Y8 Cycle 1 Science Scholar's Guide

Oxford Spires Academy

Full Name: _____
Tutor Group: _____
Science Class: _____
Science Teacher(s): _____

Science Y8

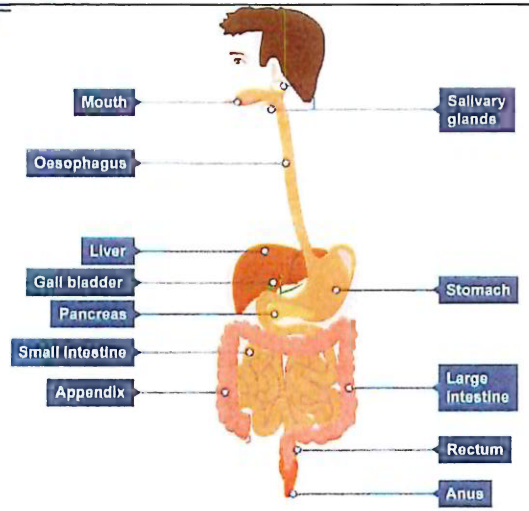
Cycle 1

The Knowledge Organisers contain all the knowledge you need to learn.
Below is what you need to be able to do.

	8.1 Digestion & Respiration	8.2 Atoms, Elements and Compounds
	To revise how to be safe in a Science Lab. Describe possible health effects of unbalanced diets from data provided.	To learn how to be safe in a Science Lab. Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles.
	Calculate food requirements for a healthy diet, using information provided. Describe how organs and tissues involved in digestion are adapted for their role. Describe the events that take place in order to turn a meal into simple food molecules inside a cell.	Explain changes in states in terms of changes to the energy of particles.
	Describe how organs and tissues involved in digestion are adapted for their role. Describe the events that take place in order to turn a meal into simple food molecules inside a cell.	Explain unfamiliar observations about gas pressure in terms of particles. Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion.
	Mid Point Assessment Re-teach. Explain observations about changes to breathing rate and volume. Explain how changes in volume and pressure inside the chest move gases in and out of the lungs. Explain how the parts of the gas exchange system are adapted to their function. Explain how exercise, smoking and asthma affect the gas exchange system.	**Mid Point Assessment Re-teach.** Explain how substances dissolve using the particle model. Use the solubility curve of a solute to explain observations about solutions.
	Describe how organs and tissues involved in circulation are adapted for their role. Describe the Use word equations to describe aerobic and anaerobic respiration. Explain how specific activities involve aerobic or anaerobic respiration.	Devise ways to separate mixtures, based on their properties. Choose the most suitable technique to separate out a mixture of substances. Use evidence from chromatography to identify unknown substances in mixtures.
11&12	Assessment & Reteach	Assessment & Reteach

8.1 Digestion and Respiration KO 1

Know The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes



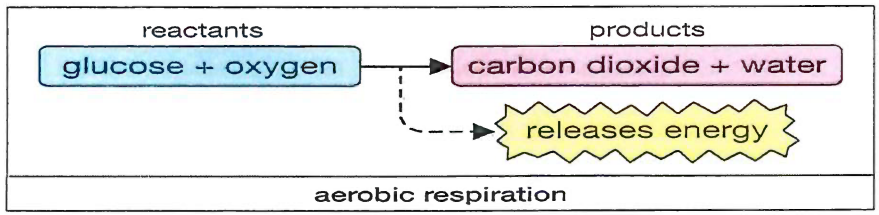
Facts
Iron is a mineral important for red blood cells.
Calcium is a mineral needed for strong teeth and bones.
Vitamins and minerals are needed in small amounts to keep the body healthy.

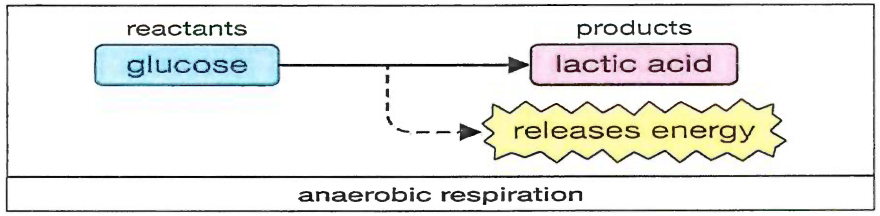
Key Word	Meaning
Enzymes	Substances that speed up the chemical reactions of digestion
Dietary fibre	Parts of plants that cannot be digested, which helps the body eliminate waste
Carbohydrates	The body's main source of energy. There are two types: simple (sugars) and complex (starch)
Lipids (fats and oils)	A source of energy. Found in butter, milk, eggs, nuts
Protein	Nutrient your body uses to build new tissue for growth and repair. Sources are meat, fish, eggs, dairy products, beans, nuts and seeds
Stomach	A sac where food is mixed with acidic juices to start the digestion of protein and kill microorganisms
Small intestine	Upper part of the intestine where digestion is completed and nutrients are absorbed by the blood
Large intestine	Lower part of the intestine from which water is absorbed and where faeces are formed
Gut bacteria	Microorganisms that naturally live in the intestine and help food break down

8.1 Digestion and Respiration KO 2

Know

Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.





Fact

Yeast fermentation is used in brewing and breadmaking.

Key Word	Meaning
Aerobic respiration	Breaking down glucose with oxygen to release energy and producing carbon dioxide and water
Anaerobic respiration (fermentation)	Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).

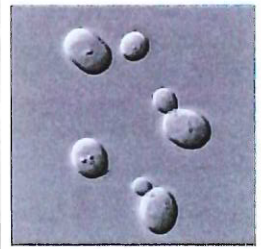
Here is the word equation for aerobic respiration:

glucose + oxygen → carbon dioxide + water

Here is the word equation for anaerobic respiration in humans:

glucose → lactic acid

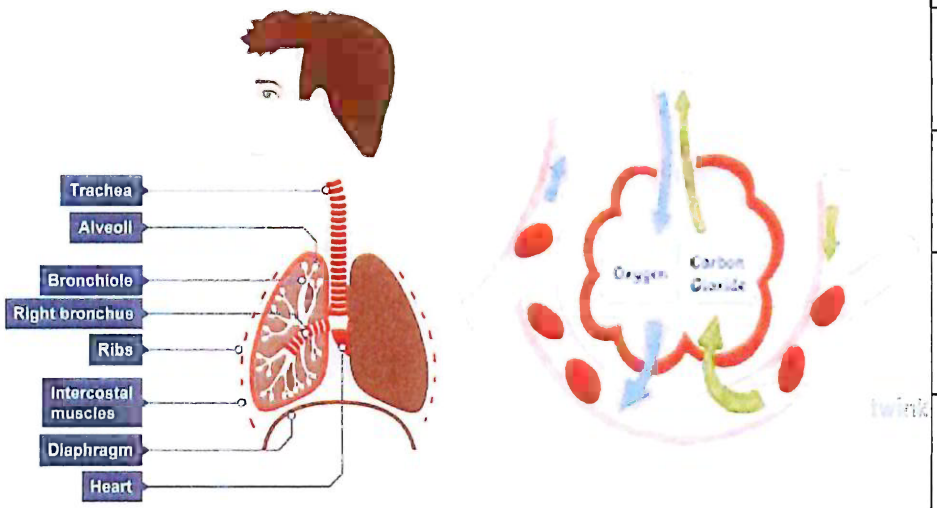
Here is the word equation for anaerobic respiration in plants and yeast (this is called fermentation in yeast): **glucose → ethanol + carbon dioxide**



8.1 Digestion and Respiration KO 3

Know

In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing.



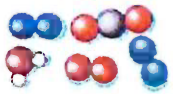
Fact

We breathe in air and breathe out air, it just changes composition i.e. how much oxygen and carbon dioxide it contains.

Key Word	Meaning
Breathing	The movement of air in and out of the lungs
Trachea (windpipe)	Carries air from the mouth and nose to the lungs
Bronchi	Two tubes which carry air to the lungs
Bronchioles	Small tubes in the lung
Alveoli	Small air sacs found at the end of each bronchiole
Ribs	Bones which surround the lungs to form the ribcage
Diaphragm	A sheet of muscle found underneath the lungs
Lung volume	Measure of the amount of air breathed in or out

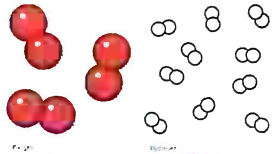
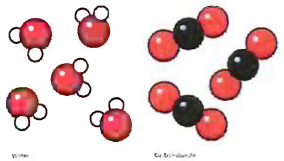
8.2 Atoms, Elements and Compounds KO 1

Know
Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain.

	Element
	Compound
	Mixture of Elements
	Mixture of Compounds
	Mixture of Elements and Compounds

Skill
Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms.

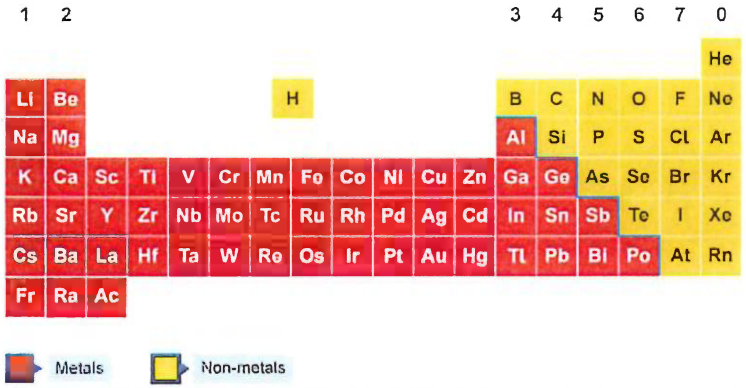
Key Word	Meaning
Elements	What all substances are made up of, and which contain only one type of atom.
Atom	The smallest particle of an element that can exist.
Molecules	Two to thousands of atoms joined together. Most non-metals exist either as small or giant molecules.
Mixture	Contains atoms of different elements or compounds not joined together which can be separated using their physical properties.
Compound	Pure substances made up of two or more elements strongly joined together.

	Atoms in Elements
	Molecules of Elements
	Molecules of Compounds

8.2 Atoms, Elements and Compounds KO 2

Know

The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties.



Facts

Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals. Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases.
Iron, nickel and cobalt are magnetic elements. Mercury is a metal that is liquid at room temperature. Bromine is a non-metal that is liquid at room temperature.

Key Word	Meaning
Periodic table	Shows all the elements arranged in rows and columns.
Physical properties	Features of a substance that can be observed without changing the substance itself.
Chemical properties	Features of the way a substance reacts with other substances.
Groups	Columns of the periodic table.
Periods	Rows of the periodic table.
Metals	Shiny, good conductors of electricity and heat, malleable and ductile, and usually solid at room temperature.
Non-metals	Dull, poor conductors of electricity and heat, brittle and usually solid or gaseous at room temperature.

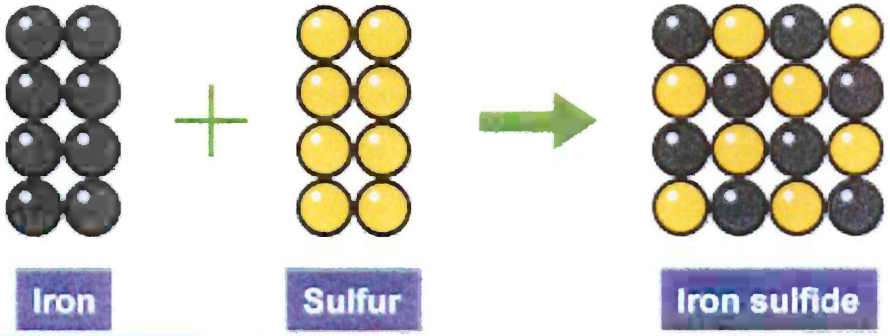
H = Hydrogen	O = Oxygen	N = Nitrogen	Mg = Magnesium
C = Carbon	He = Helium	Fe = Iron	
Zn = Zinc	Cu = Copper	S = Sulphur	
Al = Aluminium	I = Iodine	Br = Bromine	
Cl = Chlorine	Na = Sodium	K = Potassium	

8.2 Atoms, Elements and Compounds KO 3

Know

Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light. Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.

Metals and non-metals react with oxygen to form oxides which are either bases or acids.



Skill

Write word equations from information about chemical reactions.

Name simple compounds using rules: change non-metal to –ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulphate and carbonate.

Key Word	Meaning
Conserved	When the quantity of something does not change after a process takes place.
Chemical formula	Shows the elements present in a compound and their relative proportions.
Oxidation	Reaction in which a substance combines with oxygen.
Reactivity	The tendency of a substance to undergo a chemical reaction.