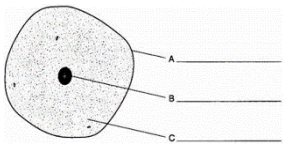
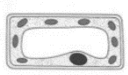
Year 9 Science Knowledge quizzes

Tips:

- Learn one quiz at a time. Cover the right hand side and go through each question, checking the answers as you go.
- Get a friend or family member to quiz you – in random order
- When you are feeling confident, cover the right side and write the answers to all the ones you can, then check.

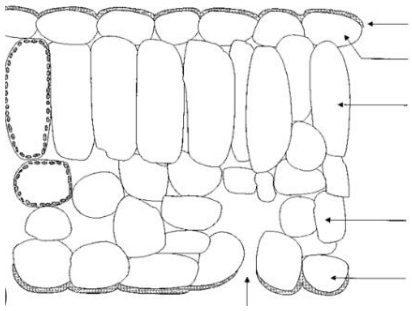
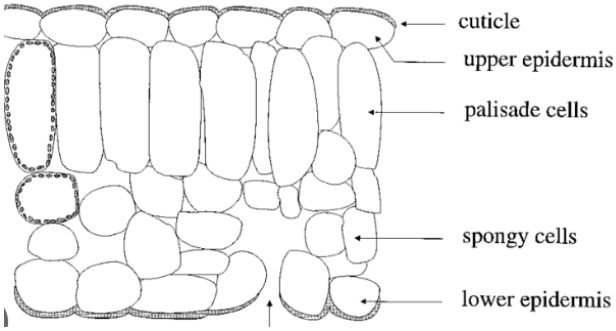
Cells, tissues, organs, organ systems

Question	Answer
What is a “unicellular organism”?	One that is only one single cell
Give an example of a unicellular organism	Bacteria or yeast
What is the function of the mitochondria?	Respiration – to release energy
What is the function of the ribosomes?	Make proteins
Which part of the cell controls what enters and leaves the cell?	Cell membrane
What is the function of the nucleus?	Controls the whole cell and contains the DNA
Why do plant cells have cell walls?	Strength and support
Which 3 structures are found in most plant cells but not in animal cells?	Vacuole, chloroplasts, cell wall
What are the 3 labels for the diagram shown: 	A – cell membrane B – nucleus C - cytoplasm
What do groups of similar cells form?	tissue
Name the process by which substances enter and leave cells because of a difference in concentration	diffusion
Why do muscle cells contain lots of mitochondria?	To release lots of energy to allow muscles to contract
Why do palisade cells contain lots of chloroplasts?	To absorb as much energy as possible for photosynthesis
Which organ system contains the stomach and large and small intestine?	Digestive system
What is the job of the respiratory system?	To get oxygen into the body for respiration and to get rid of carbon dioxide
Name the air sacs at the end of the bronchioles inside the lungs	alveoli
How does the good blood supply around the air sacs speed up diffusion?	Constantly removes substances to maintain a concentration difference
What is the job of the digestive system?	Digest food into small enough particles that they can be absorbed into the blood
How do folded membranes on structures inside the body speed up diffusion?	It gives a large surface area
Why should you always start with the lowest magnification on a microscope?	For a wide field of view to allow you to find why you are looking for
How do you bring cells into view when looking down the microscope?	Turn the focussing wheel
How can you tell that the cell below is a plant cell? 	It has a cell wall and a large vacuole

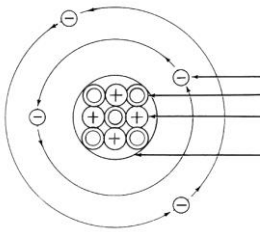
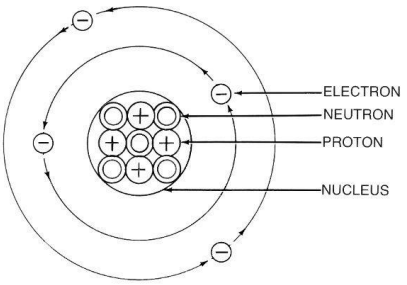
Biological Systems

Question	Answer
What are the 4 functions of the skeleton?	Support, movement, protection, blood cell production
What is an antagonistic muscle pair?	Muscles that create movement in pairs when one contracts and the other relaxes
Where in the respiratory system are gases exchanged?	Alveoli
Which gas moves into the bloodstream in the alveoli?	Oxygen
How are the alveoli adapted for gas exchange?	Thin membranes, good blood supply
By which process do gases move into and out of the blood in the alveoli?	diffusion
What happens to the pressure in the thorax during breathing in?	decreases
Write a word equation for aerobic respiration.	Glucose + oxygen à carbon dioxide + water + energy
Name the chemical found in cigarettes which binds to red blood cells	Carbon monoxide
In asthmatics, which part of the respiratory system is affected by spasms?	bronchioles
Describe the difference between breathing and respiration	Breathing is the process of inhaling and exhaling. Respiration is the chemical reaction that takes place inside cells to release energy
Write a word equation for anaerobic respiration	Glucose -> lactic acid + energy
Place the following in order from smallest to largest: cell, chromosome, nucleus, DNA, gene	Gene > DNA> chromosome > nucleus > cell
Which scientists are credited with the discovery of DNA?	Watson and Crick
What is the term for an allele which is expressed when only two copies of the same allele are present?	recessive
Define the term allele	Different versions of the same gene
What is respiration?	Chemical reaction that takes place in the mitochondria which releases energy
What happens to heart and breathing rates during exercise?	They both increase

Plants & Photosynthesis

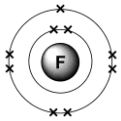
Question	Answer
What 4 things do plants need to carry out photosynthesis?	Light, carbon dioxide, water, chlorophyll
What are the products of photosynthesis?	Glucose and oxygen
Which tissue does most photosynthesis take place in?	Palisade mesophyll
Which tissue is responsible for carrying water around the plant?	Xylem
What can the sugar made in photosynthesis be used for? (3 things)	Turned into starch, used in respiration, turned into proteins or fats
Label the diagram of a leaf with the following structures : Cuticle, stomata, lower epidermis, upper epidermis, palisade cells, spongy cells 	 stomata
Which 3 conditions affect the rate of photosynthesis?	Light intensity, carbon dioxide concentration, temperature
How are roots adapted for their job?	Root hair cells give a large surface area
How are leaves adapted to absorb energy transferred by sunlight?	Lots of chloroplasts
Apart from having chloroplasts, name 2 other ways leaves are well adapted for photosynthesis	Leaves are thin, they have stomata to allow gases in and out, they have veins to deliver water, they have a waxy cuticle to stop water loss from the top surface
When do photosynthesis and respiration take place in a plant?	Respiration – all the time Photosynthesis – only when it is light
What tissue carries the glucose around the plant to where it is needed?	Phloem
Write the word equation for photosynthesis	Carbon dioxide + water → glucose + oxygen

Atoms, elements and compounds

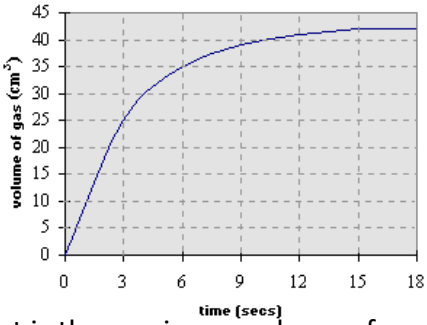
Question	Answer
What is an element?	Substance made up of one type of atom
What is a compound?	2 or more types of atom, chemically joined
What are the vertical columns in the periodic table called?	groups
What is used to order the elements in the modern periodic table?	Atomic number
What are the three particles that make up the atom called?	Proton, neutron and electron
Which two particles are found in the nucleus?	Proton and neutrons
Which particle is tiny, has a negative charge and is found orbiting the nucleus in shells?	electron
Label the diagram of an atom below: Nucleus, electron, proton, neutron 	
What do all elements in the same group have in common in terms of electrons	Same number of electrons in outer shell
What are the two types of element?	Metals and non-metals
Name the compound formed when copper reacts with chlorine.	Copper chloride
Name the three elements joined together in copper carbonate	Copper, carbon and oxygen
How many different elements are there in KNO_3?	3 elements: K , N and O
What happens to reactivity going down group 1?	Reactivity increases
What are the signs of a chemical reaction?	Temp change, colour change, fizzing/gas release
What do we mean by conservation of mass?	No mass is lost or gained during a chemical reaction mass of reactants = mass of products
Name the gas given off when group 1 react with water	hydrogen
What is the name for group 7?	Halogens

Compound formula	Name	Elements contained and number of each
MgO	Magnesium oxide	1 Magnesium, 1 oxygen
KCl	Potassium chloride	1 potassium , 1 chlorine
$CaCO_3$	Calcium carbonate	1 calcium, 1 carbon, 3 oxygen
$LiNO_3$	Lithium nitrate	1 lithium 1 nitrogen 3 oxygen

Reactivity

Name three properties of metals.	Shiny, good conductors (thermal and electrical), high melting point, sonorous
How many electrons fit into the first shell?	2
How many electrons fit into shells 2 and 3?	8
What do elements in the same group in the periodic table have in common?	Same number of electrons in outer shell
What is the name for an atom that has lost or gained electrons?	Ion
What is the common surname for alkalis?	Hydroxide
What are the two products when a metal reacts with an acid?	Salt and hydrogen
What do we call any chemical that is capable of neutralising an acid?	base
Name the equipment below: 	Burette, funnel, evaporating dish
What is the surname of the salts obtained when hydrochloric acid is neutralised?	Chloride
Name the two products if zinc oxide is reacted with hydrochloric acid.	Zinc chloride + water
How do you obtain copper sulfate crystals from a solution of copper sulfate?	Evaporation
What pH is neutral and what colour is this with UVI?	pH , green with UVI
Which gas is released when metal carbonates react with acids?	Carbon dioxide
Describe the test for carbon dioxide and the positive result	Bubble the gas through lime water, if the lime water turns cloudy, then the gas is carbon dioxide
Draw the electron configuration for fluorine.	 2, 7
Why can carbon be used to extract copper from its ore but not aluminium?	It is more reactive than copper so will be able to remove the oxygen from it, but it is less reactive than aluminium and will not be able to remove the oxygen from it.
What is the term for when a more reactive metal pushes a less reactive one out of a solution?	Displacement reaction
Complete the general equations: Metal + acid → Metal oxide + acid → Metal carbonate + acid →	 Metal + acid → salt + hydrogen Metal oxide + acid → salt + water Metal carbonate + acid → salt + water + carbon dioxide

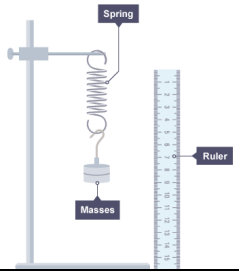
Rates of reaction

Question	Answer
Describe two ways to measure the rate of a reaction involving a gas being given off.	Change in mass in ceratin time or volume of gas produced in certain time
What is concentration?	Number of particles in a given certain volume
What is an anomaly?	An odd result – one that doesn't follow the patten
What do you do with anomalies when calculating means?	Don't include them in the mean calculation
Describe the test for oxygen.	Place glowing splint inside the gas and it should relight
What is a catalyst?	A substance/chemical that speeds up a chemical reaction
What does a catalyst do to the overall amount of product made?	Nothing – the same amount of product would be made with or without the catalyst.
How can the surface area of a substance be increased?	Chopping it into smaller pieces
When does a reaction stop?	When reactants are used up, so reacting particles are no longer colliding.
Describe the temperature change for an exothermic reaction.	Temperature increases
Why does the rate of a reaction increase when the concentration is increased?	More reacting particles in the same volume meaning that there will be more frequent collisions, resulting in a faster reaction.
What is the minimum amount of energy that particles should collide with for a reaction to be successful?	Activation energy
For the graph below:  a) What is the maximum volume of gas collected? b) How long does it take for the reaction to complete?	a) 42 -43cm^3 b) 15 minutes (graph plateaus after that)
What are the products of complete combustion?	Carbon dioxide and water
What are the products of incomplete combustion?	Carbon, carbon monoxide and water
What does "thermal decomposition" mean?	Breaking down a substance using heat

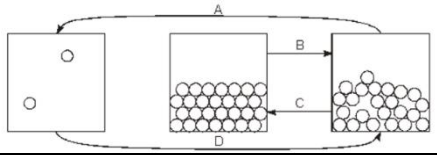
Energy

Question	Answer
What is the unit for energy?	Joules
What are the 8 energy stores?	Kinetic, gravitational potential, thermal, elastic potential, nuclear, electrostatic, magnetic, chemical
Which store is filled when an object is raised off the ground?	Gravitational potential
Name the pathways by which energy is transferred	Forces, electrically, heating, radiation (light/sound)
Which store fills when energy is 'wasted'?	Thermal store (of the environment)
What is a fuel?	A substance with a store of energy in a chemical store that can be released
Why does the Bunsen burner flame release more energy when the hole in the Bunsen is open?	More oxygen is available for combustion
Which method of heat transfer occurs in solids when particles collide with each other?	Conduction
Why do regions of hot liquids and gases rise?	They are less dense
Which colour absorbs and emits the most Infrared radiation?	Black
Why are hot food takeaway containers silver or white?	Because this reflects infrared back to the food and is a poor emitter of infrared / keeps the food hot
What is the equation to calculate power?	Power = energy ÷ time
Which unit is used for power?	Watt
What is 1 watt equal to in terms of joules?	1 watt = 1 joule per second
What is a fossil fuel?	A fuel created from the remains of dead sea creatures or plants millions of years ago
What does the term 'renewable' mean?	Will not run out
Give an example of renewable energy resource	Solar, wind, hydroelectric, wave, tidal, biomass
Give an advantage of renewable resources such as solar and wind other than not running out	They don't release carbon dioxide
Give an advantage of renewable resources such as solar and wind	Not very reliable – eg solar doesn't work when it isn't sunny/when it's dark, wind doesn't work on still days
How do insulators help us save money?	They reduce energy transfers
Name the method of heat transfer that takes place in fluids when regions of hot gas/liquid rise	convection
What is efficiency in terms of energy transfers?	The fraction of energy that is transferred usefully Calculated by $\frac{\text{energy usefully transferred}}{\text{Total energy transferred}}$

Forces in Action

Question	Answer
What is a pivot?	The point around which a lever turns
What is a lever?	Simple machine consisting of a bar that turns around a fixed pivot
What is the definition of a simple machine?	A simple machine is a device which alters: • the size of a force or; • the direction in which a force acts.
What is a 'moment'?	The turning effect of a force
What is the equation to calculate moments?	Moment = force x distance
When does an object balance?	When the total clockwise and total anticlockwise moments are equal
What is an elastic object?	An object which returns to its original shape and size when stretched or squashed (compressed)
Which store increases when an elastic object is stretched or squashed?	Elastic potential
How is work done calculated?	Work done = force x distance
What are the units for work done?	Joules (J) or kilojoules (kJ)
What is the equation linking force, extension and spring constant?	Force = spring constant x extension
Why do different springs stretch different amounts for the same force?	They have different spring constants
What unit must distance always be in before calculating work done?	meters
When the force is removed from a compressed or stretched object, to which energy store is the elastic potential energy transferred?	kinetic store
What sort of relationship is shown in a graph with a straight line through the origin?	**<u>Directly</u>** proportional
A student investigates how far a spring stretches with different weights, using the equipment below:  a) what is the independent variable? b) what is the dependent variable?	a) weight added to the spring b) the extension of the spring

Matter and waves

Question	Answer
What are the 3 states of matter?	solid, liquid, gas
Which state of matter has particles that can move around but are always touching and are not arranged in neat rows?	liquid
Why can liquids and gases flow?	Because the particles in liquids and gases are free to move around
Which states of matter have a fixed volume?	solids and liquids
Why can solids and liquids not be compressed (squashed)?	Because there is no space between the particles
Why can gases be compressed?	Because there is space between the particles
Which states of matter will take the shape of the container they are placed in?	gases and liquids
What do we call the change of state when a liquid turns into a solid?	freezing
Name the changes of state shown below 	A – boiling B – melting C – freezing D - condensation
What density does an object need to have to float on water?	Less than 1g/cm^3
What is the equation to calculate density?	Density = mass / volume
Which state of matter is the only one that can be compressed?	Gas
What is the relationship between pressure and depth of a liquid?	Pressure increases with depth
Why can liquids not be compressed?	Particles are all touching
What produces a wave?	Vibrations
What type of wave is a sound wave?	Longitudinal wave
Describe two differences between a light wave and a sound wave	- Light waves are transverse waves but sound waves are longitudinal - Light waves are caused by vibrations that are perpendicular to the direction of travel and sound waves are caused by parallel vibrations. - Light waves travel much faster than sound waves - Light waves can travel through a vacuum but sound waves need a medium to travel through - Sound travels fastest through solids but light travels slowest through solids
Through which medium does sound travel fastest?	solid
Label the diagram using the following words: amplitude, wavelength