Year 8 Science Personal Learning Checklist

Can you…?	Confidence		
	1	2	3
7C1 Particles			
States of Matter			
Categorise substances as solids, liquids and gases.			
Describe the properties of solids, liquids and gases.			
Density			
Calculate density.			
Compare the densities of solids, liquids and gases.			
The Particle Model			
Identify particle diagrams for solids, liquids and gases.			
Describe how the particles are arranged and how they behave in solids, liquids and gases.			
Explain the properties of solids, liquids and gases using the particle model.			
Expansion and Contraction			
Explain why substances expand when they are heated using the particle model.			
Explain why substances contract when they are cooled using the particle model.			
Gas Pressure			
Describe what gas pressure is and explain it using the particle model.			
Diffusion			
Describe what diffusion is and explain it using the particle model.			
Compare the rate (speed) of diffusion in solids, liquids and gases.			
Changes of State			
Name the changes of state (melting, boiling, condensing, freezing and subliming)			
Explain what happens during the changes of state in terms of particles.			
Melting and Boiling Points			
Describe what is meant by melting point and boiling point.			
Recall the melting and boiling points of pure water (0°C and 100°C).			
Work out what state (solid, liquid or gas) a substance will be in at a given temperature using its melting and boiling point.			

7B1 Cells			
Using a Microscope			
Name the parts of a microscope.			
Describe how to use a microscope.			
Cells			
Identify the organelles (parts) of an animal cell.			
Identify the organelles (parts) of a plant cell.			
Explain the function (job) of each organelle.			
Describe the features of specialised cells (sperm cell, egg cell, root hair cell, nerve cell, red blood cell, palisade cell) and explain how they help the cell to carry out its function (job).			
Organisms			

Describe what a unicellular organism is (you should be able to describe amoeba and euglena).			
Explain how unicellular organisms are different to plant and animal cells.			
Describe the link between cells, tissues, organs and organ systems in multicellular organisms.			
Diffusion and Osmosis			
Describe what diffusion is and explain it in terms of particles.			
Identify some substances that can move into or out of cells by diffusion.			
Describe an experiment to investigate the effect of temperature on diffusion.			
Describe how temperature affects diffusion.			
Describe how water moves from the soil in to a plant.			
Explain why plants wilt if they don't get enough water.			

7P1 Forces			
Forces			
Describe what a force is.			
State the unit of force (Newtons, N).			
Give examples of contact and non-contact forces.			
Identify force pairs.			
Weight and Mass			
Define mass and weight.			
Describe how to measure mass and weight.			
Use an equation to link mass and weight.			
Balanced and Unbalanced Forces			
Label a force diagram.			
Describe what balanced and unbalanced forces are.			
Explain what will happen to an object if the forces are balanced (remains stationary or travels at a constant speed) or unbalanced (start moving in the direction of the largest force, accelerate or decelerate).			
Springs			
Name the forces acting on a spring.			
Describe how weight affects the extension of a spring.			
Upthrust			
Describe what upthrust is.			
Determine whether an object will float or sink by comparing the weight to the upthrust.			
Friction			
Describe what friction is and what direction it acts in (opposite direction to the direction the object is moving in).			
Compare the force of friction between different materials and explain how to reduce friction.			
Air and Water Resistance			
Describe what air and water resistance are and what causes them.			
Explain the effect of speed on air and water resistance.			
Explain the motion of a parachutist in terms of forces.			
Identify situations where air and water resistance need to be reduced.			
Explain how air and water resistance can be reduced by streamlining.			

7C2 Separating Techniques			
Pure or Impure			
Identify ***pure*** and ***impure*** substances from particle diagrams.			
Explain the difference between pure and impure substances.			
Dissolving and Solutions			
Define the terms ***soluble***, ***insoluble***, ***solute***, ***solvent***, ***suspension***, ***solution***, ***saturated solution***, ***concentration*** and ***solubility***.			
Describe how to identify soluble and insoluble substances.			
Describe what happens when a substance dissolves in terms of particles.			
Describe how to change the concentration of a solution.			
Explain the difference between a solution with a high concentration and a solution with a low concentration in terms of particles.			
List the factors that affect solubility.			
Explain how to investigate solubility.			
Name some different solvents.			
Explain why we might need to use a different solvent instead of water.			
Melting and Boiling Points of Mixtures			
Describe the effect of salt on the melting point of water.			
Explain why salt is added to roads during cold winters.			
Use ***melting and boiling point*** data to determine what ***state*** (solid, liquid or gas) a substance will be in at a given temperature.			
Separation Techniques			
Describe how the following techniques can be used to separate a mixture:			
Magnetism; sieving; filtration; evaporation (crystallisation); distillation; decanting; chromatography			
Explain how/why each of the techniques listed above works.			
Choose a suitable technique to separate a given mixture.			
Identify whether a colour is pure or a mixture from a ***chromatogram***.			
Identify an 'unknown' colour from a chromatogram.			

7P2 Energy and Sound			
Energy			
Name five ***energy stores***.			
Give examples of ***energy transfers***.			
Identify the ***input energy transfer***, ***useful energy transfer*** and ***wasted energy transfer*** in a system.			
Draw ***Sankey diagrams*** to represent energy transfers.			
State the law of ***conservation of energy***.			
Fuels			
Name some ***fuels***.			
State what a fuel is in terms of energy and give the energy transfer for burning.			
Write a word equation for ***combustion***.			
Work Done and Levers			

Identify when work is being done and state the unit for work done.			
Calculate work done, force and distance using the equation:			
Work Done = Force x Distance moved by force			
Label a lever system.			
Describe how a lever system amplifies a force.			
Sound and Hearing			
Describe how ***sounds*** are produced and how they travel.			
State whether sound travels fastest in solids, liquids or gases and explain why, using the particle model.			
Explain why sound cannot travel through a ***vacuum***.			
Compare ***loud*** and ***quiet*** sounds in terms of ***vibrations***.			
Compare ***high and low pitched*** sounds in terms of vibrations.			
Define the terms ***frequency*** and ***volume***.			
Describe sounds, in terms of frequency and volume, from sound wave diagrams.			
Explain how ***sound-proofing*** works.			
Name the parts of the ***ear*** and describe how we hear sounds.			
Explain how ears can be damaged by noise and how this can be prevented.			
Compare the hearing range of humans and animals in terms of frequency.			
Define ***ultrasound*** and ***infrasound*** and give examples of how they can be used.			

7B2 Movement and Reproduction			
Puberty			
Identify the changes that happen to boys and girls during puberty.			
Male & female reproductive system			
Identify the parts of the male and female reproductive system.			
Describe the different stages in the menstrual cycle.			
State how long the menstrual cycle is and how often a woman menstruates.			
State where sperm are produced.			
State where ova (egg cells) are produced.			
Explain how ova (egg cells) and sperm cells are adapted for their functions.			
Reproduction and pregnancy			
Describe how a sperm cell reaches the egg cell.			
Explain the difference between ovulation and fertilisation.			
State where fertilisation takes place.			
Describe what happens after an ovum (egg cell) after it has been fertilised.			
Describe the stages in the development of a foetus.			
Explain how a foetus gets the nutrients and oxygen that it needs.			
Explain how a foetus gets rid of carbon dioxide and other waste products.			
Describe how a baby is born.			
Explain what happens to the muscles in the uterus wall during child birth.			
Name some substances that can affect the development of a foetus and explain the effects they can have.			
Describe how identical and non-identical twins are produced.			

Explain the difference between identical and non-identical twins.			
Describe what conjoined twins are.			
Plant reproductive systems			
Identify the male and female parts of a flower			
Name the male and female parts of a flower and explain their roles			
Suggest how plants avoid self-pollination and why that's important			
Describe the different ways that pollen can pollinate a flower			
Explain how the different parts of flowers are adapted to different ways of pollination			
Explain the importance of pollinators such as bees to ecosystems			
Name a way that seeds can be dispersed			
Describe the different ways that seeds can be dispersed			
Explain why plants need to use seed dispersal mechanisms			
Lungs & Breathing			
Identify the parts of the respiratory system.			
Describe how we breathe in and out.			
Explain why air enters and leaves out lungs in terms of changes in pressure and volume.			
Describe what gas exchange is and where it happens.			
Explain how the lungs are adapted for gas exchange, including the role of the alveoli.			
Describe how smoking affects the respiratory system.			
The Skeleton			
Describe four functions of the skeleton.			
Describe the structure of a long bone e.g. the femur.			
State the four different types of joint we have in the skeleton, describe where they are found and what movement they allow.			
Explain the roles of tendons, ligaments, muscles, cartilage and synovial fluid.			
Describe some medical problems that can occur in the skeletal system and suggest how they might be treated.			
Muscles			
Name the three different types of muscle found in the human body, describe where they are found and what their functions are.			
Explain how antagonistic muscle pairs work together to bring about movement.			

8C3 Elements, Compounds, Mixtures			
Elements, Compounds and Mixtures			
Recall the meaning of the terms atom, element, compound and mixture.			
Identify elements, compounds and mixtures from particle diagrams and justify your choices.			
Identify the correct chemical symbol for an element.			
Deduce information about an element from its position on the periodic table e.g. is it a metal or non-metal? What group is it in?			
Draw particle diagrams for elements that are solids, liquids or gases (monatomic and diatomic).			
Name a compound from the names of the elements it contains.			
Deduce the number and type of atoms a compound is made of from its chemical formula.			
Explain why a mixture can be separated easily by physical means (e.g. filtration) but a compound cannot.			
Name the process used to split up the elements in a compound.			

Oxidation Reactions			
Name the products formed when an element reacts with oxygen.			
Write word and balanced symbol equations for oxidation reactions.			
State whether metal oxides are acidic or basic.			
State whether non-metal oxides are acidic or basic.			
Describe what happens to the mass of a metal when it is heated in air/oxygen and explain why.			
Properties of Metals and Non-metals			
Identify the properties of metals and non-metals.			
Describe what each property means (conductor, insulator, brittle, malleable, ductile, reactive, melting point, boiling point, transparent, translucent, opaque, sonorous, strong, density).			
Describe how you could test for each property.			

8B3 Diet and Digestion			
Healthy Diet			
Name the different food groups that we need to include in our diet.			
Explain what each of the food groups is needed for.			
Describe how to test foods for starch, sugars, protein and fat.			
Recall the meaning of the term malnutrition.			
Describe the physical effects of eating too much, eating too little, obesity and starvation.			
Digestion and the Digestive System			
Identify the organs of the human digestive system.			
Describe what happens in digestion, including the role of the oesophagus, stomach, small intestine, large intestine and pancreas.			
Explain why digestion is necessary.			
Name the substances that carbohydrates, proteins and fats are broken down into.			
State what an enzyme is.			
Explain the role of enzymes in digestion.			
Describe how increasing the temperature affects how well enzymes work.			
Describe the structure of the small intestine (including the villi) and explain how this structure makes it adapted for absorption.			
Describe the role of bacteria in the digestive system and discuss the impact of changing the number/type of bacteria present.			
Respiration			
State what respiration is and where it happens.			
Explain why respiration is important.			
Name the products of aerobic respiration.			
Write a word equation and a balanced symbol equation for aerobic respiration.			
Describe what anaerobic respiration is and name the products.			
Explain the effects of lactic acid build-up on performance.			
State what is meant by the term ‘oxygen debt’.			
Describe the similarities and differences between aerobic and anaerobic respiration.			

8P3 Magnetism and Pressure

Magnets and Magnetism			
State which metals can be magnetised.			
Describe how to magnetise an iron nail.			
Use the idea of domains to explain why metals are magnetised.			
Describe how to tell a magnet from a magnetic material.			
Sketch the field lines around a magnet.			
Predict the shape of magnetic field lines when two magnets interact.			
State what a compass is.			
Identify the North and South pole of a compass.			
Draw the magnetic field around the Earth.			
Explain why the Earth has a magnetic field.			
Describe ways that the Earth's magnetic field is useful.			
Mass, Gravity and Weight			
Explain the difference between weight and gravity.			
Remember the equation to calculate weight.			
Use the right units for weight and mass.			
Calculate the weight of something on different planets.			
Draw arrows on something to show the direction weight acts.			
Describe how mass and distance affects the force of gravity between two things.			
Define weight.			
Define gravity.			
Compare mass and weight on different planets.			
Static Electricity			
Describe what happens when something becomes 'charged' with static electricity.			
Describe some problems with static electricity and their solutions.			
List some uses of static electricity.			
Explain how static electricity useful in spray painting, the electrostatic smoke precipitator and the photocopier.			
Describe the effects of charged objects on each other.			
Pressure			
Define pressure.			
Remember the formula to calculate pressure.			
Work out what units to use for pressure.			
Calculate pressure.			
Use the idea of force, area and pressure to explain everyday things.			
Describe how air and liquids exert a pressure on your body.			
Explain how the pressure in a liquid changes with depth.			
Explain how the pressure in air changes with height.			
Floating and Sinking			
Label a diagram to show the forces acting on a floating object.			
Explain what density means.			
Remember the formula to calculate density.			
Calculate the density of something.			
Explain in terms of density and upthrust why something floats.			

8C4 Acids & Alkalis			
Acids, alkalis and indicators			
Name some substances that are acidic, alkaline and neutral.			
Recall the colour changes for universal indicator in acidic, alkaline and neutral solutions.			
Identify whether a substance is a strong or weak acid, strong or weak alkali or neutral from its pH.			
Describe how to make a vegetable indicator.			
Neutralisation			
Describe what happens when an acid is mixed with an alkali or a base.			
Name the products of neutralisation.			
Name the salt made in a neutralisation reaction from the names of the acid and alkali/base used.			
Write word and symbol equations for neutralisation reactions.			
Give some examples of useful neutralisation reactions.			
Explain how a base and an alkali are similar and how they are different.			
Describe how the reaction between bases and alkalis with acid are similar and how they are different.			
The reaction of an acid with a metal			
Name some metals that react with acid.			
Describe what happens when a metal reacts with an acid.			
Name the gas produced when a metal reacts with an acid and describe the test used to identify it.			
Explain how you can tell which metals are most reactive from their reaction with acid.			
Name the products of the reaction of an acid and a metal.			
Write word and symbol equations for the reaction of an acid and a metal.			
Describe the properties of ceramics, polymers and composites			

8B4 Photosynthesis & Interdependence			
Photosynthesis			
Identify the sources of raw materials in photosynthesis			
Identify where photosynthesis takes place			
Construct the word equation for photosynthesis			
Explain the term ‘photosynthesis’			
Leaf structure & testing for starch			
Label parts of a plant			
Identify the different layers of the leaf			
Describe the functions of the different layers			
Relate the presence of starch in a photosynthesising leaf and to the presence of chlorophyll and exposure to light			
Movement of water in plants & transpiration			
Name the organs that make up the plant transport system			
Describe the role of xylem, phloem and root hair cells and explain how they are adapted for their functions			
State that transpiration is the evaporation of water vapour from the leaves.			
State the function of stomata.			
Describe how transpiration maintains the movement of water from roots to leaves.			
Describe how the opening and closing of stomata is controlled by guard cells.			
Recognise the factors that affect transpiration.			

Describe how a potometer can be used to estimate the volume of water lost by a plant.			
Identify control variables when investigating rate of transpiration.			
Uses of minerals & mineral deficiency			
State the use of minerals in a plant			
Describe where plants get minerals from			
Describe examples of mineral deficiency in plants			
Describe why farmers and gardeners use fertilisers			
Chemosynthesis			
Identify where chemosynthesis takes place			
Describe the process of chemosynthesis			
Compare and contrast chemosynthesis and photosynthesis			
Animal adaptations			
Describe how animals and plants adapt to an environment.			
Explain why animals and plants adapt to an environment.			
Design the ultimate animal adaptation for a chosen ecosystem.			
Food chains & food webs			
Describe feeding relationships between plants and animals			
Show how energy flows though food chains			
Interlink food chains to form food webs			
Interpret food chain and food web diagrams			
Define interdependence			
Pyramids of number			
Use the terms “trophic level”, “population” and “primary / secondary consumer” correctly			
Draw pyramids of numbers (simple sketches and to scale)			
Interdependence			
Define a predator and prey and describe adaptations of predators and prey			
Describe and explain a predator-prey cycle graph			
Explain why numbers of predators and prey may rapidly decline			
Bioccumulation			
Describe how bioaccumulation works.			
Describe how pesticides can kill other organisms.			
Explain advantages of using biological control over pesticides.			

8P4 Electricity			
Current			
Define current.			
State the unit of current.			
Describe what happens to current in a series circuit.			
Describe what happens to current in a parallel circuit.			
State the measuring instrument used to measure current.			
State where to put the meter that measures current in a circuit.			
"Voltage (potential difference)"			
Define voltage (potential difference).			

State the unit of voltage.			
Describe what happens to voltage in a series circuit.			
Describe what happens to voltage in a parallel circuit.			
State the measuring instrument used to measure voltage.			
State where to put the meter that measures voltage in a circuit.			
Resistance			
Define resistance.			
Compare the resistance of different materials.			
Describe what factors increase the resistance of a circuit or wire.			
Electrical circuits			
Draw the circuit symbols for different components, including: cell, battery, wire, bulb, resistor, ammeter, voltmeter, switch, motor.			
Tell the difference between a series circuit and a parallel circuit.			
Describe the energy changes in a battery.			
Know how to calculate current, potential difference and resistance using the equation V=IxR			
Electromagnets			
Recall the shape of the field lines around a magnet.			
Recall that a current-carrying wire has a magnetic field.			
State what happens to the magnetic field around a wire if there is no current.			
Describe what an electromagnet is.			
Describe how an electromagnet works.			
Identify factors that affect the strength of an electromagnet.			
Describe some uses of electromagnets.			
Motors			
Label the different parts of a motor on a diagram.			
Identify the two different sources of magnetic fields in a motor.			
Describe how a motor works.			
Explain how to increase the speed of a motor.			
Explain advantages of using biological control over pesticides.			