculate the total magnification of a microscope? | Eyepiece lens magnification x objective lens magnification |
| 19 | How do you calculate the actual length of a magnified image? | Actual length = magnified length ÷ magnification |
| 20 | Which stain is used when viewing plant cells? | Iodine |
| 21 | Why might a scientist add methyl blue to an animal cell sample before viewing it under a microscope? | It is a stain that makes objects in the slide more visible. |
|  | What is an enzyme? | A biological catalyst made of protein |
|  | List three cellular reactions that enzymes catalyse | Respiration, photosynthesis, digestion, protein synthesis and DNA replication. |
| 22 | Which enzyme breaks down protein? Name the product formed. | Protease breaks down protein into amino acids |
| 23 | Which enzyme breaks down fat? Name the product formed. | Lipase breaks down fat into fatty acids and glycerol |
| 24 | Which enzyme breaks down carbohydrate? Name the product formed. | Carbohydrases such as amylase break down carbohydrates into sugars. |
| 27 | What is the uniquely shaped ‘pocket’ on the outside of an enzyme called? | The active site |
| 28 | What do we call substances that fit into the active site for enzymes to work on? | Substrates |
| 29 | Which model do we use to explain how enzymes work? | Lock and key model |
| 30 | State three conditions that might affect the rate at which an enzyme works. | Temperature, pH and substrate concentration |
| 31 | Which two conditions could affect the shape of an enzyme’s active site? | Temperature and pH |
| 32 | What is a denatured enzyme? | An enzyme that has an active site which has changed shape and no longer allows the substrate to fit. |
| 38 | Define diffusion | Substances moving from high to low concentration (down a concentration gradient).  |
| 39 | Define osmosis | The overall movement of solute molecules in a solution across a partially permeable membrane from a dilute solution to a more concentrated one. |
| 40 | Define active transport. | The movement of substances from an area of low concentration into an area of higher concentration. This requires energy. |

CB2 Cells and Control

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| 1 | What are the stages of mitosis? | Interphase, prophase, metaphase, anaphase, telophase and cytokinesis |
| 2 | Why do cells do mitosis? | Growth, repair and asexual reproduction |
| 3 | Describe mitosis | The production of two diploid daughter cells, genetically identical to each other and the parent cell. |
| 4 | What is cancer? | Uncontrolled mitosis. Rapid cell division can cause tumours that can damage the body. |
| 5 | How is growth different in plants and animals? | In animals, cells divide then differentiate. In plants they divide, elongate then differentiate. |
| 6 | What is growth? | Growth is an increase in size as a result of an increase in number or size of cells. |
| 7 | What process leads to the creation of specialised cells? | Differentiation |
| 8 | How are percentile charts used to monitor growth? | Mass and length/height of babies are checked on a graph to compare to others the same age. Babies should remain on or around the same percentile line as they grow. |
| 9 | How can percentage change be calculated? | (Final value- initial value)/initial value x 100 |
| 10 | What are stem cells?  | Cells that divide repeatedly over a long period of time to produce cells that can differentiate. |
| 11 | What are plant stem cells called? | meristems |
| 12 | What is the difference between adult and embryonic stem cells? | Embryonic stem cells can differentiate to produce any kind of cell. Adult stem cells usually only produce specialised cells of one tissue type. |
| 13 | List two benefits associated with the use of stem cells in medicine | Benefits- can treat different diseases caused by damaged cells. Can be used to test new drugs and treatments on. |
| 13 | List two risks associated with the use of stem cells in medicine | Risks- if stem cells continue to divide this could cause cancer. Also if stem cells from one person are placed in another they could be killed by the immune system and be ‘rejected’. |
| 19 | What is the Central Nervous System (CNS) made up of? | The brain and the spinal cord |
| 20 | Describe the structures and functions of the parts at each end of a neurone. | Dendrite- tiny branches that receive impulses from receptor cellsAxon terminal- allows signal to be transmitted to the next cell |
| 21 | What is the function of the myelin sheath? | Insulator. Speeds up the signal. |
| 22 | What are neurotransmitters? Where are they released? | Chemicals that are released at an axon terminal and diffuse across the synapse (gap) between neurones to pass on a signal.  |
| 23 | What are the steps in the reflex arc? | Stimulus>receptor>sensory neurone>relay neurone> motor neurone> effector> response. |

CB3 Core Knowledge

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| 1 | State two advantages of asexual reproduction | No need to find a mateQuick to take advantage of resources |
| 2 | State a disadvantage of asexual reproduction | Almost no genetic variation- less adaptable to changes |
| 3 | State an advantage of sexual reproduction | Genetic variation for greater adaptability |
| 4 | State two disadvantage of sexual reproduction | Need to find a mateDesirable characteristics are not always passed on |
| 5 | What are gametes? | Haploid sex cells (e.g. eggs ,sperm, pollen) |
| 6 | Describe the products of meiosis | Cell division that produces four haploid daughter cells- genetically different to parent cell. These are gametes (sex cells). |
| 8 | What is a genome? | A complete set of chromosomes/ full set of DNA |
| 9 | Describe the structure of DNA | Two strands in a double helix, joined together by complementary bases with weak hydrogen bonds between each other. |
| 10 | How do the bases form complimentary pairs in DNA? | Cytosine- Guanine (with 3 weak Hydrogen bonds)Adenine- Thymine (with 2 weak Hydrogen bonds) |
| 11 | What is a gene? | A section of DNA with the instructions for making a single protein. |
| 12 | When extracting DNA from fruit, what is the role of the detergent solution? | It breaks down the membranes around the cell and the nucleus. |
| 13 | When extracting DNA from fruit, what substance is used to precipitate DNA? | (ice-cold) ethanol |
| 23 | What are alleles? | Different versions of the same gene |
| 24 | What is an organisms genotype? | The combination of alleles an organism has for a characteristic (e.g. Bb). |
| 25 | What is a phenotype? | What an organism looks like (as a result of its genotype) |
| 26 | How do alleles result in differences in the characteristics inherited by an individual? | Inheriting different combinations of alleles result in different characteristics being ‘expressed’. |
| 27 | Describe the genotype BB | Homozygous dominant (be prepared for other examples) |
| 28 | State the sex chromosomes contained within a male and a female body cell. | Male = xy. Female = xx. |
| 29 | Draw a punnett square to show that the chance conceiving a girl is 50% |  |
| 30 | Define mutation. | A change in a gene that results in a new allele. |
| 31 | When does mutation usually occur? | During cell division. |
| 32 | How often will a mutation lead to a change in the phenotype of an organism? Why? | Very rarely. Most characteristics are the result of more than one gene. |
| 35 | What is the human genome project? | A project to map all 3.3 billion complementary bases in a full set of 46 human chromosomes. |
| 36 | State two ways that information about a person’s genome could be useful in medicine? | 1. Identifying their risk of developing certain diseases.2. Identifying which medicines will work best for them. |
| 37 | What causes genetic variation? | Sexual reproduction and mutation |
| 38 | What defines data for discontinuous variation? | The data can only take a limited set of values (e.g. colour, sex) |
| 39 | What do we call variation where the data collected can be any value in a range? | Continuous variation |
| 40 | What name do we give the bell-shaped curve that continuous data for variation often forms? | A normal distribution |

CB4 Core Knowledge

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| 2 | What are the five key stages in Darwin’s theory of evolution by natural selection? | 1. Genetic variation
2. Change causes competition
3. Natural selection (survival of the ‘fittest’)
4. Inheritance (successful genes are passed on)
5. Evolution (over many years)
 |
| 3 | Explain how the emergence of resistant organisms supports Darwin’s theory of evolution including antibiotic resistance in bacteria. | Bacteria reproduce very quickly compared to most other organisms. Helpful mutations inherited and population adapt to new conditions. |
| 4 | What fossil evidence do we have for the evolution of humans? | a Ardi from 4.4 million years ago b Lucy from 3.2 million years ago c Leakey’s discovery of fossils from 1.6 million years ago |
| 5 | Describe the changes seen in fossils as early humans have evolved. | Humans have become taller, larger skulls (bigger brain volume) and have shorter arms. |
| 6 | Explain how we can date fossils and tools. | Carbon dating.Comparing them to other samples already dated.Using the age of the rock formation they were found in. |
| 7 | Describe how tools have developed over time | Tools have become sharper and changed shapes as humans evolved, more modern tools have become more sophisticated |
| 9 | What are the five kingdoms used to classify all living organisms? | Animals, Plants, Fungi, Prokaryotes and Protists.  |
| 10 | Describe how genetic analysis has led to the suggestion of the three domains rather than the five kingdoms classification method  | Some single-celled organisms were found to have genes more similar to plants and animals than to prokaryotes. |
| 11 | What are the three domains and how are organisms classified into them? | Archaea- no nucleus, genes contain unused sections of DNABacteria- no nucleus, no unused sections in genesEukarya – has nucleus, unused sections in genes |
| 12 | What is a binomial name? | A two word Latin name (written in *italics*) from the genus and species of an organism E.g. *Homo sapiens* |
| 13 | What is selective breeding?  | Selecting organisms with desirable characteristics, Breeding themSelecting offspring that have inherited those characteristics for further rounds of breeding. |
| 14 | What has the impact of selective breeding been on food plants and domesticated animals? | Food plants (crops): higher yield, nutritional value, pest and disease resistance and also tolerance to common weather conditions. Domesticated animals: grow faster, healthier, are more fertile, produce higher yields of meat, milk or wool and have temperaments useful for their role. |
| 17 | What is genetic engineering? | A process which involves modifying the genome of an organism to introduce desirable characteristics.  |
| **18** | **Describe how a bacterium can be genetically modified to produce human insulin.** | **Restriction enzymes are used to remove the human insulin gene from the human chromosome and to cut open the plasmid- creating ‘sticky ends’ of overhanging bases. DNA ligase enzymes are used to insert the human gene into the plasmid. Then the plasmid containing human insulin gene inserted into a bacterium.** |
| 23 | Evaluate the benefits of genetic engineering in modern agriculture and medicine. | Benefits: Can get desirable characteristics quickly . Genes can be moved between species. E.g. insulin producing bacteria |
| 23 | Evaluate risks of genetic engineering in modern agriculture and medicine, including practical and ethical implications | Risks: risk of cross breeding, unknown health effects of eating GM foods. If the gene mutates further we are unsure of the effects. |
| 24 | Evaluate the benefits of selective breeding in modern agriculture and medicine. | Benefits: ‘natural’ process using only the genes that exist in the species, Achievable for many plant and animal owners. Can produce organisms better suited to our needs. |
| 24 | Evaluate the risks of selective breeding in modern agriculture and medicine, including practical and ethical implications | Risks: inbreeding, lack of genetic diversity that could cause a failure to meet the unknown needs of the future or put all organisms at risk of the same disease/ environmental condition. |

CB5 Core knowledge

|  |  |  |
| --- | --- | --- |
| No. | Question | Answer |
|  | How does the World Health Organisation define health? | A state of complete physical, mental and social well-being, not merely an absence of disease or infirmity. |
|  | What is a disease? | A problem with the structure or function of the body that is not the result of an injury. |
|  | What is a communicable disease? | A disease caused by pathogens that can pass from an infected person to other people. |
|  | What is a non-communicable disease? | A disease which is not passed from person to person. |
|  | What factors can interact to cause a non-communicable disease? | 1. Genetics
2. Malnutrition
3. Lifestyle
 |
|  | Give 3 lifestyle factors and the non-communicable diseases they may cause.  | 1. Exercise and diet – obesity and malnutrition
2. Alcohol – liver disease / cirrhosis
3. Smoking – cardiovascular disease
 |
|  | Why does the presence of one disease lead to a greater chance of getting another disease? | The first disease may:* Harm the immune system
* Damage the body’s natural defences
* Stop an organ system from working effectively
 |
|  | What body measurements and calculations can be taken to measure overall health? | BMI = Weight (kg) height (m2)Hip:waist ratio |
|  | How can cardiovascular disease be treated? | 1. Life-long medication
2. Surgical procedures
3. Lifestyle changes
 |
|  | What is a pathogen? | An organism that causes a communicable disease |
|  | What type of organisms are pathogens? | Bacteria, fungi, viruses and protists. |
|  | Name and describe two common bacterial infections.  | 1 Cholera (bacteria) causes diarrhoea2 Tuberculosis (bacteria) causes lung damage |
|  | Name and describe a common fungal infection.  | Chalara ash dieback (fungi) causes leaf loss and  |
|  | Name and describe a common protist infection.  | Malaria causes damage to blood and liver |
|  | Name and describe a common viral infection.  | HIV destroys white blood cells, leading to the onset of AIDS |
|  | How are tuberculosis (bacteria) pathogens spread?  | Airborne – through coughs and sneezes. |
|  | How could the spread of tuberculosis be reduced or prevented? | Good hygiene |
|  | How are Chalara ash dieback (a fungus) pathogens spread? | Airborne – as spores  |
|  | How could the spread of Chalara ash dieback be reduced or prevented? | Improve biosecurity- not importing or moving infected trees or soil |
|  | How are cholera (bacteria) pathogens spread? | Through untreated water |
|  | How could the spread of cholera be reduced or prevented? | Good hygiene, improving cleanliness of water supplies |
|  | How are malaria (a protist) pathogens spread? | Animal vectors (e.g. mosquito) |
|  | How could the spread of malaria be reduced or prevented? | Killing mosquitoes, use of mosquito nets |
|  | How are STIs (sexually transmitted diseases) transmitted? | By contact with sexual fluids (vaginal fluid and semen) |
|  | Name two STIs and say what organism causes them. | 1. Chlamydia (bacteria)
2. HIV (virus)
 |
|  | How can the spread of STIs be reduced or prevented? | 1. Screening the population for STIs
2. Screening donated blood for STIs
3. Use of condoms during sex
4. Preventing drug users from sharing needles
 |
|  | List 3 physical barriers which provide us with protection from pathogens. | 1. Mucus in the nose
2. Cilia in the trachea
3. Skin
 |
|  | List 3 chemical barriers which provide us with protection from pathogens. | 1. Lysozymes in tears
2. Saliva and vaginal fluid
3. Hydrochloric acid in the stomach
 |
|  | What type of protein do pathogens have on their surface? | Antigens |
|  | What type of lymphocyte will be activated by a pathogen getting into the body? | One which has antibodies which fit with the pathogen’s antigens.  |
|  | Describe 2 ways lymphocytes respond to an antigen. | 1. Divide to produce many identical lymphocytes.
2. Secrete antibodies which destroy the pathogen.
 |
|  | What are memory lymphocytes? What is their role? | Lymphocytes which stay in the blood to respond to a second infection. The secondary response is much faster and you are immune to the pathogen.  |
|  | What is a vaccine? | A drug which triggers immunity to a pathogen. It contains an inactive form of the pathogen.  |
|  | What are the advantages to immunisation? | Protects an individual from a particular disease for many years.Some diseases are eradicatedReduces risk of epidemicsLess chance of long term illness as a result of the infectionHerd immunity protects those not immunisedUsing a vaccine is cheaper than treating a very ill person |
|  | Name a disadvantage to immunisation. | Some chance of side effects- some side effects can be severe. |
|  | What is herd immunity? | When the majority of people in a group are immunised, this provides protection to the few people who are not by reducing the chance of coming into contact with an infected person. |
|  | Why are antibiotics useful? How do they work? | They are used to treat bacterial infections. They kill the bacteria cells or inhibit their production by interrupting cell wall synthesis, but do not harm the organism being treated. |
|  | List the stages in the development of new drugs, including antibiotics. | * Discovery
* Development
* Preclinical testing
* Clinical testing
 |

CB6 Core knowledge

|  |  |  |
| --- | --- | --- |
| No. | Question | Answer |
| 1 | What is a producer? | An organism that makes its own food using photosynthesis. |
| 2 | What is biomass? | The total mass of an organism after drying. |
| 3 | Describe photosynthesis in plants and algae | An endothermic reaction that uses light energy to react carbon dioxide and water to produce glucose and oxygen  |
| 4 | What is the equation for photosynthesis | Carbon dioxide + water → glucose + oxygen |
| 5 | List three limiting factors of photosynthesis | Temperature, light intensity and carbon dioxide concentration |
| 6 | How does temperature limit the rate of photosynthesis? | If the temperature is not high enough, the rate of photosynthesis will not increase as the enzymes responsible cannot perform at their optimum rate. |
| 7 | What is the effect of increasing temperature on the rate of photosynthesis? | * The rate of photosynthesis will increase up to a maximum rate at the optimum temperature.
* At higher temperatures the rate will decrease due to denaturation of the enzymes that carry out photosynthesis.
 |
| 8 | How does carbon dioxide affect the rate of photosynthesis? | As the concentration of carbon dioxide increases, the rate of photosynthesis also increases. |
| 9 | How does light intensity limit the rate of photosynthesis? | If the light intensity is not high enough, there will not be enough energy for photosynthesis |
| 10 | How can the effect of light intensity on rate of photosynthesis be investigated? | The rate of oxygen production by a plant can be measured at different light intensities. |
| 11 | How does the rate of photosynthesis change with light intensity? | The rate of photosynthesis is directly proportional to light intensity. |
| 12 | How does the rate of photosynthesis change with distance from a light source? | The rate of photosynthesis is inversely proportional to the distance from the light source- following the inverse square law. |
| 13 | How is the structure of a root hair cell adapted to absorb water and mineral ions? | 1. Large surface area to volume ratio
2. Maximises contact with the soil
3. Thin cell walls to allow water molecules and mineral ions through quickly
 |
| 14 | How are xylem adapted to their function in the plant? | * Dead cells with no cytoplasm so lots of room inside.
* No walls between cells so they form a hollow tube.
* Thick walls made of lignin so they don’t burst.
 |
| 15 | How are phloem adapted to their function in the plant? | * Companion cell use energy to pump sucrose inside
* Sieve tubes made of cells with holes in the ends for liquids to move through
* No nucleus and little cytoplasm in sieve tube cell so lots of room inside
 |
| 16 | What is transpiration? | The transportation of water molecules through the plant. |
| 17 | Describe the structure and function of the stomata | Stomata are pores in the underside of leavesthat allow the diffusion of gases in and out of the leaf. Guard cells around the pore open and close it. |
| 18 | How is sucrose transported around the plant by translocation? | In phloem. Living companion cells use energy to pump sucrose inside sieve tubes. Increasing pressure causes sucrose solution to flow around plant. |
| 19 | How is the structure of a leaf adapted for photosynthesis and gas exchange? | 1. Large surface area to absorb sunlight
2. Palisade layer has lots of chloroplasts
3. Xylem vessels supply water to cells
4. Air spaces inside leaf allow carbon dioxide to diffuse into cells
5. Stomata in underside allow gases to diffuse in and out
 |
| 20 | List environmental factors that could affect the rate of water uptake by a plant | Light intensity, air movement (wind), temperature |
| 21 | How is the rate of transpiration calculated? | Measure the distance the bubble in the potometer has moved in (e.g.) 20 minutes:Distance moved (mm) = rate of transpiration (mm/min)Time taken (min) |

**CB7 Animal coordination, control and homeostasis – core questions**

|  |  |
| --- | --- |
| 1. Which system contains a collection of glands which produce hormones?
 | The endocrine system |
| 1. Which gland produces insulin?
 | The pancreas |
| 1. Which gland produces adrenaline?
 | The adrenal glands |
| 1. State 3 ways in which adrenaline prepares the body for fight or flight
 | * Increased heart rate
* Increased blood flow to muscles
* Increased blood pressure
* Stimulates liver to convert glycogen to glucose
 |
| 1. Where is TRH produced?
 | Hypothalamus |
| 1. Which gland releases TSH?
 | * The pituitary gland
 |
| 1. Which gland produces Thyroxine?
 | Thyroid gland |
| 1. How is the regulation of thyroxine production an example of negative feedback?
 | As thyroxine levels increase TRH production is decreased |
| 1. State 2 hormones which control the menstrual cycle
 | **FSH** Oestrogen**LH** Progesterone |
| 1. What is ovulation?
 | When an egg cell is released from an ovary |
| 1. On what days of the menstrual cycle does menstruation occur?
 | Days 1-5 |
| 1. When does ovulation usually happen?
 | Day 14 |
| 1. **(H) What does FSH do?**
 | **Stimulates growth and maturation of egg follicle** |
| 1. **(H) The surge in LH at day 14 triggers….**
 | **Ovulation (release of egg)** |
| 1. Towards the end of the cycle the fall in oestrogen and progesterone trigger…..
 | Menstruation |
| 1. What does hormonal contraception prevent?
 | The maturation of the egg follicle |
| 1. Name 2 methods of contraception apart from the pill
 | CondomDiaphragm |
| 1. Which hormone is released in response to high blood glucose?
 | Insulin |
| 1. Which hormone is released in response to low blood glucose?
 | Glucagon |
| 1. How is glucose stored in the liver and muscle cells?
 | As glycogen |
| 1. What causes Type 1 diabetes?
 | Insulin is not produced from the pancreas |
| 1. How can type 1 diabetes be treated?
 | Injecting insulin |
| 1. What causes Type 2 diabetes?
 | Cells do not respond to the effect of insulin |
| 1. How can Type 2 diabetes be treated?
 | Exercise; healthy diet; Medication |
| 1. Describe negative feedback
 | An increase in one factor causes a decrease in another factor (and vice versa) |

CB8

|  |  |  |
| --- | --- | --- |
| 1 | Which gas do we need for respiration? | Oxygen |
| 2 | Which gas is a waste product of respiration? | Carbon Dioxide |
| 3 | Where are food molecules absorbed into the blood? | Small intestine |
| 4 | What is urea? | A poison produced in your body when it breaks down amino acids |
| 5 |  |  |
| 6 | State 3 ways the alveoli are adapted for gas exchange | * Large surface area to volume rate
* Thin alveolus cell wall
* Thin capillary cell wall
* Lots of capillaries
 |
| 7 | State 3 factors affecting the rate of diffusion | * Surface area
* Concentration gradient
* Diffusion distance
 |
| 8B | State Fick’s law for calculating the rate of diffusion: Rate of diffusion is proportional to… | (surface area x concentration difference) ÷ thickness of membrane |
| 9 | What is the function of red blood cells? | To transport oxygen |
| 10 | What is the function of white blood cells? | They are part of the immune system and help defend the body against infection |
| 11 | What is transported in plasma? | Transports dissolved substances around the body including glucose, hormones, water, urea, carbon dioxide |
| 12 | What is the function of platelets? | Help the blood to clot |
| 13 | How are arteries adapted to their function? | Thick, elastic walls to cope with high pressure |
| 14 | How are veins adapted to their function? | Thin flexible walls,Valves to stop low pressure blood flowing backwards |
| 15 | How are capillaries adapted to their function? | Very thin walls (only one cell thick) which allows for rapid diffusion of substances into and out of the blood. |
| 16 | What is the function of valves? | To prevent the backflow of blood into the heart |
| 17 | Which side of the heart pumps oxygenated blood around the body? | The left side |
| 18 | Which side of the heart is thicker? | The left ventricle |
| 19 | Put these words in order to describe the flow of blood into, around, and out of the heart, starting at the vena cava:Vena cava; left ventricle, right ventricle, pulmonary vein, aorta, right atrium; pulmonary artery; left atrium. | Vena cava → right atrium → right ventricle → pulmonary artery → pulmonary vein → left atrium → left ventricle → aorta |
| 20 | What does exothermic mean? | Energy is given out |
| 21 | Write the word equation for aerobic respiration | glucose + oxygen → carbon dioxide + water (+ energy) |
| 22 | Write the word equation for anaerobic respiration | glucose → lactic acid |
| 23 | Write the equation for cardiac output | Cardiac output = stroke volume x heart rate |

**CB9 Ecosystems and Material Cycles – Core Questions**

|  |  |  |
| --- | --- | --- |
| 1. | All the organisms that live and interact in an ecosystem form a….. | Community |
| 2. | A community is made up of ……………………. of different species | Populations |
| 3.  | What does interdependence mean? | Interdependence is the dynamic relationship between all living things |
| 4. | State 4 abiotic factors | * Temperature
* Light
* Water
* Pollutants
 |
| 5. | State 2 biotic factors | * Competition
* Predation
 |
| 6.  | What is a parasite?  | An organism whose survival depends on the presence of another species from which it takes food and other resources |
| 7. | Give 4 examples of parasitism | * Fleas
* head lice
* tape worms
* mistletoe
 |
| 8.  | What does the term ‘mutualism’ mean?  | Organisms that exist in a close, mutually beneficial relationship where both aid the survival of the other. |
| 9. | Give 4 examples of mutualism | * Oxpeckers that clean other species
* Cleaner fish
* Nitrogen fixing bacteria
* Chemosynthetic bacteria in tube worms in deep sea vents
 |
| 12. | How does fish farming help aquatic ecosystems? | It prevents overfishing of wild fish |
| 13. | State 2 problems with fish farming | Fish are kept in small space, therefore:* Un-eaten food and faeces sinks to bottom of water and can affect wild organisms that live there.
* Parasites and disease can spread more easily
 |
| 14. | What is a non-indigenous species? | A species that is not natural to that environment |
| 15.  | How can the introduction of non-indigenous species affect an ecosystem? | It can cause problems for the native species that already exist in the ecosystem |
| 16. | What can happen in an aquatic system if too much fertiliser is used on the soil | Eutrophication |
| 17. | State the 2 nutrients found in fertiliser that can cause eutrophication | NitratePhosphate |
| 18. | How does eutrophication cause a problem? | The algal bloom blocks sunlight. Plants die and bacteria builds up in the water. The bacteria uses up all the oxygen and all living things in the ecosystem die. |
| 19. | How does reforestation benefit biodiversity? | It increases the number of species in the area |
| 20. | What is conservation? | When an effort is made to protect a rare or endangered species or habitat |
| 21. | What is food security? | Food security is having access to safe and healthy food at all times |
| 22. | State 2 biological factors which could affect food security | * Increasing human population
* Increasing animal farming
* Impact of pests and pathogens
* Environmental change caused by human activity
* Sustainability issues
 |
| 23. | What is the equation for photosynthesis? | Carbon dioxide + Water → Glucose and OxygenLight is used to do this |
| 24. | What is the word equation for respiration? | Glucose and Oxygen → Carbon dioxide + Water + (Energy) |
| 25. | Which common greenhouse gas is released in combustion that is also released in respiration? | Carbon dioxide |
| 26. | Which gas comprises nearly 80% of our atmosphere but cannot be used directly by plants and animals? | Nitrogen |
| 27. | Where do nitrogen fixing bacteria live and what do they do? | The live in the soil or root nodules and they can ‘fix’ nitrogen gas from the air |
| 28. | Which weather phenomenon can also convert nitrogen gas into nitrates? | Lightning |
| 29 | What is the role of decomposers? Give two examples. | Break down dead animals and plantsFungi, worms |
| 30. | What can nitrifying bacteria in the soil do? | Convert ammonia into nitrates |
| 31. | Why do plants need nitrates? | To make proteins for growth |
| 32. | What is the role of denitrifying bacteria? | Convert nitrates to nitrogen gas and return it to the atmosphere. |
| 33. | Identify 2 processes which cause water to change state in the water cycle | * Evaporation
* Condensation
 |
| 34. | What is desalination? | Obtaining fresh water from the sea or salty water |
| 36. | State 3 factors that affect the rate of decomposition of food | * Temperature
* Water content
* Oxygen
 |