Science

Head of Department: Ms Mary Balogun

SERVICE OPPORTUNITY ASPIRATION REWARD

SOAR

YEAR 7-13 CURRICULUM ROADMAP SCIENCE

CRITICAL SCHOLARS

SUBJECT MASTERS

LOVERS OF LEARNING

Year 13 Summer
CRITICAL SCHOLARS
Biology/Chemistry/Physics:
Independent thinkers applying skills & knowledge

Year 13 Spring
MOVING TO CRITICAL SCHOLARSHIP
Biology/Chemistry/Physics:
Mastering the language & developing more complex skills

Year 13 Autumn
DEVELOPING CRITICAL SCHOLARS
Biology/Chemistry/Physics:
Transition & routines; retrieving and applying what they know; building confidence & independence

Year 12 Summer
TALKING THE TALK
Biology/Chemistry/Physics:
Independent thinkers applying skills & knowledge

Year 12 Spring
TALKING THE TALK
Biology/Chemistry/Physics: Mastering the language & developing more complex skills

Year 12 Autumn
STEPPING STONES
Biology/Chemistry/Physics:
Transition & routines; retrieving and applying what they know; building confidence & independence

Year 11 Summer
SUBJECT MASTERS
Revision: Review and consolidate knowledge and skills learned in preparation for exams to ensure understanding and confidence in science.

Year 11 Spring
MOVING TO MASTERY
Waves and rate: Discover how waves transfer energy and information through mediums, and how rates measure changes over time in various physical and chemical processes..

Year 11 Autumn
DEVELOPING SUBJECT MASTERS
Inheritance and forces: Learn how traits are passed down from parents to offspring through genes, and how forces like gravity and electromagnetism affect objects' motion and interactions in the physical world.

Year 10 Summer
OWNING YOUR STORY
Energy: Discover how energy is transferred and transformed between different forms, powering everything from our bodies to machines and natural processes

Year 10 Spring
SPEAKING THE LANGUAGE
Chemical reactions: Explore the transformation of substances into new materials with different properties, often accompanied by changes in temperature, colour, or the production of gases.

Year 10 Autumn
REIGNITING FIRES
The body and how it works: Understand the intricate systems and processes that enable our bodies to function, including digestion, circulation, and nervous system coordination, among others.

Year 8 Summer
SUBJECT IN ACTION
Waves and forces: Explore what happens when objects interact., and learn about the behaviour of waves, such as sound and light, and how they transfer energy.

Year 8 Spring
BUILDING ON OUR STORY
Chemistry in action: Explore how chemistry affects everyday life, from the reactions that cook our food and clean our homes to the processes that produce energy and medicines.

Year 8 Autumn
FANNING THE FLAMES
My body and what happens when it goes wrong? Explore how body systems work together to maintain health and what happens when they malfunction, leading to diseases and disorders.
Where did I come from? Explore the fascinating journey of human reproduction and how traits are passed down through generations.

Year 9 Summer
SHOWCASING OUR SUBJECT
Foundations in chemistry: Explore the basic concepts about how different substances are made, how they change, and how they react with each other.

Year 9 Spring
WHERE OUR STORY TAKES US
Foundations in Biology: Explore the basic concepts and principles about how living things work, grow, and interact with their environment.

Year 9 Autumn
FIRESTARTERS
Key concepts in science: Use key ideas to explain observations and make predictions
Maths for Science: Opportunity to explore and apply mathematical methods and principles to solve problems, analyse data.

Year 7 Summer
SUBJECT IN ACTION
Energy for everything: uncover the essential role energy plays in all aspects of life, from powering our homes and gadgets to driving natural processes like photosynthesis and weather patterns.

Year 7 Spring
THE STORY OF WHERE IT BEGAN
What is everything made of?: A dive into the fascinating world of atoms, the fundamental building blocks of all matter, as well as elements and the periodic table

Year 7 Autumn
LIGHTING FIRES
My body and how it works: Explore the anatomy and functions of vital organs, learn how different body systems work together, and discover the science behind growth, health, and disease.

SOAR

SERVICE OPPORTUNITY ASPIRATION REWARD

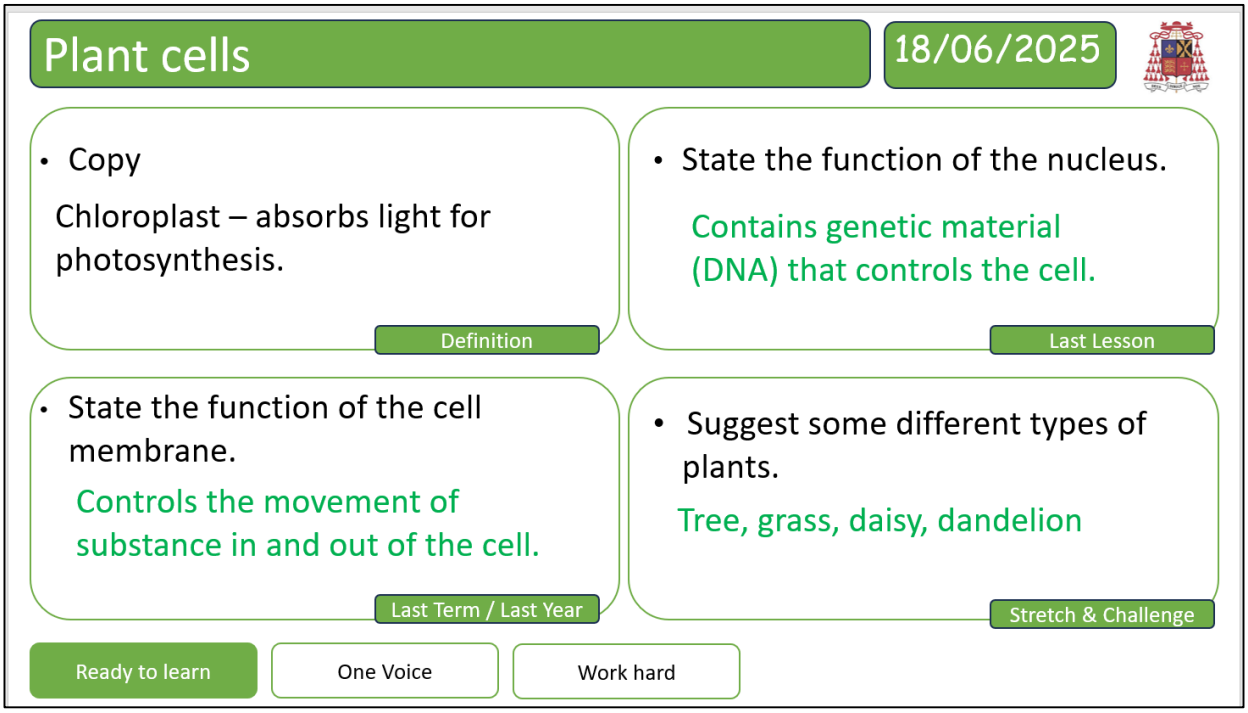
Curriculum Intent

We **serve** our students with an adaptive curriculum that meets the needs of all. Our different subjects have carefully identified plans outlining, what they teach and why. This is shared with all students, staff and parents to empower our community in their learning journey and includes careful consideration of sequencing of knowledge and skills. Cardinal Pole is committed to providing **opportunities** for staff and students to become life-long lovers of learning through personalised feedback, opportunities for reflection and progression. We are a community of **aspirant** learners where teachers are experts and students are critical scholars. This is achieved through absolute clarity of expectations and constant re-evaluation of needs through a shared language. We **reward** our community of learners by celebrating the successes, progress and achievements of all.

How do all SCIENCE lessons start? (Ready to Learn)

All lessons at Cardinal Pole start with a 'Ready to Learn' activity. The purpose of this is to support retrieval and prepares students for the lesson with recalling relevant knowledge. This activity is printed for students and handed out at the door. Students are expected to sit at their desk immediately and complete the task before sticking it in their books while the teacher welcomes the class and takes the register.

Ready to Learn activities in **SCIENCE** look like this:



Y7 Science

Becoming a physicist
Calculating a speed of a toy car.

How does a satellite stay in orbit?
Identify contact, non contact forces and effect of forces.
Be able to calculate speed of different objects

Becoming a physicist
Which object would keep your soup warmest and why?

Becoming a chemist
Observing the physical and chemical reactions of increasingly volatile elements

How are elements are organised in the periodic table?
Identify the key features of the periodic table techniques and describe the physical and chemical features of specific groups of elements

Becoming a chemist
Distillation, chromatography and filtration in action

How do you separate substances?
Identify the key features of different separation techniques and describe how they work

My body and me: heart and lungs
Identify the key features of the lungs, the heart and the circulatory system and describe how it works

How do cells work together?
Big picture: Levels of organisation: cells → tissues → organs → organ system → organism; identify the key stages and organs in the digestive system and describe how it works

What are the building blocks of life?
Big picture: Building on KS2 knowledge of plants and photosynthesis; identify the key features of animal and plant cells and describe how it works

How does heat transfer work?
Identify the key features of conduction, convection & radiation and describe how they work

Becoming a physicist
Using EPC ratings to select the printer for CP

What are the fuels that give us energy?
Identify renewable and non-renewable fuels and describe how they work

Will energy ever run out?
Identify the nine stores of energy and how they transfer between stores.

Becoming a physicist
Take on the role of energy consultant to reduce energy costs for Cardinal Pole

How do elements work together?
Identify atoms, elements, compounds & polymers; describe how they work together and apart

Why do particles matter?
Identify the key features of states of matter (solid, liquid & gas) and describe their properties

Becoming a biologist
Chicken wing dissection

My body and me: joints, muscles & skeleton
Identify the key features of the body responsible for movement and describe how it works

Becoming a chemist
Using Bunsen burners to explain changes of state

Becoming a biologist
Heart dissection to identify key features of a heart in real life; Effect of exercise on heart rate

Becoming a biologist
The journey of my food: the diary of a fried chicken!

Becoming a biologist
Using a microscope to identify key features of animal and plant cells in real life

SOAR
SERVICE OPPORTUNITY ASPIRATION REWARD

How is your progress measured in **Science** in Autumn Term 1?

Autumn 1: Becoming a Biologist	
Cells quiz	A fifteen minute formative assessment to identify strengths, gaps and inform teaching. Consists of three sections worth 5 marks each. Section 1: Five multiple choice questions (MCQ's) Section 2: Five written retrieval questions Section 3: One extended written response
Cells and digestive system topic test	A fifty minute summative assessment worth 40 marks, to evaluate understanding against curriculum objectives

Emerging	**Achieving**	**Excelling**
Cells quiz • I can answer all MCQ's	**Cells quiz** • I can answer all MCQ's and written retrieval questions	**Cells quiz** • I can answer all MCQ's, written retrieval and extended written response question.
Cells and digestive system topic test	**Cells and digestive system topic test**	**Cells and digestive system topic test**
Able to name and label some …. • Animal and plant cell organelles • parts of a microscope • Specialised cells • Digestive system	Able to name, label and describe functions of…. • Animal and plant cell organelles • A microscope • Specialised cells • Digestive system	Able to name, label describe functions, explain and solve …. • Animal and plant cell organelles • A microscope • Magnification equation • Specialised cells • Digestive system

How is your progress measured in **Science** in Autumn Term 2?

Autumn 2: Becoming a Biologist	
Cardiorespiratory system quiz	A fifteen minute formative assessment to identify strengths, gaps and inform teaching. Consists of three sections worth 5 marks each. Section 1: Five multiple choice questions (MCQ's) Section 2: Five written retrieval questions Section 3: One extended written response
Cardiorespiratory system and musculoskeletal topic test	A fifty minute summative assessment worth 40 marks, to evaluate understanding against curriculum objectives
Whole school assessment point 1	

Emerging	**Achieving**	**Excelling**
Cardiorespiratory quiz • I can answer all MCQ's **Cardiorespiratory system and musculoskeletal topic test** Able to name and label some ….	**Cardiorespiratory quiz** • I can answer all MCQ's and written retrieval questions **Cardiorespiratory system and musculoskeletal topic test** Able to name, label and describe functions of….	**Cardiorespiratory quiz** • I can answer all MCQ's, written retrieval and extended written response question. **Cardiorespiratory system and musculoskeletal topic test** Able to name, label describe functions, explain and solve ….

Y7 Biology: Cells

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1. What are cells?	• State what a cell is. • Describe the different organelles in an animal cell. • Describe the functions of the different organelles.	1) State the definition of an organelle. 2) Describe the function of the mitochondria. 3) Describe the function of the nucleus. 4) Suggest one example of a cell in the human body and their function (what they do).
2- What are Plant cells?	• Identify and label components of a plant cell. • Describe the functions of plant cells organelles. • Describe similarities and differences between plant and animal cells	1) State the function of the cell wall. 2) State the function of the vacuole. 3) State the function of the chloroplast. 4) State the name of the green pigment in leaves. 5) State one thing that is needed for photosynthesis to take place.
3- Using a light microscope	• Identify and label parts of a light microscope. • Describe how a light microscope can be used to produce clear images of cells. • Practice using a light microscope.	1) State the name of the wheel used to focus the image. 2) Describe why would we focus the image. 3) State the name of the lens used to make an image larger. 4) Describe what is it called when the image is made larger. 5) Calculate the total magnification if the eyepiece lens has a x4 magnification and the objective lens x10.
4- Observing cheek cells	- Make a slide of cheek cells. - View a cheek cell slide. - Describe how to view the cheek cell slide.	1) State the name of the staining chemical 2) Explain why we use the staining chemical. 3) State the name of the lens used to increase the magnification 4) State the name of the lens used to make the image clear. 5) Suggest one reason why we look at magnified images
5- Observing Plant cells	- Produce a slide of onion cells. - Observe the onion cells through a light microscope. - Draw the slide of onion cells that are being observed.	1) State the name of the chemical used to stain onion cells. 2) State the name of the slip put over the piece of onion. 3) Should you use a pen or a pencil when doing a scientific drawing. 4) Explain your choice. 5) State the name of the lens you look through in the microscope.

Y7 Biology: Cells

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6- Specialised cells	• State the functions of specialised cells. • Describe adaptations of specialised cells. • Explain the adaptations of specialised cells.	1) Describe the function of the Sperm cell. 2) There are lots of which organelle in a sperm cell. 3) Explain why there are lots of this organelle. 4) State the function of a root hair cell. 5) State the function of a red blood cell.
7- Describe	• Define describe in science • Answer simple describe questions. • Answer more complex describe questions.	1) Describe the organelles found in an animal cell. 2) Describe the differences between a plant cell and an animal cell. 3) State the name of where the oxygen attaches to in a red blood cell. 4) State the name of where the slide goes on a microscope.

Y7 Biology: The cardiorespiratory system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1-The respiratory system	• Identify different organs and their location in the body • Describe the functions of different organs • Describe the organisation of organisms	1) Complete the flow diagram to show the correct route that air takes to get into our cells: 2) Nasal cavity_____ ____ _____ _____ cells 3) Describe the function of the alveoli 4) Explain how the structure of the trachea is important to mammals.
2- Breathing and ventilation	• Describe how we inhale. • Describe how we exhale. • Explain both of these processes.	1) What do the intercostal muscles do? 2) What does the diaphragm do? 3) What happens to the volume of the chest space? 4) What happens to the pressure in the chest space? 5) What happens to the movement of air?
3- Modelling the lungs	• Describe a model of the lungs. • Design a model of the lungs. • Analyse a model of the lungs.	1) What did the balloons represent in the model? 2) What did the straw represent in the model? 3) What did the plastic bottle represent in the model? 4) Evaluate your model – what were the good bits and bad bits about the model? (eg how did it work well, and how did it not properly represent the system? 5) Explain how the bottom balloon was very similar to the organ it represented.
4- Gas exchange	• Define gas exchange. • Describe how gas exchange takes place. • Describe adaptations of the alveoli for gas exchange.	1) What is the meaning of gas exchange? 2) Name the two gases that get exchanged between the lungs and the blood 3) State the meaning of the term concentration? 4) Describe what happens to each of the two gases in gas exchange. You MUST use the following words: concentration, high, low, blood, alveoli.
5- How does human circulation work?	• State the parts of the human circulatory system. • Describe how blood transports nutrients around the body • Explain the importance of the circulatory system on our survival	1) State the key features of the human circulatory system 2) Describe the function of the heart 3) State the function of the arteries and the veins 4) What does the word 'oxygenated' mean? 5) Describe, in detail, the journey that blood takes around the body.

Y7 Biology: The cardiorespiratory system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6- The Mammalian Heart	• Label the chambers and blood vessels attached to the heart • Identify unknown parts of the heart from diagrams and state their relevance • Explain the relevance of other features of the heart, including the valves and the septum	1) State the names of the 4 heart chambers 2) State the names of two major veins attached to the heart 3) State the function of the heart valves. 4) Which side of the heart carries oxygenated blood? 5) Why is the wall of the left ventricle thicker than the wall of the right ventricle?
7- Heart dissection	• Carry out a safe dissection of the heart • Dissect a heart and identify the key anatomical features • Dissect and draw a labelled diagram of the internal heart structures, including chambers and blood vessels	1) Question – Look at the drawing of a heart. Describe the errors that the student has made to this drawing
8- What do arteries and veins look like?	• Identify arteries and veins from a diagram • Compare the structure of an artery to that of a vein • Explain how the structure of arteries relates to their structure	1) Compare the structure of an artery to the structure of a vein [4]. 2) Can you come up with three more comparisons. Make sure you use comparative language (for example thicker/thinner).
9- What is the blood made of?	• Label the chambers and blood vessels attached to the heart • Identify unknown parts of the heart from diagrams and state their relevance • Explain the relevance of other features of the heart, including the valves and the septum	1) State the names of the 4 heart chambers 2) State the names of two major veins attached to the heart 3) State the function of the heart valves. 4) Which side of the heart carries oxygenated blood? 5) Why is the wall of the left ventricle thicker than the wall of the right ventricle
10- The Cardiorespiratory System	• Describe the overall function of the respiratory system and the circulatory systems • Describe how the respiratory and circulatory systems work together to maximise the amount of oxygen that is taken into our cells for respiration	1) Which two body systems are involved in moving oxygen around the body 2) Describe what happens to your body when you exercise. 3) What does our body use energy for, and where does this energy come from? 4) Explain the importance of getting more oxygen into the body when you exercise. 5) Extension: Suggest what could happen to your body if you cannot get enough oxygen in when you exercise.

Y7 Biology: The cardiorespiratory system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
11- The effect of exercise on heart rate and breathing rate	• Describe how to measure a person's heart rate and breathing rate • Plan an experiment to measure how exercise effects a person's heart rate and breathing rate • Plan a fair investigation to measure how intensity of exercise can effect a person's heart rate and breathing rate	1) Describe how to measure your heart rate 2) Describe how to measure your breathing rate. 3) Which of the two is easier to measure, and why?
12- The effect of exercise on heart rate and breathing rate	• Describe the overall Carry out an investigation into how exercise effects heart rate and breathing rate	1) Which exercise caused you to have the highest heart rate? Why do you think this is? 2) Did you notice any patterns between the results for heart rate and breathing rate? 3) Can you think of any improvements we could have made to our investigation?
13 - The effect of exercise on heart rate and breathing rate	• State the results from our investigation and draw a bar graph. • Use collected data to plot bar graphs and describe the information that they show • Represent data scientifically and explain how changes in heart rate and breathing rate and link to our body's increased demand for oxygen	1) Which exercise caused you to have the biggest change in heart rate? 2) Describe the changes in our body when we exercise.

Y7 Biology: The digestive system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1- Levels of organisation	• Describe a multicellular organism • Describe the levels of organisation • Describe and identify different functions of organ systems	1) Order the levels of organisation starting with the simplest. 2) State the definition of a cell. Give one example 3) State the definition of a tissue. Give one example. 4) State the definition of an organ. Give one example and the function. 5) State the definition of a multicellular organism.
2- The journey food takes in a human	• Define digestion. • Describe the journey the food goes on during digestion. • Suggest the importance of digestion.	1) Describe the aim of the digestive system. 2) State the order of the organs that food passes through when you eat it. 3) Explain why humans eat food. 4) Sketch a labelled diagram of the digestive system. 5) State what your favourite type of food is and explain why.
3- What happens to food when it gets digested?	• Describe mechanical and chemical break down of food • State the organs where the different types of digestion take place. • Use a model to describe digestion.	1) Describe the term mechanical break down of food. 2) Describe the term chemical break down of food. 3) State the organs where food is broken down mechanically. 4) State the organs where food is broken down chemically. 5) State the function of the large intestine in the digestive process.
4- The stomach and the small intestine	• State the function of the stomach and small intestine. • Describe the function of the stomach and small intestine. • Describe adaptations of the small intestine.	1) State the name and role of the acid in the stomach. 2) Explain the role of the villi in the small intestine. 3) Explain why there are lots of capillaries in the villi. 4) Explain why the capillary walls are one cell thick. 5) Explain why these three adaptations are needed.

Y7 Biology: The digestive system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5- The role of the liver, gall bladder and pancreas in digestion	• Identify the location of the liver, gall bladder and pancreas. • State the function of the liver, gall bladder and pancreas. • Explain how the three organs aid digestion.	1) State the name of the substance released from the liver that helps to digest fats and the organ where it acts. 2) State where the substance that helps to digest fats is stored. 3) State the name of the substances released from the pancreas that aid digestion and describe how they break down the food. 4) Describe the second function of the substance released from the liver (hint – linked to the stomach) 5) State the role of the gut bacteria in digestion.
6- The diary of a fried chicken	• State, describe and explain the journey a cheese sandwich would take through our body.	1) Write a diary outlining the journey a fried chicken takes through the digestive process.

Y7 Biology: The musculoskeletal system

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1- The skeleton	• State the four functions of the skeleton. • Describe the four functions of the skeleton. • Explain some functions of the skeleton.	1) State the names of the three bones that allow humans to stand upright. 2) State the names of the three organs the ribcage protects. 3) State the names of the two bones that allow movement at the shoulder joint. 4) State the names of the two types of cells made in the bone marrow. 5) State the function of the two types of cells made in the bone marrow.
2- Joints and movement	• State the definition of a joint. • Describe three examples of joints. • Describe the function of cartilage.	1) State the function of a joint. 2) State the function of the cartilage. 3) State the function of a hinge joint and give one example. 4) State the function of a pivot joint and give one example. 5) State the function of a ball and socket joint and give one example.
3- Muscles and movement	• State the definition of a muscle. • State the definition of a tendon. • Explain how an antagonistic muscle pair works together to move.	1) State the function of a tendon. 2) Describe how the bicep and triceps work together to move your arm downwards (extend). 3) Describe the term antagonistic muscle pair. 4) Describe why it is important to understand how muscles work. 5) State one job linked to understanding how muscles work.
4- Chicken wing dissection	• Carry out a chicken wing dissection. • Identify muscles in a chicken wing. • Link the antagonistic muscle pair to chicken wing movement.	1) Draw a labelled diagram of a chicken wing. 2) Compare the chicken wing to a human arm. 3) State one safety feature when carrying out a chicken wing dissection. 4) Explain why dissections are useful in science.

How is your progress measured in class in **Science** in Spring Term?

Spring: Becoming a Chemist	
Multiple Choice Quiz	Knowledge recall on topic (15 marks): • Why do particles matter? • How do you separate substances? • How are elements organised in the periodic table? • How do elements work together?
In class assessment (recall, application, how Science works)	• Why do particles matter & separating substances • How are elements organised and how do they work together?

Emerging	**Achieving**	**Excelling**
I can define some key scientific words and processes I can label a scientific diagram I can follow a method to carry out scientific investigations I can do some simple scientific calculations	I can use scientific key words to describe why scientific processes happen I can draw and label scientific diagrams I can recall and carry out a basic scientific investigation from memory I can recall and use simple calculations	I can explain why an outcome has happened based on a scientific process I can identify errors in scientific diagrams and suggest improvements I can plan and design scientific investigations independently. I can recall and use calculations, converting units if necessary

Y7 Chemistry: Particle Model

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of the particle model. • Describe differences between the three states of matter. • Explain the differences between the three states of matter.	1) Describe the arrangement of the particles in the liquid state. 2) Describe the movement of the gas particles in the gas state. 3) Describe the arrangement of the particles in the solid state. 4) Describe one difference between the arrangement of particles in the solid state and the gas state. 5) Describe one difference between the movement of the particles in the gas state and the liquid state.
2	• State the definition of a property. • Describe how to change between the states of matter • Explain how the particle model links to the properties of the three states of matter.	1) State an order of the strength of the forces of attraction between the three states of matter, going from strongest to weakest. 2) Explain why the particles in a gas move randomly in all directions. 3) Use the diagram to explain why a gas can be compressed. 4) State the names of the two states of matter where particles can flow. 5) State the name of the state of matter where particles can be compressed.
3	• Describe the changes that take place when changes of state happen. • Observe practical safety. • Explain the changes take place during changes of state.	1) Describe how to change state from water (liquid) to steam (gas). 2) Explain how the water (liquid) has changed state to steam (gas). 3) Suggest how you would change state from water (liquid) into ice (solid). 4) Explain how the water (liquid) has changed state into the ice (solid). 5) State the temperature ice changes state into liquid water.
4	• Use key phrases to discuss changing state. • Link key phrases to changes of state. • Explain the difference between evaporation and boiling.	1) State the name for a gas changing state into a liquid. 2) Explain the term evaporation. 3) Explain the term physical change of state. 4) Describe how to change liquid water into solid ice. 5) Describe the term sublimation.

Y7 Chemistry: Particle Model

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• State the importance of temperature and the states of matter. • Use temperatures to predict the states of substances. • Determine the states of substances based on their temperature.	1) A substance has a melting point of 1°C and boiling point of 125°C. What state will it be in at room temperature. 2) A substance has a melting point of 40°C and boiling point of 130°C. What state will it be in at room temperature. 3) A substance has a melting point of -150°C and boiling point of -20°C. What state will it be in at room temperature. 4) What state is oxygen in at room temperature. 5) What state is water in at room temperature.
6	• State the definition of diffusion. • Describe the term gas pressure. • Explain the term gas pressure	1) Explain why diffusion can take place in gases. 2) Explain how gas pressure is caused.
7	• Explain the term density. • Analyse the density of different objects. • Use density to analyse objects.	1) Explain which has the highest density out of A and B. (3) 2) State the order of density of the three states of matter, starting with the highest density. (1)
8	• State the definition of explain. • Produce a mind map. • Answer explain style questions.	1) Explain why heating a solid to its melting point changes the arrangement of the particles from a regular to irregular arrangement. (2) 2) Explain the difference between boiling and evaporation. (2) 3) Explain why solid iron has a higher density than solid polystyrene. (2)

Y7 Chemistry: Separating Mixtures

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of pure substances and mixtures • Identify pure substances and mixtures. • Describe the structure of solutions	1) State an example of a pure substance and a mixture 2) Define a pure substance 3) State 3 physical properties of salt 4) State the definition of a solution. 5) Draw a labelled diagram of sugar being added to a beaker of water and dissolving. Label the solute and solvent.
2	• Describe the structure of solutions • Investigate which solids will form solutions • Describe how amount of solute and temperature affect solubility	1) Define 'insoluble' 2) Describe the difference in physical properties of salt and sand 3) Describe how temperature affects solubility of a solute 4) What is the name for a solution that has stopped dissolving a solute? 5) A student adds cold water to sand. The student then adds boiling water to sand. Explain the results that they will get
3	• Carry out filtration • Carry out evaporation • Describe why filtration and evaporation are used for different mixtures	1) Draw a labelled diagram for the sand filtration. Label the filter paper, funnel, beaker, residue, filtrate and conical flask. 2) Explain why the sand and water could be separated by filtration, but the salt and water could not. (2) Keywords – soluble and insoluble.
4	• Plan your own method for separating a mixture • Justify the reasons and selections for the parts of your method	You have a mixture of salt and sand, you need to separate this mixture so the solid sand and solid salt remain. 1) Write a method with **three steps** to separate the mixture of salt and sand, and **<u>justify</u>** why you have carried out each step
5	• Carry out the method for separating a mixture of salt and sand	1) State the two key steps in the first part of separating a mixture of salt and sand. (dissolving) 2) State the two key steps in the second part of separating a mixture of salt and sand (filtration). 3) State the three key steps in the third part of separating a mixture of salt and sand. (evaporation).

Y7 Chemistry: Separating Mixtures

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	• Recap state changes involved in liquids and gases • Describe the process of distillation • Explain how the process of distillation works including state changes	1) What are the two state changes involved in distillation, in the correct order? 2) Why does the water change state before the dissolved solutes? 3) What is the purpose of the water jacket (water in and water out)? 4) Describe what happens to the solution when it is heated by the Bunsen burner
7	• Describe the process of chromatography • Analyse chromatograms	1) Draw a labelled chromatography diagram. 2) State what the line near the bottom of the paper must be drawn in. 3) State what is put into the beaker. 4) How many spots will an impure substance produce.
8	• Carry out the process of chromatography to solve an investigation	1) State a 5 step method for the chromatography practical, in order. 2) Explain why the line near the bottom is drawn in pencil 3) State two uses of chromatography.

Y7 Chemistry: Periodic Table

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of groups and periods of the Periodic Table • Identify metals and non-metals • Describe how elements are arranged in the Periodic table	1) State the definition of a period in the periodic table. 2) State the definition of a group in the periodic table. 3) Is Oxygen a metal or a non-metal? 4) Name the element that has the symbol Ca. 5) What is the symbol of the ninth element.
2	• Name and identify the elements in group 1 • Observe and describe reactions with group 1 metals • Suggest explanations for differences in observed results for group 1 reactions	1) As you go down group 1 suggest what happens to the reactivity. 2) When bubbling is present in a chemical reaction, what does it suggest? 3) Describe two common observations that all the alkali metal chemical reactions with water have in common. 4) Describe the colour change when universal indicator is added to the solution, after the reaction of alkali with water. 5) Predict if Caesium will be more or less reactive than Francium. Justify your choice.
3	• Explain the trend of Group 1 metals • Predict trends of Group 1 elements • Plot a graph trends	1) State the trend in melting point as you go down the alkali metals. 2) Predict the melting point range of the element at the bottom of alkali metals, Francium. (1) 3) Plot this data onto the bar graph. (1) 4) Describe two physical properties of the alkali metals. (2)
4	• State the physical properties of Group 7 elements • Describe data trends for Group 7 elements • Plot a graph showing the trends for Group 7 elements	1) State the name of the halogen with the highest boiling point 2) State if the halogens can conduct electricity. 3) State the colour of Bromine 4) What colour in Fluorine? 5) Explain the trend in boiling points in and melting points in Group 7 elements?

Y7 Chemistry: Periodic Table

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• State the chemical properties of group 7 • Describe the trends in reactivity for group 7 • Investigate displacement reactions of group 7 elements	1) Which halogen is the most reactive? 2) Describe the trend in reactivity as you go down group 7? 3) What is a displacement reaction? 4) Why does chlorine displace bromine? 5) Complete the reaction: 6) Fluorine + Copper iodide → _____ + _____
6	• State the physical properties of group 0 • Describe the reactivity properties of group 0 • State uses of the Noble gases	1) State the name of group 0. 2) State the names and symbols of three noble gases. 3) State the trend in boiling point as you go down group 0. 4) State what happens to the reactivity as you go down group 0. 5) State why helium balloons can float in air.
7	• Construct a bar chart and analyse a trend • Define anomaly • Identify an anomaly from a set of data	1) Describe the trend in melting point between Na and Si. (1) 2) Describe the trend in melting point between Si and Ar. (3 points) 3) State the element that is the anomaly.

Y7 Chemistry: Atoms, elements and compounds

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of an atom and an element. • Name different elements based on their symbols. • Identify metals and non-metals.	1) State the definition of an atom 2) State the definition of an element. 3) Draw a diagram showing 2 atoms of Magnesium that are separate. 4) Draw a diagram showing 2 atoms of Nitrogen joined together. 5) Draw a diagram showing 1 atom of Potassium, 6 atoms of Gold that are joined together.
2	• State the definition of a compound. • Draw diagrams for compounds. • State the names of simple compounds.	1) State the definition of a compound. 2) One lithium atom and one iodine atom joined together. 3) One barium atom and two chlorine atoms joined together. 4) Two sodium atoms and one oxygen atom joined together.
3	• State the definition of a mixture and a molecule • Draw diagrams for simple mixtures • Draw diagrams for more complex mixtures	Draw a particle diagram and name the elements or compounds for the following…….. 1) Two oxygen atoms joined together, 1 carbon atom joined with 2 oxygen atoms, and 1 sulphur atom joined with 3 oxygen atoms. 2) Two nitrogen atoms joined together, 1 sodium atom joined with 1 chlorine atom, and 1 magnesium atom joined with 2 bromine atoms. 3) Draw your own particle diagram and name the elements/compounds. It must consist of 2 different elements and 2 different compounds.
4	• Name simple compounds. • Name more complex compounds. • Draw particle diagrams for more complex compounds.	1) Name the following compounds. LiOH $BeSO_4$ $NaNO_3$ KOH $SrCO_3$ $CaSO_4$ Extension – Write the formula of your own compounds and name them.

Y7 Chemistry: Atoms, elements and compounds

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• Describe a polymer. • Discuss the impacts of polymers on the environment. • Discuss natural polymers.	1) State the definition of a polymer. 2) State the two elements found in hydrocarbons. 3) State two uses of polymers and give an example for each. 4) State a disadvantage of synthetic polymers. 5) State one example of a natural polymer and its use.

How is your progress measured in class in **Science** in Summer Term?

Summer: Becoming a Physicist	
Multiple Choice Quiz	Knowledge recall on topic (15 marks): • What are the fuels that give us energy? • Will energy ever run out? • How does heat transfer work? • How does a satellite stay in orbit?
In class assessment (recall, application, how Science works)	• What are the fuels that give us energy & will energy ever run out? • How do heat transfer and satellites work?

Emerging	**Achieving**	**Excelling**
I can define some key scientific words and processes	I can use scientific key words to describe why scientific processes happen	I can explain why an outcome has happened based on a scientific process
I can make a decision based on scientific data	I can justify a decision based on scientific data	I can evaluate a range of choices and justify a decision based on scientific data
I can follow a method to carry out scientific investigations	I can recall and carry out a basic scientific investigation from memory	I can plan and design scientific investigations independently.
I can do some simple scientific calculations	I can recall and use simple calculations	I can recall and use calculations, converting units if necessary

Y7 Physics: Energy

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• Identify different fuels • Describe the functions of different fuels • Describe how fuels are source of energy	1. How can we describe energy? 2. What is the law of conservation of energy? 3. What is the unit of energy? 4. How do we get energy from fuels?
2	• Define what non renewable fuels are • Describe how fossil fuels are formed • Evaluate the pros and cons of non renewable fuels	1. What form of energy is stored in fossil fuels? 2. Why are coal, oil and gas called fossil fuels 3. Explain how coal is formed
3	• State how fossil fuels are used to generate electricity • Describe how fossil fuels are used to generate electricity • Evaluate the use of fossil in generating electricity	1. Where is main electricity generated? 2. Describe how a power station works 3. If you burn coal what is the chemical energy transferred to ?
4	• Explain the term “renewable energy resource” • Identify the main renewable energy resources • Describe how we use renewable energy resources	1. What does renewable mean 2. Which energy resources are infinite 3. Where do all renewable energy resources come from?
5	• Describe how renewable energy resources are used to generate electricity • Evaluate the use of renewable energy sources in generating electricity • Describe how we use renewable energy resources to generate electricity	1. What is the difference between solar cells and solar panel? 2. How do water waves generate electricity? 3. How does wind generate electricity? 4. How does biomass generate electricity
6	• Define electrical power • Calculate power ratings for common electrical appliances • Compare power ratings for common electrical appliances	1. Calculate the power of a light bulb that uses 40J of electricity in 4 seconds. 2. Calculate the power of a toaster that uses 200J of electricity in 20 seconds. 3. Calculate the power of a digger who performs 12000J of work in 6 seconds. 4. Calculate the power of a car that uses 6600J of chemical energy in 3 seconds. 5. Calculate the power of a car that uses 12000kJ of chemical energy in 6 seconds.

Y7 Physics: Energy

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
7	• Define domestic electricity • Compare the energy usage and cost of running different home devices. • Calculate cost of electricity (domestic bills)	1. How do the energy companies work out the cost of electricity used? 2. How do you calculate a unit of energy (kWh) 3. How do you convert minutes into hours? 4. How do you convert seconds into hours?
8	• Define energy efficiency • Discuss the energy efficiency of Cardinal Pole • Evaluate the best way to increase the energy efficiency of Cardinal Pole	1. Evaluate the best way Cardinal Pole can increase energy efficiency

Y7 Physics: Heating and cooling

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the difference between temperature and thermal energy • State what the thermal energy of an object depends on. • Explain, in terms of thermal energy transfer, why objects change their temperature.	1. What is the name of the instrument we use to measure temperature? 2. What does thermal energy depend on? 3. True or False: Temperature can be understood as a measurement of the motion of the particles only. 4. What is the name of the thermal energy flow? 5. A flow of thermal energy (heat) is moving out of a body to its surroundings. The temperature of this body is higher or lower than the environment? Why
2	• State and explain the 3 different pathways in which thermal energy transfer can take place. • Describe and sketch diagrams to show how convection currents occur. • Describe what is infrared radiation and how heat is transferred from the Sun to Earth	1. What are fluid substances? 2. Heat transfer by convection can only take place on fluid substances. Why? 3. True or False: the heat transfer by infrared radiation can only take place in vacuum. 4. An iron box is over a wooden table. They are in thermal equilibrium (they are at the same temperature). If you touch them with bare hands, the iron box seems to be colder than the table. Why? 5. How does the heat emitted by the Sun reaches Earth?
3	• Describe how a thermal insulator can reduce energy transfer. • Compare insulation methods in terms of conduction, convection and radiation. • Explain how a thermos bottle work and why the conductors of an air conditioning system are thermal insulated	1. Why is the ampoule inside a thermos bottle made of glass? 2. Explain why the walls are double with vacuum in between. 3. True or False: These glass ampoule walls are covered with a reflective layer to avoid heat transfer by convection. 4. Explain how the thermal insulation on pipes of air conditioning systems avoid water dripping. 5. Why are the pipes of air conditioning systems covered with a reflective material?

Y7 Physics: Energy transfer

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State what energy is • Identify different energy stores • Give examples of different energy stores	1. What is a kinetic energy stores? 2. What is nuclear energy store? 3. Give an example of elastic energy store 4. What is Gravitational Potential energy store? 5. Give an example of magnetic energy store
2	• State the conservation law of energy • Know that energy is a quantity that can be quantified and calculated • Apply the conservation law of energy	1. Describe the principle of conservation of energy. 2. State the unit of energy. 3. A book is on a shelf and has an initial gravitational potential energy store of 30 J. It then falls off the shelf. State how much energy is in the kinetic energy store by the time the book reaches the ground
3	• State how energy is transferred between stores • Identify the four pathways that bring about change between stores • Apply how energy is transferred between pathways	1. What are the four energy pathways 2. The steam train uses coal to produce steam to power it's engines which produces motion. What energy transfers are there involved? 3. How can energy be transferred?
4	• State what dissipation means • identify useful and wasted energy in energy transfers • Describe how energy is dissipated in a range of situations	1. What does dissipation mean? 2. What is meant by useful energy? 3. What is meant by wasted energy? 4. Describe how energy is dissipated in a range of everyday situations. 5. Identify useful and wasted energy from simple energy transfers
5	• Give examples of energy transfers that everyday electrical appliances are designed to bring out • Identify energy transfers that everyday electrical appliances are designed to bring out • Compare power ratings of electrical appliances	1. What is electrical power? 2. What is meant by power ratings? 3. What does energy efficient mean? 4. What doe energy labels show? 5. How do you calculate efficiency?

Y7 Physics: Energy transfer

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	• State what input and output energy is • Identify input and output energy • Calculate the useful energy and the amount dissipated, given values of input and output energy	1. Draw Sankey diagrams and calculate efficiency from the diagrams
7	• Describe how to use efficiency to select electrical appliances • Calculate the useful energy and the amount dissipated, given values of input and output energy • Justify the selection of electrical appliances using calculations of efficiency	1. Justify the selection of electrical appliances using calculations of efficiency

Y7 Physics: Forces and speed

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State what a force is • Identify different forces • Represent forces using arrows • Describe forces as contact or non contact	1. What is a force? 2. What is the unit for force? 3. How do you represent forces 4. Identify some forces 5. What two categories can you put all forces in?
2	• State what is meant by balanced and unbalanced forces • Describe what happens when the resultant force is not zero • Use force diagrams to show balanced and unbalanced	1. What happens to an object of the forces acting on the object are balanced? 2. What happens to an object if the forces acting on the object are unbalanced? 3. What is the resultant force? 4. What does accelerating mean? 5. What does decelerating mean?
3	• State the formula for speed with units • Apply the relationship between speed, distance and time • Describe the link between speed and time	1. What is speed? 2. How do you calculate speed? 3. What are the units for speed? 4. Write down the relationship between speed, distance and time 5. Make calculations of speed
4	• Select correct apparatus to measure distance and time • Set up a practical by following a method • Collect data accurately and calculate the mean using three repeats	1. What equipment would you use to measure speed? 2. Follow instructions to carry out the practical 3. Collect data accurately 4. Calculate the mean
5	• Label the x axis with the independent variable and the y axis with the dependent variable • Decide which numbers to start and finish with on the x and y axis • Draw line graphs to display relationships	1. When plotting graphs the variable that you plot on the x axis is ? 2. When plotting graphs the variable that you plot on the x axis is ? 3. When scaling your graph the axis must always start at zero 4. A bar chart is only drawn when 5. The purpose of graphs is to …….

Y7 Physics: Forces and speed

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	• State the formula for speed • State what a straight diagonal line, horizontal line and curve line mean on a distance – time graph • Calculate speed from a distance – time graph	Interpret distance using a time graph
7	• State the value of g, (gravitational field strength) on Earth and the moon • Describe the difference between mass and weight • State the relationship between mass, weight and gravitational field strength • Calculate weight on different planets. • Explain why weight changes but mass remains the same on different planets	1. Explain the way in which an astronaut's weight varies on a journey to the moon 2. The size of the weight depends on the amount of ? 3. What is the difference between mass and weight 4. What the relationship between mass, weight and gravitational field strength 5. Calculate weight on different planets. 6. Explain why weight changes but mass remains the same on different planets

Y8 Science

Becoming a physicist
Collapsing cans
Testing objects in different liquids to see if it floats or sinks.

Why does the same object float in some liquids and not others?
Explain how pressure changes in liquids and gases.

Becoming a physicist
How to balance a see saw

Why is it harder to open a door without a handle?
Identify the key features of a moment, and calculate moments in different situations

Becoming a physicist
Reflection , refraction and making a pinhole camera

How do you see in the mirror?
Identify the key features of a transverse wave, anatomy of the eye and how both interact.

Becoming a physicist
Measuring the speed of sound

Are chemical reactions permanent?
Explain the difference between a physical and chemical change; be able to balance symbol equations

Becoming a chemist
Using chemical reactions to explain physical and chemical change.

How is energy transferred in a chemical reaction ?
Identify the key features of exothermic and endothermic reactions and explain how energy is stored, transferred and released.

Becoming a chemist
Using thermometers to monitor temperature changes and explain endothermic and exothermic reactions

How do we hear sound?
Identify the key features of a longitudinal wave, anatomy of the ear and how both interact.

Becoming a chemist
Using chemical reactions to explain metal reactivity and displacement.

Becoming a chemist
Making cabbage indicator and copper sulphate salt

What happens in a chemical reaction?
Identify the products from various chemical reactions of metals with other non metals, and be able to write word equations

What are acids and alkalis?
Big picture: Know the difference between an acid and an alkali, in terms of indicator and pH scale; name the products of different neutralisation reactions.

Where do I come from?
Big picture: Identify the key areas of the body responsible for reproduction and describe how it works. Explain how genes are inherited and how it links to evolution, biodiversity and extinction

Becoming a biologist
Extracting DNA from a strawberry

What happens when I become infected?
Big picture: Name the four different types of pathogens that cause infectious disease. Explain how the body fights pathogens, and the role of medicine and hygiene to prevent the spread of pathogens.

Becoming a biologist
A day in the life of a doctor: diagnosing some conditions based on symptoms

What happens when I have a poor diet?
Big picture: Identify the key food groups in a healthy diet, and explain how lack of these groups lead to deficiency diseases

Becoming a biologist
Using chemicals to identify key food groups in different food samples

How is your progress measured in class in Science in **Autumn** Term?

Autumn: Becoming a Biologist	
Multiple Choice Quiz	Knowledge recall on topic (15 marks): • Nutrition and food groups • Food tests • Malnutrition and unbalanced diet • Obesity • Coronary heart disease
In class assessment (recall, application, how Science works)	• Malnutrition, • How we make it worse, • Infection and disease and • Where do I come from.

Emerging	**Achieving**	**Excelling**
I can define some key scientific words and processes	I can use scientific key words to describe why scientific processes happen	I can explain why an outcome has happened based on a scientific process
I can label a scientific diagram	I can draw and label scientific diagrams	I can identify errors in scientific diagrams and suggest improvements
I can follow a method to carry out scientific investigations	I can recall and carry out a basic scientific investigation from memory	I can plan and design scientific investigations independently.
I can describe basic trends in a bar chart	I can draw a bar chart and describe a basic trend	I can draw a bar chart and calculate differences in data

Y8 Biology: Malnutrition and Health

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Revisit the digestive system and recognise the organs involved in digestion Describe why having a healthy digestive system is important Describe the factors that can make our digestive health worse	1) Give two ways that you can look after your digestive health 2) Describe some symptoms of an unhealthy digestive system 3) State 3 positive impacts of having a healthy digestive system
2	Revisit the circulatory system and recognise the anatomy of the system Describe why having a healthy circulatory system is important Describe the factors that can make our circulation worse	1) Give two ways that you can look after your circulatory system 2) Describe some symptoms of an unhealthy circulatory system 3) Explain why having normal blood components is important in your health
3	Name the major food groups and have examples for each of them Describe the function of the food groups in our body Explain the importance of the food groups in keeping our body healthy	Identify the food group responsible for the following functions: 1) Improve digestion 2) Provide and store energy 3) Growth and repair 4) Store energy, insulation and growth
4	Describe a balanced diet Use data to compare diets and suggest which are more balanced Come up with a balanced diet using numerical values for food groups	1) How many grams of carbohydrates should a year 7 female have each day? 2) How many grams of fat should a year 7 male have each day? 3) Which group of child has to eat the most food? 4) How much <u>more</u> protein should a 16 year old boy eat than a 10 year old boy? 5) How much <u>more</u> carbohydrate should a 17 year old girl eat than a 3 year old boy
5	Describe the colour change when food molecules are present in food Describe methods to carry out food tests Describe how to carry out food tests and identify foods from the results of tests	1) What is the positive colour for the starch test? 2) What is the negative result colour for the biuret test? 3) Describe how to test a food sample for starch 4) Describe how to test a food sample for lipids

Y8 Biology: Malnutrition and Health

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	State the causes for an unbalanced diet Describe health issues of an unhealthy diet To identify the symptoms of an unbalanced diet	Name four deficiency disease, and describe the following for each one: - Cause - Symptoms - Changes need to diet
7	Explain the effects on the human body of consuming too much food Calculate BMI Describe the effects of obesity on the body	1. Define obesity 2. What causes a person to become obese 3. State two diseases that are linked to a person being obese 4. Calculate the BMI of a 165cm woman who has a mass 52kg
8	Describe the importance of arteries on the human body How fat builds Describe the effects of arteries becoming blocked	1. What is coronary heart disease, and how does it affect the heart? 2. What are the main causes and risk factors associated with CHD? 3. How do lifestyle choices, such as diet and exercise, influence he risk of developing CHD? 4. What are the symptoms of CHD and how can it be diagnosed? 5. What are the different treatment options available for CHD, and how do they work?
9	Understand what diabetes is and the difference between Type 1 and 2 diabetes Discuss the diabetes on individuals and society	1. What is diabetes and what are the main types? 2. What is insulin, and why is it important in the body? 3. What are some common symptoms of diabetes? 4. How can lifestyle changes help manage Type 2 diabetes? 5. Why is it important for people with diabetes to monitor their blood sugar levels?

Y8 Biology: Malnutrition and Health

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	State the causes for an unbalanced diet Describe health issues of an unhealthy diet To identify the symptoms of an unbalanced diet	Name four deficiency disease, and describe the following for each one: - Cause - Symptoms - Changes need to diet
7	Explain the effects on the human body of consuming too much food Calculate BMI Describe the effects of obesity on the body	1. Define obesity 2. What causes a person to become obese 3. State two diseases that are linked to a person being obese 4. Calculate the BMI of a 165cm woman who has a mass 52kg
8	Describe the importance of arteries on the human body How fat builds Describe the effects of arteries becoming blocked	1. What is coronary heart disease, and how does it affect the heart? 2. What are the main causes and risk factors associated with CHD? 3. How do lifestyle choices, such as diet and exercise, influence he risk of developing CHD? 4. What are the symptoms of CHD and how can it be diagnosed? 5. What are the different treatment options available for CHD, and how do they work?
9	Understand what diabetes is and the difference between Type 1 and 2 diabetes Discuss the diabetes on individuals and society	1. What is diabetes and what are the main types? 2. What is insulin, and why is it important in the body? 3. What are some common symptoms of diabetes? 4. How can lifestyle changes help manage Type 2 diabetes? 5. Why is it important for people with diabetes to monitor their blood sugar levels?

Y8 Biology: How can we make it worse?

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	State the definition of alcohol. Describe the effects of alcohol on the body. Suggest the long term impact of over using alcohol on the body.	1) State the name of the drug found in alcohol. 2) Describe the effect of alcohol on the body. 3) Suggest why you should not drink alcohol and drive a car. 4) Describe the potential effect on the liver with long term overuse of alcohol. 5) Describe one potential effect on a baby, when a mother drinks alcohol when pregnant.
2	State the definition of a drug. State examples of drugs and classify them as legal/illegal and medicinal/recreational Describe effects of different drugs.	1) State the definition of a medicinal drug and give an example. 2) State the definition of a recreational drug. 3) State one example of a legal recreational drug and give the effect. 4) State one example of an illegal recreational drug and give the effect. 5) State the definition of addiction and withdrawal symptoms.
3	State the different chemicals in cigarette smoke. State the effects of chemicals found in cigarette smoke. Suggest some long term effects of smoking.	1. State the name of the substance found in cigarettes 2. Describe the effect of nicotine on the body. State one disease it is associated with 3. Describe the effect of tar on the body. State one disease it is associated with. 4. Describe the effect of carbon monoxide on the body. State one disease it is associated with. 5. Describe the term passive smoking and state one effect of it.

Y8 Biology: How can we make it worse?

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
4	Describe the term cancer. Suggest some factors that can increase the risk of cancer. Describe treatments for cancers.	1. State two reasons why mitosis takes place 2. State the name of a tumour that is cancerous. 3. State the name of the type of therapy where chemicals are used to destroy the cancer. 4. State the name of one substance humans can use and the potential cancer it is linked to. 5. What was the most common cancer in females in 2017.
5	Describe the role of a doctor. Suggest some different types of doctors. Play the role of a doctor.	1) State what the term GP stands for. 2) Describe the type of health condition that a psychiatrist specialises in. 3) Describe what the term "prescribe" means. 4) Mark has been over-eating for 10 years and feels very tired. Suggest what conditions Mark could have and how to reverse the effects. 5) Lara has been smoking cigarettes everyday for 15 years and is short of breath. Suggest what organ could be effected and how to reverse the effects
6	Design a poster explaining 1) The effects of <u>three</u> health condition. 2) How you can get these health conditions. 3) How to prevent yourself from getting these health conditions.	

Y8 Biology: Infections and Diseases

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Identify the four different pathogens. Describe how pathogens damage my body Describe the pathogens and their characteristic	1. What is the definition of a pathogen? 2. List four types of pathogens 3. Give the main features of a bacteria 4. Give the main features of a virus 5. Give an example of fungal disease
2	Identify main bacterial diseases Describe how bacterial diseases works Explain how bacterial diseases make us ill	1. Which organ system is affected by pneumonia? 2. Suggest how salmonella can spread from a chicken to a person 3. How can you avoid catching Salmonella? 4. How do you treat bacterial infections?
3	Identify fungal and protist infections Describe how fungal and protist disease make us ill Explain how fungal and protist infections make us ill	1. What causes malaria? 2. How can we get a malaria infection? 3. What symptoms does Athlete's foot cause? 4. What is a fungi?
4	State the job of white blood cells State 3 ways white blood cells fight infection Describe process of phagocytosis	1. State the definition of immunity 2. Name the part of the blood that fights infection 3. What is a toxin? 4. Explain the difference between antitoxins and antibodies 5. Describe phagocytosis
5	Define antibiotics Explain the difference between antibiotics and painkillers Explain why we use antibiotics to treat bacterial diseases but not viral diseases	1. Name two painkillers 1. State the definition of antibiotics 2. Name the best treatment for a cold. 3. What do bacteria cells have that not all cells have?

Y8 Biology: Infections and Diseases

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	To understand 3 ways diseases are transmitted Explain methods used to prevent spread of disease Conduct an experiment to model how diseases are spread	1. State three ways pathogens infect plants and animals 2. Explain how "Catch it, bin it, kill" adverts help reduce the spread of diseases 3. Name the best treatment for a cold? 4. Describe and explain other ways the government aims to control the spread of disease
7	Describe what a vaccine contains. State the name of the scientist who developed the first vaccine and describe how he did this. State some diseases that have been eradicate due to vaccinations.	1. State two side potential side effects of vaccines. 2. Describe what the vaccine stimulates the production of in the body and how long they remain in the blood. 3. Explain why it is important to develop vaccines. 4. State the name of two diseases that are often vaccinated against in childhood.
8	Identify fungal and protist infections Describe how fungal and protist disease make us ill Explain how fungal and protist infections make us ill	1. What causes malaria? 2. How can we get a malaria infection? 3. What symptoms does Athlete's foot cause? 4. What is a fungi?
9	Diagnose some conditions based on symptoms. Link conditions to symptoms and the type of pathogen that causes it. Link conditions to symptoms and the type of pathogen that causes it with prevention methods.	1. Today you are going to act as a doctor. We have previously looked at the role of a doctor. 2. You are going read the symptoms from the board and use it to suggest the type of pathogen causing the illness. 3. You then need to fill in how the individual should stop the pathogen from spreading. This will be shared with the class.

Y8 Biology: Where do I come from?

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Describe how sperm and egg cells meet. Describe what takes place during sexual intercourse. Explain how the sperm cells reach the egg.	1. Describe the term implantation 2. Describe the term fertilisation 3. State one reason why a male may have low fertility 4. State one why reason why females may have low fertility
2	Describe how long it takes baby to grow. Describe where the baby grows. Explain how a baby develops.	1. State how long gestation lasts in a human. 2. State the two functions of the placenta. 3. State the function of the amniotic fluid.
3	Describe how organisms vary Explain what causes different types of variation Classify characteristics	1. Classify the following into the different categories of variation 2. State the definition of a species 3. Explain why your height is both an inherited and environmental characteristic
4	Describe the structure of DNA State the levels of organisation for DNA in the cell Design a model for DNA	1. State the definition of DNA 2. Describe the structure of DNA – use the words/phrases – strand, base pair, double helix 3. Draw a labelled diagram of the structure of DNA 4. State the definition of a gene 5. State how many chromosome pairs there are in the standard human body cell
5	Describe how sex is determined Produce a punnet square to determine biological gender Identify and describe some inherited diseases due to mutations	1. State the sex chromosomes for a male and female 2. State the definition of a phenotype 3. State the definition of a mutation 4. State one symptom of cystic fibrosis 5. Draw a punnet square showing how sex (gender) is inherited

Y8 Biology: Where do I come from?

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
6	State the importance of Charles Darwin Describe the term natural selection Describe the term evolution	1. State the definition of a species 2. State the name of Charles Darwin's theory 3. State the definition of a population 4. Use 4 bullet points to describe how the genes for a longer neck in giraffes is passed on 5. State the definition of evolution
7	State the importance of biodiversity and identify biodiverse areas Suggest how humans negatively impact biodiversity Describe extinction and suggest how organisms become extinct	1. Explain the term deforestation and suggest how this impacts biodiversity. 2. Explain the term extinct. 3. State three ways a species can become extinct. 4. State the name of two species that are extinct. 5. Explain how variation can lead to a reduce chance of a species becoming extinct.

How is your progress measured in class in Science in **Spring** Term?

Spring: Becoming a Chemist	
Multiple Choice Quiz	Knowledge recall on topic (15 marks): • How do you know a chemical reaction is occurring? • How do metals and non metals react? • How is energy released transferred in a chemical reaction? • How are chemical bonds represented?
In class assessment (recall, application, how Science works)	• Introduction to reactions • Acid and alkali • Chemical energy in reactions • Types of reactions

Emerging	**Achieving**	**Excelling**
I can define some key scientific words and processes I can label a scientific diagram I can follow a method to carry out scientific investigations I can do some simple scientific calculations	I can use scientific key words to describe why scientific processes happen I can draw and label scientific diagrams I can recall and carry out a basic scientific investigation from memory I can recall and use simple calculations	I can explain why an outcome has happened based on a scientific process I can identify errors in scientific diagrams and suggest improvements I can plan and design scientific investigations independently. I can recall and use calculations, converting units if necessary

Y8 Chemistry: Introduction to Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• Describe a chemical reaction. • Observe a chemical reaction. • Describe how we know a chemical reaction is taking place.	1. State two observations when copper carbonate is heated up. 2. State two observations when magnesium is added to hydrochloric acid. 3. State two chemical reactions that take place in living organisms.
2	• Describe simple observations of a chemical reaction. • Construct a word equation for the reaction. • Construct more complex word equations.	1. State the word equation for Lithium reacting with water. Forming Lithium hydroxide and Hydrogen. Label the reactants and the products. 2. State the word equation for Iron reacting with chlorine. Forming Iron chloride. Label the reactants and the products. 3. State the word equation for Nickel reacting with chlorine. Predict the name of the product Use the above equation to help you. Label the reactants and the product. 4. State two observations when Sodium is added to water.
3	• State the definition of variables in a practical. • Design a plan to investigate the reactivity of different metals. • Design a results table to record your data.	1. State the definition of the independent variable. 2. State the definition of the dependent variable. 3. State the definition of the control variables. 4. State what we use to measure temperature and the units we measure it in. 5. State the definition of volume and the units we measure it in.
4	• Carry practical work safely. • Record the start and final temperature. • Calculate the temperature change.	1. Describe how you came up with the order of reactivity of the metals. 2. Describe how you calculated the temperature change. 3. Suggest how you could have improved the results of the practical.

Y8 Chemistry: Introduction to Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• Design a bar graph for my results • Apply knowledge to exam questions based on the 3 lesson sequence	1. State the definition of discrete data. 2. State the definition of continuous data. 3. Would discrete data be represented on a line or a bar graph. 4. Is blood type an example of discrete or continuous data, explain your answer.
6	• State the definition of metals and non metals. • Describe differences between the metals and non metals. • Explain the differences between metals and non metals.	1. What is the definition of properties in Science? 2. State three properties of a metal. 3. State three properties of a non metal. 4. Are metals good conductor of electricity? 5. Are non metals magnetic?
7	• Observe and predict the outcomes of the demo • Be able to write a word equation for the practical. • Predict the outcomes for metals that react with oxygen	1. Describe how the reaction with magnesium is a combustion reaction? 2. Why is food turning brown a oxidation reaction? 3. Write the reaction for rusting. 4. Write down the products for copper reacting with oxygen, can you identify the reactants and products.
8	• Define displacement • Carry out displacement reactions • Write equation for and predict reactions between metals and metal sulfates	1. What is meant by the term ‘displacement reaction’? 2. What is a compound? 3. Which is the most reactive metal shown in this reactivity series? 4. Which is the least reactive metal shown in this reactivity series? 5. What will be produced if magnesium metal is added to a solution of copper sulfate?

Y8 Chemistry: Acid and Alkali

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• What is an acid and an alkali. • State what we can use to distinguish and acid and alkali. • Why is it important to identify an acid and alkali.	1. What is the pH scale, and how does it relate to acids and alkalis? 2. How can you test whether a substance is acidic or alkaline using universal indicator? 3. What are some common examples of acids and alkalis in everyday life? 4. Suggest what happens when an acid reacts with an alkali? 5. How can you use litmus paper to identify an acid or an alkali?
2	• State the use of the pH scale. • Use the pH scale to identify acid and alkalis. • Identify the strength of acids or alkalis based on pH scale.	1. Which number has a stronger acidity on the pH scale. 1 or 6? 2. Which number has a stronger alkalinity on the pH scale. 10 or 12? 3. If a substance has a pH of 7, what is it called? 4. Give one example of a substance with a pH of 7. 5. What does the pH scale allow us to measure?
3	• Be able to use natural materials to make your own indicator. • Make an indicator with red cabbage safely • Use observation to determine if common substances are acid or alkali	1. What are the first 3 steps of making the red cabbage indicator? 2. List 4 pieces of equipment needed when using the indicator 3. In your own words why do you think it is useful to make indicators from natural products
4	• To identify weak vs strong acids. • Carry out a practical to identify weak vs strong acids. • To understand what makes an acid weak and strong.	1. What is the difference between a strong acid and a weak acid? 2. How can you tell if an acid is strong or weak based on its pH? 3. Why are strong acids more dangerous than weak acids? 4. Is strength and concentration the same thing?

Y8 Chemistry: Acid and Alkali

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• State the products of an acid – alkali reaction • Describe the uses of neutralisation reactions • Perform a neutralisation reaction and explain pH changes	1. Give an example of a acid, base and alkali 2. State one difference and similarity between a base and an alkali 3. Define neutralisation? 4. State the products from an acid – base reaction. 5. Describe two situations in which neutralisation reactions are useful?
6	• Describe what a salt is and give examples of uses. • State and name the products when acids react with bases • State and name the products when acids react with metals.	1. Name three different acids 2. Name the salts each acid above produces 3. Define a salt? 4. State three different uses of acids. 5. Write the two general equations between an acid and metal, acid and a base?
7	• State the definition of a simple bond. • Model simple chemical bonds determine if the bonds are strong or weak • Model complex molecules and determine how this effect the energy in a bond	1. What is a simple bond? 2. What is bond energy? 3. What is energy in a chemical reaction used for? 4. Is bond breaking endothermic or exothermic? 5. How does the number of bonds effect the melting point of a molecule?
8	• State the definition of bond energy. • Describe what happens to chemical bonds during exothermic and endothermic reactions. • Use your ideas about bond energies to explain energy changes in chemical reactions.	1. What do we call the strong forces that hold molecules together? 2. What is bond energy? 3. State whether bond making is endothermic or exothermic ? 4. Does bond breaking release energy or take energy in? 5. Why do cars use catalytic converters?

Y8 Chemistry: Chemical Energy in Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of exothermic and endothermic reaction • Describe differences between exothermic and endothermic reaction • Explain the differences between exothermic and endothermic reaction	1. Write the definition of endothermic reaction. 2. Write the definition of exothermic reaction. 3. Is injury pack an example of endo or exothermic reaction? Why? 4. Is hand warmer an example of exo or endothermic reaction? Why? 5. Is burning endothermic or exothermic?
2	• State the definition of exothermic and endothermic. • Describe differences between exothermic and endothermic. • Explain the differences between exothermic and endothermic.	1. An exothermic reaction the final temperature increases or decreases? 2. In an endothermic reaction the final temperature increases or decreases? 3. The temperature change in an endothermic reaction is positive or negative? 4. The temperature change in an endothermic reaction is positive or negative? 5. What is the equation to calculate the temperature change?
3	• State the definition neutralisation reaction • Determine the uses of scientific apparatus • Practice writing a scientific method	1. What does the word apparatus mean? 2. What do we use to measure mass? 3. What should a good method include? 4. What is the dependent variable? 5. When an acid and alkali react, what is the name of the reaction?
4	• Define the 3 types of variables • Describe the variables in this investigation • Carry out the practical, collecting data in a result table	1. In our investigation what was the dependent variable (the variable we were measuring)? 2. In our investigation what was the independent variable (the variable we were changing)? 3. What were the control variables (variables we must keep the same? 4. What should a results table include? 5. Which had the higher temperature change?

Y8 Chemistry: Chemical Energy in Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• State different types of graphs • Construct different types of graphs • Interpret results by looking at graphs	1. In our investigation were these reactions endothermic or exothermic? Explain your answer. 2. Which acid had the greatest temperature change? 3. Which reaction had the greatest transfer of energy? 4. What 5 things are needed to draw a perfect graph? 5. Which variables go on the x and y axes in a line graph?
6	• State the definition of reaction profile. • Describe differences between exothermic and endothermic reaction profile. • Explain the differences between exothermic and endothermic reaction profile.	1. What is a reaction profile graph? 2. In a reaction profile graph for endothermic reaction who has more energy reactants or products? Why? 3. In a reaction profile graph for exothermic reaction who has more energy reactants or products? Why? 4. What is the x axes and y axes label for a reaction profile graph? 5. What is activation energy?
7	• State the definition of a simple bond. • Model simple chemical bonds determine if the bonds are strong or weak • Model complex molecules and determine how this effect the energy in a bond	1. What is a simple bond? 2. What is bond energy? 3. What is energy in a chemical reaction used for? 4. Is bond breaking endothermic or exothermic? 5. How does the number of bonds effect the melting point of a molecule?
8	• State the definition of bond energy. • Describe what happens to chemical bonds during exothermic and endothermic reactions. • Use your ideas about bond energies to explain energy changes in chemical reactions.	1. What do we call the strong forces that hold molecules together? 2. What is bond energy? 3. State whether bond making is endothermic or exothermic ? 4. Does bond breaking release energy or take energy in? 5. Why do cars use catalytic converters?

Y8 Chemistry: Types of Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• State the definition of conserved. • Use word equations to explain conversation of mass. • Use vinegar and baking powder to demonstrate conservation of mass.	1. State the word equation for magnesium reacting with oxygen. 2. If 5g of Magnesium reacts with 12g of Oxygen, what is the mass of product produced. 3. Write a word equation for the following. 6g of Sodium reacts with 9g of hydrochloric acid. This forms 10g of sodium chloride and some Hydrogen. Include the mass of Hydrogen produced. 4. If 6g of sodium reacts with chlorine and produces 20g of product, calculate the mass of chlorine that reacts.
2	• State the definition of combustion. • Write word equations for combustion reactions. • Describe what takes place during a combustion reaction.	1. State the general combustion word equation. 2. State the two things that you observe during a combustion reaction. 3. State if a combustion reaction is exothermic or endothermic, justify your decision. 4. State three examples of non-renewable fuels. 5. State the chemical formula for carbon dioxide, water and oxygen.
3	• State the definition of fuels. • Design a plan to investigate The fuel that releases the most energy. • Design a results table to record your data.	1. What happens during combustion reaction? 2. Why is it important to only change one independent variable at a time in an experiment? 3. Does all the heat produced by combustion go into raising the temperature of the water? 4. What is the main reason for repeating an experiment several times? 5. What role do control variables play in an experiment comparing the energy transferred by burning different fuels

Y8 Chemistry: Types of Reactions

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
4	• Investigating burning fuels practical. • Record the start and final temperature. • Calculate the temperature change.	1. What is a fuel? 2. What is the main reason for repeating an experiment several times? 3. What is a sign that a chemical reaction is exothermic?
5	• Design a bar graph for my results • Apply knowledge to exam questions based on the 3 lesson sequence	1. What is combustion? 2. Describe Complete combustion 3. Describe Incomplete combustion
6	• Describe the term thermal decomposition. • Analyse thermal decomposition reactions. • Construct word and symbol equations for thermal decomposition reactions.	1. State the word equation for the thermal decomposition of magnesium carbonate. 2. State the symbol equation for the thermal decomposition of magnesium carbonate. 3. State the word equation for the thermal decomposition of beryllium carbonate. 4. State the symbol equation for the thermal decomposition of beryllium carbonate. 5. State the name of the chemical used to test for carbon dioxide and the positive result if carbon dioxide is present.
7	• State the definition of a physical change • Describe physical changes of state. • Use a model to explain physical changes of state.	1. What is the name of the state of matter with the strongest forces between the particles. 2. Describe how to change a solid into a liquid. 3. Describe what happens to the forces as you change state from a liquid to a gas. 4. State the temperature at which the stearic acid turned into a solid. 5. Draw a diagram showing the particles in a solid, liquid and gas.
8	• State the law of conservation of mass • Balance simple equations. • Balance more complex equations.	1. State the law of conservation of mass. 2. What are the reactants and products in a reaction. 3. Explain observations about mass in a chemical or physical change.

How is your progress measured in class in Science in **Summer** Term?

Summer: Becoming a Physicist	
Multiple Choice Quiz	Knowledge recall on topic (15 marks): • How does sound travel? • How do you calculate the speed of sound? • How do forces affect the shape of objects? • What is Hooke's law?
In class assessment (recall, application, how Science works)	• Sound • Light • Contact forces • Pressure

Emerging	**Achieving**	**Excelling**
I can define some key scientific words and processes I can make a decision based on scientific data I can follow a method to carry out scientific investigations I can do some simple scientific calculations	I can use scientific key words to describe why scientific processes happen I can justify a decision based on scientific data I can recall and carry out a basic scientific investigation from memory I can recall and use simple calculations	I can explain why an outcome has happened based on a scientific process I can evaluate a range of choices and justify a decision based on scientific data I can plan and design scientific investigations independently. I can recall and use calculations, converting units if necessary

Y8 Physics: Sound

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• Label key parts of a longitudinal wave. • Describe how sound travels. • Use key terms to describe sound.	1) State the definition of compression and rarefaction. 2) State the definition of wavelength. 3) State the definition of amplitude and frequency. 4) State the medium that sound travels through the quickest. 5) State the speed of sound in air.
2	• Carry out the practical. • Measure the speed of sound. • Take repeat readings.	1) To calculate the mean add up all your results and divide by how many times you repeated it. 2) Use your mean time and distance to find the speed. 3) Suggest one problem with the practical 4) How could you improve the practical results.
3	• Describe the term pitch and relate it to frequency. • Analyse the auditory range. • Analyse an oscilloscope to find frequency.	1) Sketch two diagrams, one showing a high frequency wave and one showing a low frequency wave that both have the same amplitude. 2) State the definition of infrasound and ultrasound. 3) Convert 1100Hz into kHz. 4) Describe how to change the pitch of a sound. 5) Calculate the frequency of a wave that has a time period of 0.004seconds.
4	• Explain what is meant by audible range • Understand how the ear detects sounds • Apply ideas about sound to explaining defects in hearing	1) How many Hertz are there in 1 kHz? 2) Suggest why dog whistles can be heard by dogs but not by humans. 3) Where in the ear are: Electrical signals transmitted to the brain? Vibrations first detected? 4) Who is most likely to be most at risk of having problems with poor hearing?

Y8 Physics: Sound

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• State the definition of ultrasound • Calculate the speed of sound • Produce a poster summarising the uses of ultrasound	Calculate the following. Include units in your answer. 1)Speed of an object that has travelled 100m in 20seconds. 2) Speed of an object that has travelled 5km in 800seconds. Your answer must be in m/s. 3) Speed of an object has travelled 150m in 1 minute. Your answer must be in m/s. 4)Distance an object has travelled if it is moving at 5m/s in 200 seconds. 5) Distance an object has travelled if it is moving at 20m/s in 2 minutes.

Y8 Physics: Light

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• Describe the properties and model of a transverse wave • Understand and explain superposition of waves • Compare and contrast the properties of sound and light waves	1) Give an example of a transverse wave 2) Describe the direction of oscillations compared to wave direction. 3) Which travel faster, sound waves or light waves? 4) What two thing can happen when waves combine? 5) What can sound waves not travel through and why?
2	• Understand how light is reflected in a plane mirror • Know how and why refractions occurs • Know the difference between Specular and Diffuse Reflection	1)If you see an object in a plane mirror describe the size and shape of the image formed 2) What is the difference between specular and diffuse reflection 3) When does refraction occur? 4) What are the two types of lenses called which use refraction 5) Give an example of each type of lens
3	• Be able to state the law of reflection • Be able to carry out an investigation to prove the law of reflection • Be able to draw and use ray diagrams	1) The Law of Reflection: The angle of reflection is less than/equal to/more than the angle of incidence. 2) We can therefore predict that an angle of incidence of 62.3° will have an angle of reflection of_____. 3) What is the angle of incidence if the angle of reflection is 46° 4) What kind of mirror does the law of reflection apply to?
4	• Understand why refraction happens • Be able to complete a ray diagram in a refraction practical • Be able to measure the angle of incident and angle of refraction	1)What happens to light when it changes from one medium to another? 2) What do you call the ray of light entering the glass block in refraction practical? 3) What do you call the ray of light leaving the glass block in a refraction practical? 4) What do you call the line at 90° to the refracting material? 5) How can you measure how much the incident ray has been refracted?

Y8 Physics: Light

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• Identify the different parts of the mammalian eye and state their function • Describe how the retina of the eye allow us to see images • Describe how to correct problems with vision	1) What part of the eye does light focus on in a clear image? 2) What cells in the eye are responsible for detecting movement? 3) Describe how the lens assists in forming images 4) What are the two types of lens, and what do these lenses do? 5) Describe what happens, in as much detail as possible, when photoreceptors are stimulated.
6	• Describe how a pinhole camera works to form images • Produce a pinhole camera of your own	1) Take the lid off the Pringles can and wipe the inside of the can. Keep the lid. 2) Draw a line with a marker pen all around the can, about 8cm up from the bottom. 3) Use scissors to carefully cut along the line so that the tube is in two pieces. 4) Make a small hoed in the metal end of the can using a pin 5) Put the plastic lid onto the shorter piece of tube. 6) Tape the pieces together, with the lid in the middle. 7) Cover the can in metal foil and tape.
7	• Describe our eye sees different colours of light • Describe how a glass prism allows us to see the colours of the light spectrum • Describe how coloured filters change the colour of light that are seen	1)What property is different about the colours in the colour spectrum? 2) Describe how a glass prism allows us to see the colour spectrum. 3) Describe how objects appear to us as orange. 4) Describe how some objects appear to us as white. 5) A student takes a green filter and a cyan filter and puts them together. Explain the colour that they will see. Use a diagram to help you if you wish.

Y8 Physics: Contact Forces

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• When a force is applied to an object it can cause it to rotate • The rotational effect of a force is called a moment • Explain how turning forces are used in levers	1) What is the formula for calculating moments ? 2) What are the units for moments, force and distance? 3) A force of 40N is applied 0.4m from a pivot. What is this moment? 4) A moment of 15Nm is created by a force 0f 60N. What is the perpendicular distance of the force from the pivot ? 5) A moment of 200Ncm is created by a force acting 4cm from a pivot. What is the size of the force?
2	• I can investigate turning forces • I can calculate turning forces • I can apply the principle of moments to state if an object is in equilibrium or will rotate clockwise or anticlockwise	1) Set up the equipment. 2) Measure and record the distance between the pivot and masses. 3) Test different combinations of masses and distances on each side and identify the ones which allow the beam to be balanced.
3	• To state what is meant by deformation • To describe how forces affect the shape of objects • To state and apply Hooke's law to various scenarios.	1) Can you rearrange the equation F = kx; To get k on one side of the equation Now, can you rearrange it to get x on its own? 2) What Force would be needed to extend a spring with a spring constant k=5, 0.3 m? 3) If a 4N weight is hung on a spring, and it extends by 0.2m. what is the spring constant (k)? What do you think the units are? 4) What force is necessary to stretch an ideal spring with a spring constant of 120 N/m by 0.30 m? 5) A spring with a spring constant of 600N/m is used for a scale to weigh fish. What is the weight (force) of a fish that would stretch the spring by 0.075m from its normal length?

Y8 Physics: Contact Forces

Summer Term Golden Nuggets and Work Hard

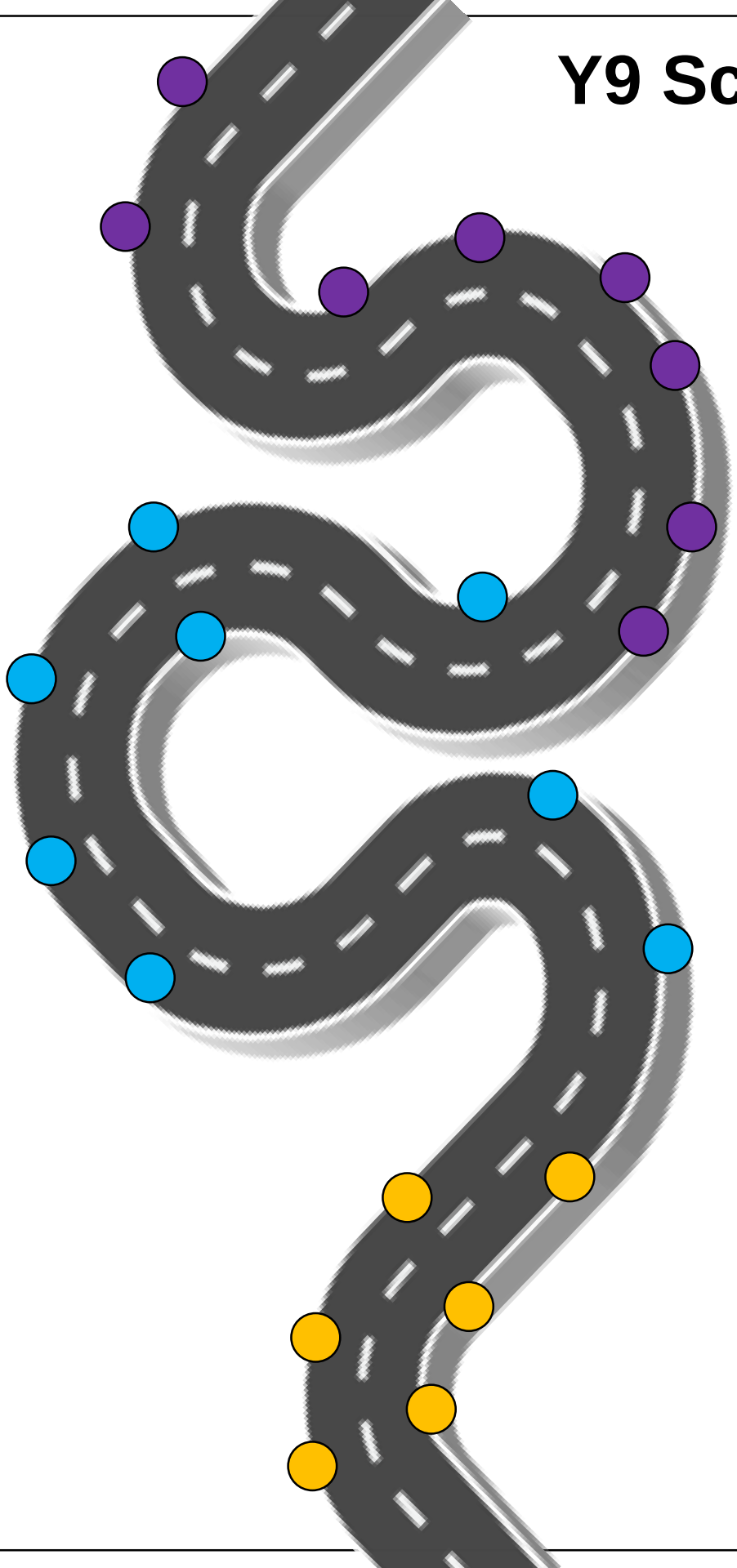
Topic	Golden Nugget	Work Hard
4	• Investigating Hooke's law • Measure a range of spring extensions for a range of forces • Analyse data	1) Set up the equipment . 2) Use the ruler to measure the length of the unstretched spring and record this as the start length. 3) Attach the mass hanger to the spring. This exerts a force of 1N. 4) Measure the new length of the spring and use this length to calculate the extension. 5) Add a 100g mass to the mass hanger to increase the force by 1N. Measure and record the extension of the spring. 6) Continue to repeat step 5 until you have a force of 5N acting on the spring (the mass hanger and four masses). 7)Unload the spring and repeat twice more to calculate a mean.

Y8 Physics: Pressure

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• Define atmospheric pressure • Understand how atmospheric pressure changes with altitude • Explain the relationship between altitude and atmospheric pressure	Gap fill definition and explanation.
2	• State what liquid pressure is. • Understand that liquid pressure increases with depth • Explain why objects float or sink	1) Pressure in liquids only happens downward. 2) Pressure in a liquid acts perpendicular (in a right angle)to a surface. 3) Pressure increases with depth in a liquid. 4) Pressure from an object in a fluid creates an upthrust force. 5) Liquids cannot be compressed because the particles are already close together.
3	• Understand that pressure is the force applied per unit area • Understand how a change in force will affect the pressure applied to the area • To be able to apply the force, pressure, area equation	1) Calculate the pressure exerted by a 1000N elephant when standing on the floor if his feet have a total area of 1m2. 2) A brick is rested on a surface. The brick has an area of 20cm2. Its weight is 10N. Calculate the pressure. 3) A woman exerts a pressure of 100N/cm2 when standing on the floor. If her weight is 500N what is the area of the floor she is standing on?

Y9 Science



How is your progress measured in class in Science in **Autumn** Term?

Autumn:	

Emerging	Achieving	Excelling

Year 9 Physics: Electricity (ABH)

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• **Recognise and describe the function of circuit components** • **Draw and build functional circuits using bulbs, motors and batteries** • **Recognise and describe the difference between a series and parallel circuit**	1. What is a conductor of electricity? 2. What is an electrical insulator? 3. What is a series circuit? 4. What is a parallel circuit? 5. Draw a circuit in the box below consisting of one cell, an ammeter, and two bulbs
2	• **Describe potential difference as a push that charges gain from a cell or battery** • **Describe how to measure the potential difference of a series and parallel circuit** • **Explain how potential difference affects the way that components work**	1. Define potential difference 2. What is the unit for potential difference? 3. What would you use to measure the potential difference in a circuit? 4. Draw the symbol for a voltmeter 5. How do you connect voltmeters in a circuit?
3	• **Describe what is meant by current** • **Describe what happens to current in a series and parallel circuit** • **Describe how to measure the current of a component and build a circuit to illustrate this**	1. What is current? 2. What piece of equipment do you use to measure current? Draw the symbol for this component 3. How do you connect an ammeter in a circuit? 4. What is the rule for current in a series circuit? 5. What is the rule for current in a parallel circuit?
4	• **Describe what is meant by resistance and how increasing resistance decreases the current in a circuit** • **Use formula to calculate the resistance in a circuit from given information** • **Explain, using built circuits, how changing resistance affects the current and appearance of a bulb**	1. What is resistance? 2. What is the symbol for resistance? 3. What are the units for resistance? 4. How do you calculate resistance? 5. How do you calculate the total resistance in a series circuit?

Year 9 Physics: Electricity (ABH)

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• **Set up a simple circuit to measure potential difference and current** • **Investigate how increasing the number of electrical components affects resistance** • **Analyse the relationship between current and resistance**	1. Draw the symbol for a fixed resistor 2. Write down the equation that links potential difference, current and resistance. 3. What does directly proportional mean 4. Which variable do you plot on the x – axis? 5. Which variable do you plot on the y – axis?
6	• **Build a functioning circuit from a circuit diagram** • **Draw a circuit diagram from a pre-made circuit** • **Fix a faulty circuit to make it match one in a circuit diagram**	1. Which component provides power to the circuit? 2. Draw the electronic symbol for a cell and a battery 3. What is the difference between a cell and a battery? 4. What is the difference between a series and parallel circuit?
7	• **Draw a circuit used to measure the current and potential difference of a range of circuit components** • **Build a circuit used to measure the current and potential difference of a range of circuit components** • **Build a circuit to calculate the resistance of a range of different components**	1. Are ammeters connected in series or in parallel to the component? 2. Are voltmeters connected in series or in parallel to the component? 3. Identify the missing current values 4. Identify the missing current and potential difference values
8	• **Describe how charged objects interact with each other** • **Describe what happens when charged objects are placed near each other** • **Describe the properties of an electric field**	1. What is an electrical insulator? 2. What happens when two positive charges are placed near each other? 3. What happens when two negative charges are placed near each other? 4. what happens when one positive charge and one negative charge are placed near each other? 5. What is an electric Field?

Year 9 Physics: Electromagnets (ABH)

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
10	• **Describe how magnets interact** • **Describe how magnetic field diagrams tell you about the direction and strength of magnetic field** • **Explain observations about navigation using the Earth's magnetic field**	1. What are the three magnetic **elements**? 2. What is a 'induced' magnet? 3. Two like poles will ……. each other 4. Two unlike poles will ……each other 5. Magnetic field lines always go from the ……. pole to the …… pole.
11	• **Describe what the difference between a magnet and electromagnet is** • **Describe how to make an electromagnet** • **Explain how to change the strength of an electromagnet**	1. What are magnets? 2. When electricity flows through a wire, it creates a ……. 3. What are electromagnets? 4. What is a solenoid? 5. How can you increase the strength of an electromagnet?
12	• **Build a simple electromagnet** • **Build electromagnets with different strengths** • **Explain how the strength of an electromagnet changes with distance**	1. Why did you include certain features? 2. How did you increase the magnetic field? 3. Why is the iron core not magnetic when the current is turned off? 4. How could you prove there was a magnetic field around your electromagnet?
13	• **Explain why you choose an electromagnet rather than a permanent magnet for a purpose** • **Describe how electric bells, circuit breakers, loud speakers and DC motors work**	1. True or false? When current flows through a wire, it generates a magnetic field. 2. What is the name of the coil of wire with many turns? 3. True or false? Motors and loudspeakers use the same effect to work. 4. In an electrical motor, what will happen if the current direction is reversed? 5. Which part of a loudspeaker causes the air to vibrate?

Year 9 Chemistry: Earth's Structure

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Name the three rock layers of the Earth Compare the layers of the Earth Identify what is present in the Earth's crust	1) State the names of the two main elements found in the Earth's core 2) Estimate the temperature of the Earth's core 3) Draw a simple labelled diagram of Earth's structure 4) State the most common element in the Earth's crust
2	Describe how sedimentary rocks are formed Describe how igneous rocks are formed Describe how metamorphic rocks are formed	1) State two examples where sedimentary rocks are used in famous buildings 2) Describe the process of weathering in forming sedimentary rocks 3) Describe how magma forms granite 4) Describe how marble is formed from limestone 5) Explain why slate is useful in roofing tiles
3	List processes that change rocks Label a diagram explaining the rock cycle Describe properties of ceramics	1) Describe one way rocks change over time 2) State what is meant by uplift 3) State what a ceramic material is made up of 4) List two physical properties of ceramics 5) List three uses of ceramics
4	Label the layers of the Earth Design a simple model of the Earth Label the simple model of the Earth's layers	1) Identify the composition of the core and the mantle 2) Use three colours of playdoh to model the three layers of Earth

Year 9 Chemistry: Earth's Resources

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Describe the function of the atmosphere State the different gases that make up the atmosphere Describe the terms global warming and climate change	1) State one function of the Earth's atmosphere 2) State the percentage of Nitrogen and oxygen in the atmosphere 3) Describe what has happened to Earth's average temperature since the 18th century 4) State two potential consequences of climate change 5) Suggest why scientific papers provide more accurate facts than newspapers
2	State the names of the greenhouse gases. Briefly describe the greenhouse effect. Describe how the greenhouse gases are linked to global warming.	1) State the name and formulae of the two main greenhouse gases 2) Describe how greenhouse gases cause the greenhouse effect 3) State two examples of processed that are leading to increased methane levels in the atmosphere 4) State name of the fossil fuel that powered the industrial revolution 5) State the word equation for the combustion of coal
3	State some potential consequences of climate change Suggest wats to limit the effects of climate change Analyse data to suggest factors that cause impacts of global warming	1) Describe a consequence of ice caps melting 2) Explain why switching to renewable energy could slow down global warming 3) Explain why switching to hybrid engine cars should slow down global warming 4) Describe the relationship between average Earth temperature and carbon dioxide concentration of the atmosphere
4	Label simple parts of the carbon cycle Describe some key processes in the carbon cycle Analyse the carbon cycle and understand the relevance of metabolic reactions	1) State the word equation for photosynthesis 2) Explain how photosynthesis changes the amount of carbon dioxide in the atmosphere 3) State the word equation for respiration 4) Explain how respiration changes the amount of carbon dioxide in the atmosphere 5) Describe how combustion of fossil fuels changes the amount of carbon dioxide in the atmosphere

Year 9 Chemistry: Earth's Resources

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	Describe the importance of metals and state the definition of an ore State word equations for the extraction by carbon Describe how to extract metals above carbon in the reactivity series	1) State the definition of the native state 2) State the word equation for iron being extracted from iron oxide by carbon 3) Explain the term electrolysis 4) Explain why sodium cannot be extracted from sodium oxide using carbon
6	State the definition of a finite resource Explain the importance of recycling Analyse specific uses of recycling	1) State, with an example, the definition of a finite resource 2) Describe what landfill is 3) State two advantages of recycling 4) State two disadvantages of using landfill sites

Year 9 Numeracy: Maths for Science (MBA)

Autumn Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5		
6		

How is your progress measured in class in Science in **Spring** Term?

Spring: Foundations in Biology	

Emerging	Achieving	Excelling

Y9 Biology: Interdependence

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	Identify different habitats and the organisms that live there Describe how ecosystems are organised Explain how interdependence exists in a variety of ecosystems	1) Describe the difference between a population and a community 2) State 3 examples of non-living parts of an ecosystem 3) Give 2 examples of interdependence shown between different animal species 4) Giv1 example of interdependence shown between an animal and a plant
2	State what food chains and food webs are Describe the levels of food chains and food webs Construct food webs from food chains and explain why food webs are more representative of ecosystems	1) Describe the roles of a producer in a food chain 2) State one similarity between primary and secondary consumers 3) State two differences between primary and secondary consumers 4) Explain whether a scientist should choose to record data as a food chain or a food web
3	State factors that affect the population of a species Describe the effect that changing population will have on another species Explain how climate change and bioaccumulation effect populations	1) Give three ways that the population of a species can be dramatically decreased 2) Explain the effect on the prey population if all the predators catch a new disease 3) Describe the effect on the predator population if the rate of breeding in prey increases 4) Describe bioaccumulation has a greater impact on secondary consumers than primary consumers
4	List some resources that animals and plants compete for in an ecosystem Describe when organisms are more likely to outcompete a competitor Explain the relationships between predators and prey	1) State 3 resource that animals compete with other animals for 2) State 3 resources that plants compete with other plants for 3) Two lions are competing for a mate. Explain the type of competition that is happening 4) Explain how a decrease in the number of prey affects the population of predators

Y9 Biology: Interdependence

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	Recall what is meant by the term adaptations. Identify the adaptations of predators and prey from images. Separate adaptations into structural and behavioural.	1) Define adaptations 2) State 3 examples of structural adaptations 3) State 2 examples of behavioural adaptations 4) Choose an animal and list all of the structure and behavioural adaptations it has
6	Recall that plants produce glucose by photosynthesis and describe where this takes place. Identify and recall the word equation for photosynthesis. Describe how plants obtain the raw materials needed to carry out photosynthesis.	1) Write the word equation for photosynthesis 2) Describe how plants obtain the water needed for photosynthesis 3) Describe how the stem is adapted to transport water 4) Describe how leaves obtain the carbon dioxide needed to carry out photosynthesis 5) Describe the role of the phloem
7	Describe the structure and function of the main components of a leaf. Identify leaf structures from under a light microscope. Describe how leaves are adapted to maximise photosynthesis.	1) Describe the structure and function of the palisade layer of a leaf 2) Describe the structure and function of the spongy layer of a leaf 3) Describe how to use a light microscope to observe leaf tissue 4) Describe the function of the stomata and guard cells
8	State and identify the parts of the flower. Describe the process of pollination. Explain how interdependence is important in plan populations.	1) Label the key features of a flower 2) Describe the differences in the two types of pollination 3) Describe the typical structure of insect pollinated plants 4) Describe the typical structure of wind pollinated plants

Y9 Biology: Cell Biology 1a (SKA)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• **I can recognise and draw animal and plant cells** • **I can describe the function of organelles in plant and animal cells** • **I can describe and differences in cell structure in plant and animal cells**	1. What is the function of the nucleus? 2. What is the function of the cell membrane? 3. What is the function of ribosomes? 4. Which 5 organelles do both plant and animal cells have? 5. Which 3 organelles are only present in plant cells and what are their functions?
2	• **I can define Prokaryotic and Eukaryotic cells** • **I can recognise and draw a bacterial cell** • **I can compare the structure and size of bacterial cells to Eukaryotic cells**	Exam question •a) List the main structures you would expect to find in a human cell. •b) State the three extra features that may be found in plant cells but not animal cells. • c) Describe the main functions of these extra structures 2. Suggest why the nucleus and the mitochondria are so important in all cells. 3. Chloroplasts are found in many plant cells but not all of them. Suggest two types of plant cells that are unlikely to have chloroplasts and, in each case, explain why they have none.
3	• **I can identify parts of the microscope and describe their function** • **I can compare the function of a light and electron microscope** • **I can describe how to set up and adjust a light microscope to produce clear images**	1. What is the function of the nucleus? 2. What is the function of the cell membrane? 3. What is the function of ribosomes? 4. Which 5 organelles do both plant and animal cells have? 5. Which 3 organelles are only present in plant cells and what are their functions?

Y9 Biology: Cell Biology 1b (GHA)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	• I can define diffusion • I can state some molecules that diffuse in living organisms • I can explain the factors that affect the rate of diffusion	1) State the definition of diffusion 2) Give two examples where diffusion is important in living organisms 3) Explain how plants get carbon dioxide from the air into their leaves 4) Explain how temperature increases the rate of diffusion 5) Explain concentration increases the rate of diffusion
2	• I can list examples of exchange surfaces in animals • I can describe how animal exchange surfaces are adapted to maximise diffusion • I can explain, using concentration gradients, how gas exchange occurs in mammals and fish	1) Describe the need for exchange surfaces in larger animals compared single-cell organisms 2) Name the structures that increase efficiency of diffusion in the lungs 3) Explain how these structures increase the surface area of the lungs 4) Name the structures that increase efficiency of diffusion in fish gills 5) Explain how fish have efficient gas exchange
3	• I can calculate surface area to volume ratios of different sized cubes • I can state how the size of an organism affects its surface area to volume ratio • I can explain, using surface area to volume ratios, why multicellular organisms need exchange surfaces, whereas unicellular organisms do not	1) Describe how to calculate surface area 2) Describe how to calculate volume 3) Describe how to calculate surface area to volume ratio 4) Explain why larger animals need to have adaptations to have efficient gas exchange but single celled organisms do not. 5) Calculate the surface area to volume ratio for a cube of 11 cm
4	• Define osmosis • Understand how osmosis affects the mass of animal and plant cell tissue • Describe what happens to animal and plant cell structure when they lose or gain water	1) State the definition of osmosis 2) What is a partially permeable membrane 3) What is a dilute solution? 4) What is a concentrated solution? 5) Compare osmosis and diffusion

Y9 Biology: Cell Biology 1b (GHA)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	• I can carry out an investigation to investigate the effect of glucose concentration on the mass of a potato • I can make predictions to the mass changes for each potato piece • I can use correct apparatus to measure the mass of potato pieces	1) What apparatus do we use to measure the mass of the potato? 2) What apparatus do we use to measure the volume of solution? 3) Why do we cut the potato pieces to 2 cm? 4) Why do we need to dab the pieces of potato with a paper towel before weighing the mass? 5) Why do we need to calculate the change in mass?
6	• I can calculate mass changes in each sample after 24 hours • I can calculate percentage changes of mass • I can describe how changes in mass are due to osmosis	1) 1)What is the calculation for percentage change in mass? 2) Describe how you know if the potato has gained or lost mass 3) Explain the difference between accurate and precise 4) Calculate the percentage change for a potato that has a mass of 1.2 g then after 24 hours became 1.6 g. 5) Explain the change in mass of question 4
7	• I can plot a line graph of glucose concentration against percentage mass change • I can describe and explain trends shown by the line of best fit • I can use a line graph to estimate the glucose concentration of the potato and explain in relation to osmosis	1) What is the label for the x-axis for this practical? And the units? 2) What is the label for the y-axis for this practical? And the units? 3) Explain how to draw a line of best fit 4) Describe how to estimate the concentration of potato 5) Explain the effect of solution on the percentage change in mass
8	• I can define active transport • I can describe examples of molecules that are transported by active transport • I can explain the role of mitochondria in active transport	1) What is the label for the x-axis for this practical? And the units? 2) What is the label for the y-axis for this practical? And the units? 3) Explain how to draw a line of best fit 4) Describe how to estimate the concentration of potato 5) Explain the effect of solution on the percentage change in mass

Y9 Biology: Bioenergetics L1 - L10 (EDE)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	I can recall the word and balanced symbol equations for photosynthesis I can describe where in a plant and cell photosynthesis takes place. I can explain why photosynthesis is an example of an endothermic reaction	**Q1)** Name the organelle where Photosynthesis takes place **Q2)** What is Chlorophyll? **Q3)** Where do plants gain water from? **Q4)** What is the word and symbol balanced equation for photosynthesis? **Q5)** Define Endothermic reaction
2	I can state the factors that will affect the rate of photosynthesis I can explain describe what a 'limiting factor' is I can identify limiting factors from line graphs	•. What is a limiting factor in photosynthesis? •. How does light intensity affect the rate of photosynthesis? •. Why is carbon dioxide a limiting factor in photosynthesis? •. How does temperature affect the rate of photosynthesis? •.What happens to the rate of photosynthesis when more than one factor is limiting?
3	I can describe the optimal conditions for the rate of photosynthesis I can describe how greenhouses are designed to maximise photosynthesis I can explain how farmers adjust conditions to maintain profit	•Which of the limiting factors can be changed by farmers? •Which of the four limiting factors are farmers not able to control? •Why are farmers not able to control this limiting factor? •Why would a farmer want to control the limiting factors for photosynthesis? •Why do farmers need to consider the economic cost of creating certain conditions?
4	I can describe how to measure the rate of photosynthesis I can write a method to investigate the effect of light intensity on the rate of photosynthesis I can calculate the rate of photosynthesis from reaction data.	•State one other control variable in this experiment. •Explain why each experiment was carried out three times. •What is an anomalous result? •Why were any anomalous results discarded? •How could you improve an investigation?

Y9 Biology: Bioenergetics L1 - L10 (EDE)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	I can carry out an investigation to investigate the effect of light intensity on the rate of photosynthesis I can use practical equipment to measure length and volume I can carry out a practical investigation safely, understanding the safety measures	•State one other control variable in this experiment. •Explain why each experiment was carried out three times. •What is an anomalous result? •Why were any anomalous results discarded? •How could you improve your investigation?
6	I can use the inverse law to calculate light intensity at given distances I can plot a graph of light intensity against rate of photosynthesis I can explain trends shown by a line graph	•What does it mean when a factor is described as a limiting factor? • Which of the following are not limiting factors of photosynthesis? carbon dioxide concentration, oxygen, chlorophyll availability, light intensity. •Which gas is essential for photosynthesis? •Which part of the plant leaf contains the most chloroplasts? •How does carbon dioxide enter the plant leaves?
7	I can identify appropriate variables I can explain improvements and limitations to calculating the rate of photosynthesis I can describe how to investigate the effect of temperature on rate of photosynthesis	•What is photosynthesis? •What are the main factors affecting the rate of photosynthesis? •How do you investigate the effect of light intensity on photosynthesis? •Why is sodium hydrogencarbonate ($NaHCO_3$) added to the water in photosynthesis experiments? •What is the relationship between light intensity and the rate of photosynthesis?
8	I can state the uses of glucose in plants I can describe the relationship between glucose and starch, and describe how to qualitatively test for these I can describe how plants use additional minerals ions to convert glucose into protein	•What are the four things glucose can be used to synthesise? •What process can glucose be used in? •What other chemical is needed to make proteins? •What is the function of cellulose? •What is the function of lipids and starch?

Y9 Biology: Bioenergetics L1 - L10 (EDE)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
9	I can recall the word and balanced symbol equations for aerobic respiration I can describe where in the cell aerobic respiration takes place I can describe the uses of aerobic respiration in mammals	•What three things do organisms need energy for? •Write the word equation for aerobic respiration •Where in the cell does aerobic respiration take place? •Define aerobic respiration •Write glucose in its chemical symbols
10	I can recall the word equations for anaerobic respiration in animal, plant and yeast cells I can compare aerobic and anaerobic respiration I can describe uses the human uses of fermentation and describe muscle fatigue	•Write the word equation for anaerobic respiration in yeast cells •Define fermentation •State the use of carbon dioxide •State the use of ethanol •What is the poisonous waste product of anaerobic respiration?

Y9 Biology: Bioenergetics L11 - L12 (AGM)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
11	•I can describe the ways in which the body responds to exercise. •I can define oxygen debt. •I can explain why changes in heart rate and breathing rate occur during and after exercise.	1)Explain why your heart rate increases during exercise. (3) 2)Explain why your breathing rate increases during exercise. 3)Describe why an oxygen debt arises. (3)
12	•I can define metabolism. •I can list and recall metabolic reactions that occur in animal cells. •I can explain how a lack of respiration leads to a reduced metabolism and the impact of this.	1)State one example of a metabolic reaction involving glucose in an animal cell. 2)State what nitrate ions can be used for with glucose in a metabolic reaction. 3)State what glucose is stored as in plants. 4)Describe the process by which the liver deals with the lactic acid from anaerobic respiration. (3)

Y9 Biology: Bioenergetics L11 - L14 (AGM)

Spring Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard

How is your progress measured in class in Science in **Summer** Term?

Summer:	

Emerging	**Achieving**	**Excelling**

Y9 Chemistry: Chemical analysis (MBA)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard

Y9 Chemistry: Atomic structure (AGM)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	•I can state the definition of an atom, element and compound •I can label a simple diagram of a element •I can label a simple diagram of a compound	1)State the definition of an element. 2)State the definition of a compound. 3)Draw a diagram showing 4 of the same element (use one circle for each). 4)Draw a diagram showing 4 of the same compounds (use two circles for each). 5)Draw a diagram showing 4 elements, 2 are the same and 2 are different (use one circle for each). What would you name this.
2	•I can devise simple chemical formulae •I can name simple compounds (metals & non-metals) •I can name more complex compounds	1) 2) 1 Magnesium atom joins with the carbonate group. State the name of the compound formed and the chemical formula. 2) 3) 1 Calcium atom joins with the sulfate group. State the name of the compound formed and the chemical formula. 3) 4) 1 Sodium atom joins with the nitrate group. State the name of the compound formed and the chemical formula. 4) 5) 2 Lithium atoms join with the carbonate group. State the name of the compound formed and the chemical formula
3	•I can construct word equations •I can state the definition of a molecule and name simple molecules •I can construct basic symbol equations	1)State the word equation for Calcium reacting with Chlorine. 2) State the definition of a simple molecule. 3)State the formula of an oxygen molecule. 4)State the name and chemical formula of the molecule formed when sulfur combines with three oxygen atoms. 5)State the symbol equation for Sulfur reacting with an oxygen molecule.

Y9 Chemistry: Atomic structure (AGM)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
4	•I can construct basic symbol equation based on word equations •I can recall the law of conservation of mass •I can apply the law of conservation of mass to balancing simple equations	1) 1)_Be + _O2 → _BeO 2) 2)_K + _F2 → _KF 3) 3)_H2 + _O2 → _H2O 4) 4)_Na + _Cl2 → _NaCl 5) 6) _Cl2 + _Al → _AlCl3 6) 5) _Mg + _HCl → _MgCl2 + _H2
5	•I can state the definition of a mixture •I can describe the physical processes that separate mixtures •I can describe the components that make up a solution	1)State an example of a pure substance and a mixture 2)Define a pure substance 3)State 3 physical properties of salt 4)State the definition of a solution. 5)Draw a labelled diagram of sugar being added to a beaker of water and dissolving. Label the solute and solvent.
6	• I can describe and carry out the process of filtration • I can describe and carry out the process of crystallisation •I can link the processes of filtration and crystallisation together to separate salt, sand and water	1)What is the purpose of filtration in separating mixtures? (1 mark) 2) During crystallisation, why is the solution heated before crystals form? (1 mark) 3) Describe the steps you would take to obtain salt from a solution (4 marks)
7	•Describe the process of simple distillation. •Describe the process of fractional distillation. •Explain the distillation process to unfamiliar situation.	1.Which piece of apparatus causes the vapour to condense? 2.How is the condenser kept cool? 3.How do we separate 2 or more liquids in a solution? 4.Which substance will evaporate first? 5.What do we use fractional distillation in?
8	•Describe the model of the atom. •State the charges and masses of subatomic particle. •State the radius of an atom and nucleus	1.Name 3 subatomic particles. 2.Describe where each subatomic particle are found. 3.Which subatomic particle are responsible for most of the mass of an atom? 4.State the charge and mass of each subatomic particle. 5.Explain why atom have no overall charge.

Y9 Chemistry: Atomic structure (AGM)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
9	•I can describe Daltons model of the atom •I can describe Thomsons plum pudding model of the atom. •I can describe Rutherford's alpha particle scattering experiment.	1) 1)_Be + _O2 → _BeO 2) 2)_K + _F2 → _KF 3) 3)_H2 + _O2 → _H2O 4) 4)_Na + _Cl2 → _NaCl 5) 6) _Cl2 + _Al → _AlCl3 6) 5) _Mg + _HCl → _MgCl2 + _H2
10	•I can describe Niels Bohrs adaptations of the nuclear model •I can describe James Chadwick's discoveries. •I can link these ideas to describe the current model of the atom	1) 1)Describe the planetary model of the atom devised by Bohr. 2) 2)State the name of the scientist who discovered neutrons. 3) 3)State the correct order of the scientists that led to nuclear model, starting with the earliest. 4) 4)Sketch a diagram for the planetary model of the atom, labelling the key parts

Y9 Chemistry: The Periodic Table (JCU)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
1	1) I can explain that Newland ordered elements by atomic weight in terms of the law of octaves 2) I can explain how Mendeleev overcame Newlands problems by leaving gaps and changing the order based on atomic weights/properties 3) I can explain how Mendeleev came up with the blueprint for the modern periodic table due to his predictions being correct	1) 1.How did Newlands and Mendeleev organise the elements? 2) 2.What did Newlands use to group elements which Mendeleev then built on? 3) 3.How did Mendeleev group elements? 4) 4.Why were Mendeleev's groups consistent but some of Newlands did not fit the pattern? 5) 5.Give an example of how Mendeleev altered his arrangement to make chemical properties fit
2	1) I can identify metals and non-metals on the periodic table and identify some properties 2) I can use the atomic number to calculate the number of protons and electrons in an atom 3) I can use the mass number to calculate the number of neutrons in an atom and describe why atoms are electrically neutral	1) How many protons does Sodium have? 2) How many neutrons does Argon have? 3) How many electrons does the Aluminium atom have? 4) Why are atoms electronically neutral? 5) State two properties which metals have 6) State two properties which non-metals have
3	1) I can describe the term relative atomic mass and apply this to the term isotope 2) I can Identify isotopes in terms of the numbers of protons and neutrons 3) I can calculate the relative atomic mass from the percentage abundance of isotopes	1) What is an Isotope? 2) Define Relative Atomic Mass 3) What two pieces of information do you need about each isotope in order to calculate the relative atomic mass? 4) Why are these isotopes of each other? 5) find the relative atomic mass of Lithium and Bromine
4	1) I can use the 2,8,8,2 rule in terms of electron shells 2) I can draw the electronic structure of the first 20 elements 3) I can explain that outer shell electrons are linked to group numbers and reactivity	1) How many electrons can go in each of the 1st 3 electron shells? 2) Sodium has an atomic number of 11; what is its electron configuration? 3) Draw the electrons in a chlorine atom 4) Tellurium is the group 6; how many Electrons are in its outer shell? 5) How many electrons are in the outer shell of Francium? 6) What does the period tell us about amount of electron shells?

Y9 Chemistry: The Periodic Table (JCU)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
5	1) I can explain how why ions form 2) I can describe that elements are ordered by atomic number and placed into groups based on chemical properties 3) I can work out what ion will be formed from each group of periodic table	1) 1.What is an ion? 2) 2.What are the specific names of positively and negatively charged ions? 3) 3.If an atom is in group 6 explain how it becomes and ion and what charge that ion has. 4) 4.If an atom is in group 3 explain how it becomes and ion and what charge that ion has. 5) 5.What do elements in the same group share physically and chemically?
6	1) I can describe the observations when group 1 metals react with water and oxygen and their physical appearance 2) I can write word and balanced symbol equations for the reactions of group 1 metals with oxygen 3) I can write word and balanced symbol equations for the reactions of group 1 metals with water	1) 1.Why are Group 1 elements named 'Alkali Metals'?' 2) 2.What happens when Alkali metals are left exposed to air? 3) 3.How does reactivity change as you move up the group of Group 1 elements? 4) 4.Write the word equation for Lithium reacting with water, including state symbols. 5) 5.Write the balanced symbol equation for Francium reacting with water.
7	1) I can describe the observations when group 1 metals react with chlorine 2) I can write word and balanced symbol equations for the reactions of group 1 metals with chlorine 3) I can explain the reactivity trend as you go down group 1 of the periodic table	1) 1.What is the trend in reactions of Alkali metals with Chlorine as you move down Group 1? 2) 2.Write a word equation for Chlorine reacting with Caesium 3) 3.Write a balanced symbol equation for Francium reacting with Chlorine, including state symbols. 4) 4.What happens to size of atom as you go down group 1 and how does that effect reactivity? 5) 5.What is the effect of inner electron shells on the outer most electron called which also lowers the electrostatic force between nucleus and electron?

Y9 Chemistry: The Periodic Table (JCU)

Summer Term Golden Nuggets and Work Hard

Topic	Golden Nugget	Work Hard
8	1) I can describe the physical properties of the group 7 elements 2) I can describe the diatomic nature of group 7 elements and their chemical reactions 3) I can explain the reactivity trend as you go down group 7 of the periodic table	1) 1.Name 3 properties of Halogens 2) 2.How do Group 7 elements exist in terms of size of molecules? 3) 3.How does size of atoms change as you go down group 7? 4) 4.How does reactivity change as you go down group 7? 5) 5.Why is the reactivity different between Chlorine and Astatine in terms of electronic configuration?
9	1) I can describe the term displacement and describe simple observations 2) I can carry out a practical to describe displacement reactions in terms of word equations 3) I can explain displacement reactions in terms of symbol equations	1) Arrange the three Halogens tested in order of decreasing reactivity and link this to how this is related to position in periodic table 2) Explain how the displacement reactions of Halogens are linked to position in Periodic Table 3) Predict the reactivity of Fluorine and Astatine – explaining BOTH answers 4) Write the word equation for Chlorine water reacting with Potassium Iodide 5) Write the balanced symbol equation for Chlorine water reacting with Potassium Iodide
10	1) I can explain why group 0 elements are unreactive in terms of their electronic structure 2) I can describe the physical properties as you go down group 0 3) I can revise for my topic test	1) 1.What do we call Group 0 elements? 2) 2.Explain in terms of electron configuration why Group 0 elements are unreactive? 3) 3.How does the trend of melting point as you go down the group compare to boiling point as you move down the group? 4) 4.In terms of atoms, compounds and molecules how do Group 0 elements exist? 5) 5.What happens to density of Group 0 elements as you move up?