Half Term 5

Week	Topic Studied
Topic 1	Waves – exploring sound and light
Topic 2	Waves – comparing types of waves
Topic 3	Energy – doing work and making it easier
Topic 3	Energy – thermal energy, conduction, convection and radiation
Topic 5	Energy – thermal energy, how to stop energy transfer

- During this summer term, students will be learning about the topics outlined above.
- The scheme of work below is what students would follow if they were in school and is based on the Oxford University Press 5 year curriculum and the Collins Key Stage 3 science books that they use in school.
- We will aim to set tasks following this lesson by lesson structure however many of the activities will be different for home learning however they may give you some ideas on how to take your learning further.
- You may find the objectives most useful as this highlights what the pupils need to understand /know
- Pupils should make sure they know the meanings of all the keywords in the topic.

Student Book 2 Chapter 4 Waves: Wave Effects and Wave Properties

Scheme of Work 2019 – 2020

Subject: KS3 Science Student Book 2 Chapter 4 Waves: Wave Effects and Wave Patterns

Year Group: 8

Specification: AQA Science Collins

Skill Focus: 20b,d 25f

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
2.4.1 Exploring sound	Understand how sound waves vary in frequency. Apply ideas about frequency to understand ultrasound. Understand practical applications of ultrasound.	What are the units of frequency? Some people clean old coins by immersing them in vinegar. How is using ultrasound different?	Use a tuning fork to generate a note, and say to the students that we can hear this because it is vibrating. Ask the students to estimate how many vibrations per second it produces. (The answer depends on the pitch, but middle C has a frequency of 256 Hz – or 256 vibrations per second.) Strike a tuning fork, and hold its foot against something that will resonate. Ask the students to explain what is happening and to draw out ideas about the object vibrating at the same frequency but with greater loudness. Keywords Medium Frequency Hertz Ultrasound	T-P-S Worksheet Extended response	Doddle – Sound waves	Lit Num So 1, 3, 4, 6 So 6, 7, 8 C 3, 6 Sp 2, 5
2.4.2 Sound systems	Understand the function of microphones and loudspeakers. Understand how audio equipment responds to different frequencies.	Which part of the microphone picks up the vibration? What kind of note will the loudspeaker make if is	Show a picture of a rock concert – the microphones, amplifiers and loudspeakers should be clearly visible. Ask the students to suggest what equipment is being used to amplify the sound. Show the students a microphone – ask them what it does and what else is needed to produce a louder sound Keywords: Microphone	T-P-S Worksheet Exam question	Doddle – Sound waves	Lit Num So 1, 3, 4, 6 So 6, 7, 8 C 3, 6

		oscillates slowly but travels in and out quite a long way?	Signal Loudspeaker Cone Diaphragm Energy transfer			Sp 2, 5
2.4.3 Exploring light	Understanding light can vary in frequency. Describe UV light and its risks. Explain the uses of UV light.	What colour do you think light with a wavelength of 600nm would be? Why do some flowers need to attract the attention of insects?	Show a picture of a rainbow, and ask the students for ideas as to what causes it. Show a CD with light reflecting off it, and ask for ideas as to why it appears different colours. Keywords: Wavelength Ultraviolet Frequency Energy	Class discussion Worksheet Exam question	Doddle – Light waves	Lit Num So 1, 3, 4, 6 So 6, 7, 8 C 3, 6 Sp 2, 5
2.4.4 Exploring waves	Use water waves to model wave behaviour. Understand and apply the processes of reflection and absorption.	Why is a longitudinal wave sometimes referred to as a compression wave? Draw a picture of a transverse wave. Now draw a second wave that has twice the wavelength and half the	Ask the students to think about light and sound, and to come up with ways in which these waves are similar and ways in which they are different (this will provide a useful indication if ideas from earlier in the topic have been clearly understood). Keywords: Longitudinal Compression Wavelength Transverse Amplitude Frequency	Worksheet Mini quiz Whiteboards	Doddle – Light waves	Lit Num So 1, 3, 4, 6 So 6, 7, 8 C 3, 6 Sp 2, 5

		amplitude of the first one.				
2.4.5 Comparing transverse and longitudinal waves	Understanding longitudinal waves. Understanding transverse waves. Comparing types of wave	Describe the difference between a crest and a trough. Explain what is meant by superposition?	Show the students some photographs or a video of waves in the sea. Working in small groups, ask them to discuss how water moves. After a few minutes, invite each group to summarise their ideas. Keywords: Transverse Crest Trough Amplitude Wavelength Superposition	Class discussion Worksheet Practical assessment Exam questions Marksheet	Doddle – Transverse and longitudinal waves	Lit Num So 1, 3, 4, 6 So 6, 7, 8 C 3, 6 Sp 2, 5

Student Book 2 Chapter 3 Energy : Work and Heating and Cooling

What should pupils have learnt at KS2?

- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Scheme of Work 2019 – 2020

Subject: KS3 Science Student Book 2 Chapter 3 Energy: Work and Heating and Cooling

Year Group: 8

Specification: AQA Science Collins

Skill Focus: 20c,d 24a,c,e

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
2.3.1 Doing work	Recognise situations where work is done. Describe the relationship work done = force × distance. Apply the equation for work done to different situations.	Ask the students to produce a poster to explain what is meant by 'work done' in at least three different situations	Set up a circus of different activities for pairs of students to try out, such as a heavy box to drag, push or lift, a door to open, a 1 kg weight to lift through a distance of 1 m, and a stool to step on. Provide metre rules and force meters. Ask the pairs to discuss each situation and identify the forces in each case. Ask the students to look at the pictures in Fig 2.3.1b and to suggest how these represent work being done. Page 22 Mathematics. Calculating force x distance. Keywords: Lever Energy Work Deformation Displacement	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- Work done presentation Work done worksheet BBC work done interactive activity Work done quiz bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2

2.3.2 Making work easier	Understand what simple machines are. Explain why they are useful. Compare and contrast different machines	Show students a picture of a crowbar (or, even better, a real one), and ask how it can be used to force open a locked door when pushing on it did not work.	Show the students a heavy object, and discuss ways to lift it. Select volunteers, and ask them to try to lift it with their hands. Now demonstrate lifting it using a long plank as a lever with a wooden block as a fulcrum. Explore reasons why this is much easier. Ask the students to recall ideas about work done from previous session and to sketch an example of a situation in which work has been done. Explain what can be seen and label the drawing. Engineering DT. Understanding machines doing work. Understanding what 'work done' means. Keywords: Machine Force Level Input force Output force	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- simple machines presentation Moments presentation Moments quiz BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2
2.3.3 Explaining thermal energy	Describe how temperature differences lead to energy transfer	Show the students a range of different thermometers, and demonstrate taking the temperature of different objects. Discuss the advantages and	Working in groups of four, students carry out the class practical using Practical sheet 2.3.3. They investigate the effect of temperature differences in two identical metal blocks. Provide three bowls – one full of warm water at 40 °C, one with cold water with ice cubes in it at 10 °C and one with lukewarm water at 20 °C. Select students to place their hands in each of the three bowls in turn and to describe what they feel. Use the demonstration to explore the meaning of the word 'temperature'.	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- Heating and cooling part 1 presentation (heat and temperature) BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9

		disadvantages of each.	Catering. Understanding how temperature effects rate of food being cooked. Keywords: Temperature Degrees Celsius Energy Thermal energy			SP5 SP6 M2
2.3.4 How heat travels	Explain how heat can travel by conduction, convection and radiation. Give examples of each of these happening.	Light a Bunsen burner and ask students to suggest why thermal energy from the fire can travel elsewhere. Ask for suggestions as to why it is possible to make it travel more effectively	Set up a metal rod, clamped horizontally and with paper clips stuck along its length with wax. Heat it with a Bunsen burner at one end. Ask students to predict what will happen, and why Set up a convection box, with a candle under one of the two chimneys. Hold a smoking taper above the other chimney. Ask students to explain what is happening DT- insulation for different kinds of products such as a thermos Understanding that heat can transfer from one place to another. BBCbitesize.co.uk Keywords: Conduction Convection Insulation Radiation	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- heating and cooling part 2 presentation (conduction, convection and radiation) Heating and cooling worksheet 1 & 2 BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2
2.3.5 How to stop heat from travelling	Explain the difference between conductors and insulators. Explain how insulation works. Apply ideas about insulation to practical applications.	Show the students an image of a bonfire, or light a Bunsen burner, and ask how it might be possible to stop heat from	Remind the students of the three ways in which heat travels, and ask them to suggest how that process could be stopped – how, for example, could cooking implements be designed so as not to conduct heat, how could convection currents be stopped from circulating and how could objects that are good radiators be made into poor radiators.	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- Heating and cooling part 3 presentation (Heat loss and insulation). BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02

		moving from one place to another.	Show the students an image of a bonfire, or light a Bunsen burner, and ask how it might be possible to stop heat from moving from one place to another. DT- insulation for different kinds of products such as a thermos. Identifying the difference between a conductor and an insulator. Keywords: Conductor Insulator Energy Metals Non-metals			S06 S08 SP9 SP5 SP6 M2
2.3.6 Energy and temperature	Describe the warming and cooling of objects. Explain the relationship between energy transfer and temperature change.	Ask the students to describe some situations in which they feel cold, and what they do to keep warm. Even if they do not use the correct terminology at this stage, ask them if they can group ways of keeping warm	Ask the students to read the 'Cooling and warming' section in the Student Book. Take some time to look at Figure 2.3.6b 9 (a cooling curve) with the students. Point out different features of the graph. If time allows, the experiment could be demonstrated, with students being invited to take temperature readings. Comparison thinking frame. Comparing different materials and how efficient they are at insulating. Mathematics- reading and drawing graphs. Literacy- explaining the relationships shown on graph. Understanding how energy can transfer away from a hot liquid. BBCbitesize.co.uk	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- investigating thermal insulation and factors affecting thermal insulation animations Heating and cooling mini quiz BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2

Half Term 6

Week	Topic Studied
Topic 1	Genes – Variation, natural selection and extinction
Topic 2	Genes – DNA, chromosomes and inheritance
Topic 3	Reactions - Exothermic and endothermic reactions
Topic 4	Reactions – Catalysts and changes in reactions
Topic 5	Reactions – Combustion and thermal decomposition
Topic 6	Electromagnets – forces and fields
Topic 7	Electromagnets – Investigating and using electromagnets

- During this summer term, students will be learning about the topics outlined above.
- The scheme of work below is what students would follow if they were in school and is based on the Oxford University Press 5 year curriculum and the Collins Key Stage 3 science books that they use in school.
- We will aim to set tasks following this lesson by lesson structure however many of the activities will be different for home learning however they may give you some ideas on how to take your learning further.
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- Pupils should make sure they know the meanings of all the keywords in the topic

Student Book 2 Chapter10 Genes: Evolution and Inheritance

What should pupils have learnt at KS2

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Scheme of Work 2019 – 2020

Subject: KS3 Science Student Book 2 Chapter 10 Genes: Evolution and Inheritance

Year Group: 8

Specification: AQA Science Collins

Skill Focus: 10f 12a,b,c 16a,b 20f

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
2.10.1 Explaining natural selection	Describe how variation causes competition for resources, and drives natural selection.	Can you explain, in detail, what natural selection is?	**Collins 2.10.1 Investigating natural selection** This practical allows students to investigate natural selection by using models to represent pray and predators. Ask the students 'What animals have been able to survive despite massive challenges?' and 'What characteristics would an animal need to survive for hundreds of millions of years?' The students **write** a newspaper article about Charles Darwin and his ideas about evolution. Resources: BBC Bitesize Doddle – power points and quick quizzes You tube: 'Free science lessons' Keywords: Competition Population	Scientific write up of practical. Produce findings in a graph. Peer assessment of newspaper article	Doddle- Variation quiz. Doddle- Variation worksheet 1 and 2.	Lit. Num/ So 1, 3, 4, 6.

			Variation Natural selection Evolution			
2.10.2 Understanding the importance of biodiversity	Describe what is meant by biodiversity. Explain the importance of biodiversity.	Describe the ways that an ecosystem could demonstrate high biodiversity?	Display the word 'biodiversity' and separate it into 'bio' and 'diversity'. Explore with the students what the parts of the word mean, to reach an understanding of the definition. Refer back to work done previously on natural selection and the importance of variation within species. Students **design** storyboards using pictures and diagrams, and as few words as possible, to show why biodiversity is important. Keywords: Biodiversity Ecosystem endangered	T-P-S Class discussion RAG Collins 2.10.2 Write on WS can be completed and marked to assess students understanding. Story boards	Doddle- Biodiversity quiz.	Lit So 1, So 3, So 4, So 6.
2.10.3 Explaining extinction	Identify changes that can cause a species to become extinct. Explain the use of gene banks to preserve hereditary material before a species becomes extinct. Analyse and evaluate theories of what caused the extinction of the dinosaurs.	What is the cause of extinction? Can you explain what a gene bank is?	students **discuss** the question 'What do dinosaurs, dodos, sabre-toothed cats and the woolly mammoth all have in common?' **brainstorm** ideas, and **write an explanation** of what they think caused the extinction of these animals. **research** the use of gene banks and seed banks to preserve the DNA of plant and animal species Keywords: Extinction Gene bank Mass extinction	T-P-S Complete a write up and research task based on extinction, using key words.	Doddle- adaptations revision. Doddle- Causes of variation revision. Doddle- Environmental change revision.	Lit So 1, So 3, So 4, So 6.
2.10.4 Understanding the nature	Identify that the nucleus contains chromosomes, which carry inherited genetic information.	What is the difference between a gene and a chromosome?	**Collins 2.10.4 Modelling the DNA molecule** Allows students to practically build and produce their own DNA molecule using sweets.	Draw and label the structure of DNA, use key words.	Doddle- Genetics lesson pack.	Lit So 1, So 3, So 4,

of genetic material	Describe the link between chromosomes, genes and DNA. Describe the structure of DNA. Assess the work of Watson, Crick, Wilkins and Franklin on DNA structure.	What is the role of the gene? How many chromosomes do humans have?	Ask the student pairs to **draw** a simple diagram to show the link between a cell, a nucleus, a chromosome, a gene and DNA. Keywords: Chromosomes DNA Gene Base Double helilx	Peer assessment	Doddle- structure of DNA interactive.	So 6.
2.10.5 Exploring the role of chromosomes	Identify that a fertilised egg contains a full set of chromosomes, half from each parent. Explain the number of chromosomes in gametes. Explain how some genetic disorders arise.	What is karyotype? Why do females and males get described as XX and XY?	**Collins 2.10.5 Exploring human chromosomes** Allows students to investigate how chromosomes are passed down to offspring. Ask the students the question 'How is sexual reproduction similar to and different from cell division?' Take feedback and discuss their ideas. Elicit that the sperm first fertilises the egg, and then the cell divides, resulting in a new organism Keywords: Gametes Karyotype Mutation Trisomy	T-P-S RAG Students to research and present findings and information on genetic disorders. During presentations students are to take notes and complete WS.	Doddle- Chromosomes, DNA and genes quiz.	Lit So 1, So 3, So 4, So 6.
2.10.6 Understanding variation	Identify inherited characteristics in plants and animals that vary between offspring. Explain how inherited differences arise by genetic material from both parents combining. Describe how identical twins occur and analyse data about their features.	What is an inherited characteristic? Can you name ten of them?	**Collins 2.10.6 Exploring why siblings are different** Allows students to explore human genetic traits, by collecting data on the traits they have and collaborating class data. Show photos of a black Labrador and a Dalmatian. In groups, the students **predict** and **draw** the features of puppies produced by breeding from these parents. Discuss their ideas – what could happen to a puppy to alter how it looks?	Students to use data from their homework task to present their findings in a scientific write up and graph. Collaborate this data with rest of class.	Homework- collect genetic traits info.	Lit Num So 1, So 3, So 4, So 6.

			Show photos of a black Labrador and a Dalmatian. In groups, the students **predict** and **draw** the features of puppies produced by breeding from these parents. Discuss their ideas – what could happen to a puppy to alter how it looks? Keywords: Inherited characteristics Identical twins			
2.10.7 Modelling inheritance	Describe how identical twins occur and analyse data about their features. Use a model to represent inheritance of a trait. Predict likelihood of offspring inheriting specific traits.	What are alleles? What is the difference between dominant and recessive alleles?	Students to **try** rolling their tongues and **recall** what controls whether we can roll our tongue or not Remind the students that we inherit two of each gene, one from each parent. Stress that sometimes these might be the same type of gene, but sometimes they might differ. Display the three genotypes FF, ff and Ff, and ask the students to **identify** whether each of these people would have freckles or not. Keywords: Allele Dominant Recessive Genetic diagrams Probability	Student discussion Collins write on WS 2.10.7 to be used to show understanding and knowledge. Mini whiteboards Mark sheet	Doddle- AQA Cell division quiz.	Lit Num So 1, So 3, So 4, So 6.

Student Book Chapter 6 Reactions : Chemical Energy and Types of Reaction

In this chapter, students will consider energy changes in chemical reactions using an understanding of bond making and bond breaking. They will explain why exothermic and endothermic changes take place and how these can be usefully applied. They will be introduced to the idea of catalysts and how they can change the rate of chemical reactions. Students will study combustion and thermal decomposition as examples of chemical reactions. They will consider the differences between the two reactions, and the applications of each. Students develop the skill of representing reactions by word equations and use a particle model to support this. This particle model is then applied to the Law of Conservation of Mass.

This chapter provides several opportunities to carry out chemical reactions and to make detailed observations. The students will plan investigations, including identifying a suitable range and intervals. They will also consider how to present data and analyse their findings to make conclusions.

Scheme of Work 2019 – 2020

Subject: KS3 Science Student Book 2 Chapter 6 Reactions: Chemical Energy and Types of Reaction

Year Group: 8

Specification: AQA Science Collins

Skill Focus: 6a,b 7a,b,c,d 8a,b,c 18d,e

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
2.6.1 Understanding exothermic reactions	Describe examples of exothermic reactions. Explain the energy changes taking place during an exothermic reaction.	What is an exothermic reaction? What happens during an exothermic reaction?	Word association for “exo” Ask the students to **recall** other reactions in which they can **identify** that energy is given out. Make up a class list, **explain** why one reaction is more or less exothermic than another. They should include ideas about bond breaking and bond making Sticky notes; molymods, equipment and materials as detailed in the Technician’s notes; Worksheet 2.6.1; Practical sheet 2.6.1 Keywords: Exothermic reaction	Class discussion Sketch energy level diagram (Whiteboards) Extended writing Exam questions	Design poster Doddle – exothermic and endothermic reactions presentation Bonds and exothermic reactions animation	Numeracy: creating a graph Literacy: Extended writing/ word association S02 S06 S08 SP9 SP5

			Chemical bond Bond making Bond breaking			SP6 M2
2.6.2 Comparing endothermic and exothermic changes	Describe examples of endothermic reactions	What is an endthermic reaction? What is the differennce between an endothermic reaction and an exothermic reaction?	A green plant; a cold pack (containing ammonium nitrate); Show the students a plant photosynthesising, and a cold pack. Ask them to **identify** what these two changes could possibly have in common. Introduce the idea of an endothermic reaction as the opposite of an exothermic reaction. Ask the students to **predict** what would happen to the temperature during an endothermic reaction. equipment and materials as detailed in the Technician's notes; Worksheet 2.6.2; Practical sheet 2.6.2 Calculation of bond energy to compare difference in enthalphy diagrams Comparison thinking frame for extended writing task Keywords: Endothermic reaction	T or F Class discussion Mini Quiz Extended writing Exam questions	Doddle quiz – exothermic and endothermic reactions	Numeracy: calculation of bond energies S02 S06 S08 SP9 SP5 SP6 M2 L
2.6.3 Investigating endothermic reactions	Choose a suitable range and interval of values in an investigation.	How can exothermic reactions benefit us?		Class discussion Presenting data- draw results	WS Doddle- endothermic and exothermic	Numeracy: Collecting and presenting data

	Consider how to present data to make conclusions.		The students **discuss** how we could identify the best cold pack Resources as on technician's notes; examples of single-use cold packs (with different ingredients, if possible); tray of sand and a marble; 2.6.3; Tech's notes ,WS Set the scene: the students are researchers for a manufacturer of sports cold packs. Explain that the researchers need to devise a method to find out the amounts of ingredients needed to make the most effective cold pack. Keywords: Variable Range Trial Interval	Working scientifically skills Graph skills	summary activities and energy changes in reactions revision	Literacy: Method writing So6 SP9 SP5 SP6
2.6.4 Explaining	Describe what a catalyst is.	What is a catalyst?		Presenting data- draw results	WS/doddle	N/L/So6

the use of catalysts	Explain how catalysts work.	How can catalysts be useful?	A sealed test tube of 10% v/v hydrogen peroxide that has been left overnight; equipment and materials as detailed in the Tech's notes; 2.6.4 Show the students a sealed test tube of hydrogen peroxide that has been left overnight. Explain that it decomposes very slowly to make water and oxygen. Test the gas in the test tube with a blown-out splint for oxygen – there should be no sign of it. Now add a spatula of manganese dioxide to a conical flask containing hydrogen peroxide, and ask the students to **observe** the changes. Ask some students to feel the flask and to test the gas for the presence of oxygen Mind map – thinking frame. The students could **explain** the similarities and differences between manganese dioxide and catalase Keywords: Catalyst Rate of reaction Enzyme Catalytic converter	Scientific skills Extended writing Exam questions	Doddle- rates of reaction and catalysts lesson	Numeracy: percentages Literacy: extended writing
2.6.5 Exploring combustion	Summarise combustion using an equation. Make observations during chemical reactions Write word equations to represent chemical changes.	What is combustion? How is combustions useful? How would you represent combustion in an equation?	Define 'combustion' as the scientific name for burning.	Textbook Q 7 to 9 Round robin Mini quiz Exam questions	WS/Doddle Chemical reactions lesson	Literacy: extended writing Numeracy: writing equations/So2

	Explain chemical changes using a model.		Ask the students to **identify** whether this is a chemical or physical reaction.n Toy building blocks; equipment and materials as detailed in the Tech's notes; 2.6.5 (second page copied onto card) Use building bricks to **explore** the equation further, and to show that same atoms are present in the reactants and products – but they have been rearranged Keywords: Product Chemical reaction Fuel Combustion Reactant Oxidation			
2.6.6 Exploring the use of fuels	. Identify applications of combustion reactions. Identify fuels used in different applications. Compare the energy content of different fuels. .	How do fuels link to combustion? Are all fuels made equally and do they react in the same way?	Pictures of examples of combustion; mini-whiteboards (optional); equipment and materials as in the Tech's notes; 2.6.6 WS Ask the groups to **consider** and **discuss** how we can compare the efficiency of different fuels in these situations. Take feedback from across the class. Show the students the spirit burners containing different alcohols, and ask them to **discuss** in pairs how we could compare the efficiency of the fuels Keywords: Exothermic Energy Precision Outliner	Class discussion Extended response Mini Quiz	WS/Doddle Doddle – release of energy from different alcohols animation	L/So2 Numeracy: analysing data Literacy: describing trends

2.6.7 Understanding thermal decomposition .	Recognise and explain thermal decomposition reactions. Describe some uses of thermal decomposition.	What is the difference between combustion and thermal decomposition? How is thermal decomposition useful?	Objects (or photos of objects) that contain calcium carbonate such as marble, sea shells, toothpaste, cement/concrete, chalk and indigestion tablets.; equipment and materials as detailed in the Tech's notes 2.6.7 The students should name and describe the starting materials (solid green copper carbonate, $CuCO_3$) and the products (carbon dioxide gas (CO_2) and black powder). After their initial **discussion**, name the symbols to enable the students to **identify** the black powder (copper oxide (CuO)). Keywords: Thermal decomposition Carbonate conserved	End of chapter Q1 to 8 End of chapter Q 9 to 14	WS/doddle Research /doddle Calcium carbonate revision and mini quiz	N/L/Sp7 N/L/So3
2.6.8 Explaining changes	Use particle diagrams to explain chemical processes. • Observe and explain mass changes for chemical and physical processes.	What is the difference between a chemical and a physical change?	Equipment and materials as detailed in the technician's notes; Worksheet 2.6.8; Practical sheet 2.6.8; Technician's notes 2.6.8 Demonstrate some physical processes, such as melting ice, melting chocolate, mixing rice and peas, and dissolving salt in water. Ask the students to suggest what would happen to the mass of the chocolate after it has melted or to the mass of the water and salt when they are mixed. If necessary, test the theory that mass does not change during these reactions. Introduce the Law of Conservation of Mass – the idea that mass cannot be created or destroyed, but can take new forms. That is, in chemical reactions	End of chapter Q 9 to 14 Exam questions Mark sheet	Research /doddle Physical and chemical changes mini quiz	N/L/So3

			we rearrange atoms (and hence mass) but the total mass/number of atoms does not change Keywords: Physical change Product Reactant conserved			

Student Book Chapter 2 Electromagnets : Magnetism and Electromagnetism

What should pupils have learnt in KS2?

- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Scheme of Work 2019 – 2020

Subject: KS3 Science Student Book 2 Chapter 2 Electromagnets: Magnetism and Electromagnetism

Year Group: 8

Specification: AQA Science Collins

Skill Focus: 4a,b,c 5a,b,c,d 9a 26a

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
2.2.1 Forces and fields	Know the laws of magnetic attraction. Explain how a magnetic field can be represented by field lines. Apply ideas about attraction to magnetic materials placed in a field.	How ae forces and magnets linked? Why do some things attract and others repel?	Provide students with bar magnets and mystery boxes; challenge them to work out the number and position of the magnet(s) inside each box Ask the students to answer questions 3–5 in the Student Book. Defining map- Magnetic at the centre with different materials around the home that may be magnetic. Literacy Use ideas from observations to develop 'rules' about magnetic force Keywords: Pole Non-contact Attract Repel Field	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions. Thinking map	Doddle- weekly set tasks. Magnets and electromagnets presentation part 2 – Magnetic fields BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2

2.2.2 Using ideas about fields	Describe key features of the Earth's magnetic field. Explain why fields vary in strength. Explore the fields around combinations of magnets.	Why do we have a North and South pole? What part of a magnet is the strongest and why?	Ask the students to suspend magnets, or to use plotting compasses, to detect the Earth's magnetic field in the classroom. They should be able to detect and report on the alignment and direction. Ask them to explain what this means. Show the students the globe, and ask them what they know about the Earth's magnetic field – its shape, strength and position Literacy- Make comparisons and explain differences using ideas and evidence Understanding why some materials are magnetic Keywords: Filed Pole Compass	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions. Peer assessment	Doddle- weekly set tasks. Magnets and electromagnets presentation part 1 – Magnetic poles BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2
2.2.3 Investigating electromagnetism	Describe what an electromagnet is. Investigate the factors affecting the strength of electromagnets.	What is an electromagnet? How do electromagnets work?	Practical sheet 2.2.3. Experiment 1 on Practical sheet 2.2.3. Using a plotting compass, the students should identify the magnetic field lines of the wire when the current is switched on and off, and record their results on a large sheet of paper Pair talk- Ask the students to discuss and share some advantages and disadvantages of a magnet that can be switched on and off. Mathematics - Collect and present data	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions. Practical work	Doddle- weekly set tasks. Magnets and electromagnets presentation part 3 – Electromagnets BBC bitesize	Lit- Describing tasks. Num- Drawing diagrams S02 S06 S08

			Understanding the earth's magnetic field. Keywords: Magnetic field Electromagnet Solenoid Core			SP9 SP5 SP6 M2
2.2.4 Using electromagnets	Describe different applications of electromagnets.	How can electromagnets be useful? Explain the advantages and disadvantages of using electromagnets	Arrange the students in small groups of similar ability. Provide them with the diagrams from task 2 of Worksheet 2.2.4 – circuits that use electromagnets in useful applications. Ask each group to look at one of the circuits. Display a selection of equipment that uses electromagnets and magnets Literacy- Summarise advantages and disadvantages. Keywords: armature contact circuit breaker	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- weekly set tasks. Electromagnets and their uses revision Electromagnets mini quiz BBC bitesize	Lit-Describing tasks. Num-Drawing diagrams S02 S06 S08 SP9 SP5 SP6 M2
2.2.5 Investigating strength of electromagnets	Identify and manage variables Investigate the effect of changing variables. Draw conclusions about how the strength of	What is one way of strengthening an electromagnet?	Consider how they could make an electromagnet stronger so that it could, for example, pick up more paperclips or attract them from further away. Gather ideas and display them so that they can be reviewed. Show that a current flowing through a straight wire will deflect a compass needle.	Whiteboards. Red pen piece. RAG boxes at the end of the lesson for books. Exam questions.	Doddle- weekly set tasks. Magnets and electromagnets worksheet 1	Lit-Describing tasks. Num-Drawing

	an electromagnet can be controlled.		Ask the students what this shows about electricity Literacy- Make comparisons and explain differences using ideas and evidence Keywords: Variable Discrete Continuous Relationship Limit		BBC bitesize	diagrams S02 S06 S08 SP9 SP5 SP6 M2