Year 4 Programme of Study for Science

Living things

Working Scientifically NC Statutory Learning Objectives	• Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Using results to draw conclusions, make predictions for new values, suggest improvements and raise further questions. • Identifying differences, similarities or changes related to simple scientific ideas and processes. • Using straightforward scientific evidence to answer questions or to support their findings.

Unit 2.1 Guess who?

NC Statutory Learning Objectives	• To recognise that living things can be grouped in a variety of ways. • To recognise how a simple key helps identify living things. • To ask questions that can be used to construct a key. • To observe key features of living things.	Success criteria	• I can make careful and detailed observations of living things. • I can use a simple key to identify a living thing or object. • I can explain why it is important to classify living things into groups. • I can explain how a key helps to classify living things.

Scientific language	Classify, key, organism	
Who am I page 26	Quick challenges	Take children to the library and get them to find specific books. Challenge them to organise a supermarket.

Whole class learning

Write the name of one child on a piece of paper (A) and another child (B) answers questions about the child answering yes or no only. As the questions or asked the children sit down if they don't match the answer. Continue until one child left.

1. In groups, the children match up the name of living things to images of plants and animals.
2. In pairs, the children list all the differences and similarities between two different objects.
3. Children play the game '20 questions'.
4. Children write yes/no questions for some of the animals or plants from the earlier activity.

Key to the problem page 27	Quick challenges	Children write yes/no questions for a range of biscuits given.
Whole class learning Show children four different cuddly toys and explain they all have names but you can't remember them. Work through a simple branching key that allows you to demonstrate how the key works. Make a giant key on the floor with arrows and get the class to think of yes/no questions to split 4 objects.	1. In pairs, the children play 'Guess who?' 2. Children produce their own key to sort a small range of sweets.	

Unit 2.2 Habitats

NC Statutory Learning Objectives	• To recognise that environments can change and that this can sometimes pose dangers to living things. • To examine invertebrates in their environment. • To identify invertebrates with a simple key. • To make careful observations.	Success criteria	• I can name some common invertebrates. • I can describe what an invertebrate is and some of its features. • I can sort invertebrates into groups. • I can suggest how a habitat has been altered by humans. • I can suggest how we can improve or protect a habitat. • I can make and record observations.
Scientific language	Habitat, invertebrate, insect, millipede, centipede		
Where going on a bug hunt! page 30	Quick challenges	Children name bugs. They discuss where to find them and what equipment would be useful.	
Whole class learning Discuss rules for bug hunting.	1. In pairs, children collect a selection of bugs and identify those using keys. 2. Children produce a fact file on one bug. 3. In groups, they produce a tally chart of the most common bugs and mark on a school map where they were found. 4. Children consider the impact of builders digging up the area where the bugs where found and how they could make the habitat right again for bugs.		
A bug's life page 31	Quick challenges	Watch the Tigtag video 'Invertebrates' Discuss the features of them. List all bugs known. Watch clip's from 'A bug's life' and compare to real bugs.	

Whole class learning Show images of the bugs taken last session and put them into groups. Ask for the names of the groups and discuss the features on each one.	1. In pairs, children explore how they could move without a skeleton. 2. Children complete Top Trumps of the key features of invertebrates by researching them on the internet. 3. Children design a home for a woodlouse.

Unit 2.3 Which kingdom?

Learning Objectives	• To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • To ask relevant questions in order to sort and classify. • To devise and use a key to identify common trees from their leaves.	Success criteria	• I sort living things into groups. • I can ask questions that make sorting easier to carry out. • I can describe and name some animals that have backbones and some that don't. • I can recognise a flowering plant and name some examples. • I can devise and use a key to identify a range of common animals and plants.

Scientific language	Vertebrate, invertebrate, insect, mammal, bird, amphibian, reptile, fish, flowering plant	
High five page 34	Quick challenges	Put a few quick skeleton x-rays up for children to guess what they are. Look at an image of an unusual animal and try and guess what it is.
Whole class learning Explain that animals with backbones and skeletons inside the body are called vertebrates and those without are called invertebrates.	1. Children match skeletons to animals. 2. Children group animals into vertebrates and invertebrates. 3. Find mammals with similar skeletons and discuss how they move similarly. Loo animals that are no tmammals and compare how they are different. 4. Children create a key to identify vertebrates.	
Flower power page 35	Quick challenges	Name plants and animals from pictures. Go for a walk to the local park and discuss how you can name the trees.
Whole class learning Go on a plant hunt and collect some leaves. Discuss the difference between the leaves, using observational skills. Use the leaves to make a bar chart to identify the most common plant in the area. Discuss flowering and non-flowering plants.	1. Children draw plants they see identify what they are. 2. In pairs, they devise their own identification system to identify leaves. 3. Children design a display to illustrate how keys work.	
End of topic assessment	Children to all complete the interactive activity 'Living things' topic test to assess knowledge.	

What's that sound?

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Unit 1.1 What a racket!

NC Statutory Learning Objectives	• To identify how sounds are made, associating some of them with something vibrating. • To recognise that vibrations from sounds travel through a medium to the ear. • To find patterns between the volume of a sound and the strength of the vibrations that produce it.	Success criteria	• I can name some sounds. • I can describe how to make a sound. • I can explain simply what a vibration is. • I can say what is vibrating when a sound is made. • I can describe the pattern between how loud the sound is and the size of the vibrations it has. • I can use my observations to identify similarities and differences between sounds.

Scientific language	Vibration, volume	
Let's make a sound page 8	Quick challenges	Invite children to list all the things they can make a sound with. Have a minutes silence and record all sounds heard.
Whole class learning Provide the children with a range of toys which make noises and begin a word wall of descriptive words to describe sounds. Open the inside of a piano and ask the children to make careful observations of what happens when you hit a note. Introduce the term vibration.	5. In pairs, the children explore different musical instruments and record how you make them make a sound. 6. In pairs, the children make noises with different objects and relate how they are similar to the musical instruments. 7. Note down which part of the musical instrument vibrates.	
Let's make it louder! page 10	Quick challenges	Allow the children to explore how to makes sounds louder on musical instruments.

Whole class learning Explain that they are going to produce a report about how to make sounds louder. Discuss what the children should observe and how to make them accurate.	3. Investigate how the loudest depends on the size of the drum using plastic cups. 4. Investigate how the loudness of a ruler vibrated depends on how much the ruler is depressed. 5. Investigate how the loudness of sound made by blowing over a bottle depends on how hard they blow. 6. Children discuss any patterns.

Unit 1.2 Turn it up and down.

NC Statutory Learning Objectives	• To recognise that sounds get fainter as the distance from the sound source increases. • To identify patterns in data. • To use results to form conclusions.	Success criteria	• I can plan a pattern-seeking enquiry to find out how sounds change with distance. • I can describe what happens to sounds as they get closer or further away. • I can say what the pattern is between sound and distance. •
Scientific language	Volume, vibration		
Can you hear it? page 14	Quick challenges	Show the children a picture of a singer at a pop concert using a microphone. Discuss with the children why the singer is using a microphone. Start whispering at the front of the class and discuss who could hear.	
Whole class learning Discuss how you could be scientific and find out any patterns about how sound changes with distance.	5. In groups, children plan a pattern-seeking investigation to find out how far away from a sound source they can hear the sound. Measuring the sound level and the distance.		
Ear to stay page 15	Quick challenges	Go on a sound walk and mark the noisy and quiet areas on a map of the school. Watch the Tigtag video 'Hearing loss' Discuss sign language.	
Whole class learning Brainstorm a range of ways sound can be reduced. Provide a range of materials and see if they have any ideas which would be best.	4. In pairs, they plan how they will test the best muffler for a tin full of marbles rolling down a slope. Children use data loggers for the measurement of sound. Conclude which materials work best.		

Unit 1.3 Making music

Learning Objectives	• To explore various ways of making sounds with different pitches. • To find patterns between the pitch of a sound and the features of the object that produced it. • To use instruments designed in class to play a recognisable tune. • To use evidence to answer questions.	Success criteria	• I can describe how to change the pitch of a sound. • I can explain how the vibration changes when pitch changes. • I can apply what I have learned to make a tune. • I can use evidence to answer question.

Scientific language	Pitch	
Pitch up page 18	Quick challenges	Play a few notes on a xylophone and discuss what is different about each note. Keeping hitting the same note in the rhythm of a familiar song. Why is it not easy to recognise the song?
Whole class learning Explain that 'pitch' is the scientific and musical word for how high or low the note is. Show the children a china cup. How can they use it to make a note? Strike it in different places and explain that sometimes it depends on where an instrument is struck or plucked and what the pitch of the note is.	5. Children investigate elastic bands, bottles, rulers and coat hangers to see how they can make high and low notes. 6. In pairs, children investigate one piece of equipment and come up with a pattern about how to change how high the note is. 7. Children report back to the class and produce an overall rule about sound and changing pitch.	
Junk band page 20	Quick challenges	Demonstrate how to change the pitch of a straw, by blowing it and cutting off the end. Remind the children of the nursery rhyme Baa Baa Black Sheep and ask for suggestions of how we could play it.
Whole class learning Tell the children they are going to explore playing this tune on the equipment used to change pitch.	4. Children investigate playing Baa Baa Black sheep on bottles, tubing, rubber bands, coat hangers, and rulers. 5. Using pre-prepared instruments made of bottles and tubing and children have to match them up to the musical scale. 6. Children perform the nursery rhyme on these instruments while reporting on what is happing to pitch and volume.	
End of topic assessment	Children to all complete the interactive activity 'What's that sound?' topic test to assess knowledge.	

Looking at states

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Unit 3.1 What's the matter?

NC Statutory Learning Objectives	• To compare materials. • To group materials together, based on observations on them to recognise that some materials, for example water, may exist in solid, liquid and gas states. • To make careful observations about how matter changes from solid to liquid. • To record what has been learnt in a variety of ways. • To read scales accurately.	Success criteria	• I can group materials based on their appearances. • I can recognise some properties of solids, liquid or gases. • I can make comparisons between materials in different states. • I can recognise that some materials may exist in solid, liquid and gas states. • I can make careful observations and record what is observed. • I can describe what happens when ice melts. • I can read a thermometer carefully.

Scientific language	Solid, liquid, gas, matter	
What a state! page 40	Quick challenges	Go on a matter meander to find lots of materials to sort. Challenge children to decide whether odd materials are solid, liquid or gas.
Whole class learning Build up some definition of what a solid, liquid and a gas are on the board by looking at a glass of beads, water and air. Sort materials as a class into the three groups.	8. In groups, the children sort materials into solids, liquids and gases. 9. Children explore how liquids behave in different containers compared to solids. 10. Compare more challenges solids, such as rice, to pour in different containers and discuss whether they are liquids.	

A watery end page 41	Quick challenges	Mix up definitions of solids, liquids and gases and get children to sort. Look at a range of scales to practise reading thermometer readings.
Whole class learning Show children very large ice cubes. Pass around and discuss what state of matter it is.	7. Children observe ice melting recording what happens. 8. In pairs, they take the temperature of an ice cube melting every 3-4 minutes and discuss melting.	

Unit 3.2 Ziggy's party

NC Statutory Learning Objectives	• To observe that materials change state when they are heated and cooled. • To recognise when these processes, called freezing, boiling and melting, take place. • To measure and research temperature in degrees Celsius. • To explore patterns in freezing and melting. • To use research skills to find out about temperature.	Success criteria	• I can describe what happens when a solid melts. • I can describe what happens when a liquid freezes. • I can recognise when a liquid turns into a gas and that this is called boiling or evaporation. • I can measure temperatures accurately. • I can give a pattern in results when I recognise one.

Scientific language	Temperature, thermometer, melting, freezing, melting point, freezing point	
It's melting page 44	Quick challenges	Children are given chocolate to melt in their mouths. Introduce Ziggy and his plans for a party. He wants to make treats but his butter and chocolate are too hard.
Whole class learning Explain that Ziggy thinks if he puts the butter and chocolate in the fridge it will melt because it is above 0 oc. Discuss whether he is right and how we can check the temperature of the fridge. Children predict at what temperature this will happen and make a plan of what to test.	5. In pairs, children heat up butter/chocolate and record he temperature when it melts. 6. Children find an appropriate place in the classroom to melt the chocolate/butter. 7. Children report back to Ziggy explaining where he needs to put his ingredients and why.	
Let's make ice cream! page 45	Quick challenges	Children compare a frozen and normal grape.
Whole class learning Tell the children Ziggy wants to make	1. Children make ice-cream in a bag and write instructions for Ziggy to use.	

ice-cream for his party, but he has no freezer.			
Unit 3.3 Going round in circles			
Learning Objectives	• To recognise when evaporation and condensation take place. • To explore what happens to a material that is evaporating or condensing. • To make careful observations and record these. • To identify the part played by evaporation and condensation in the water cycle.	Success criteria	• I can describe the process of evaporation. • I can explain how condensation and evaporation take place. • I can link all the process of the water cycle to changes of state of water. • I can identify the part that evaporation and condensation play in the water cycle. • I can record observations.
Scientific language	Evaporation, boiling point, condensing, water cycle, boiling		
Whatever the weather page 48	Quick challenges	Compare eating dried and normal apple and discuss the differences. Demonstrate evaporating water.	
Whole class learning Discuss the processes of boiling, evaporation and condensation. Question about which two of these processes take place every day. Provide images of clouds, sunshine, rain, puddles, rivers and fog and link to processes.	7. Children make clouds in a glass. 8. In groups, they draw out the water cycle and label the processes taking place.		
Ziggy's clothes page 49	Quick challenges	Discuss how Ziggy could dry his favourite shirt for the party. Watch video clip of puddle in sunshine.	
Whole class learning Hand round Ziggy's wet clothes and discuss how they could dry them.	1. Children plan and perform an investigation to find the fastest way to dry Ziggy's clothes and report back to the class.		
End of topic assessment	Children to all complete the interactive activity 'Looking at states' topic test to assess knowledge.		

Mirror Mirror

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Unit 3.1 Time to reflect

NC Statutory Learning Objectives	• To recognise that they need light in order to see things and that dark is the absence of light. • To notice and describe the reflections when light is reflected from surfaces. • To recognise that light from the sun can be dangerous and that there are ways to protect their eyes.	Success criteria	• I can name some sources of light and sort materials into those which are good and bad reflectors of light. • I can describe what a reflection in a mirror looks like. • I can build a mirror maze and make light change direction.

Scientific language	Dull, shiny, reflect, mirror, observation, explanation, light source	
Looking at reflections page 40 (Year 3 book)	Quick challenges	Teach children the Light sources song. Ask them to spot any sources of light. Discuss the dangers of looking at the sun and how we can protect our eyes. Watch the Tigtag video 'What is a reflection?'
Whole class learning Tour the school and spot where they can see their reflections. Make a list and discuss. Show the children different mirrors and spoons. Ask them to describe how their reflection changes in different mirrors.	11. Children investigate a collection of shiny and dull surfaces to see which they can see themselves in and which reflect light. They record their results and draw conclusions, ordering the surfaces in order of reflectivity. 12. Children explore different mirrors to see how they can make reflection bigger or smaller.	
Bouncing and reflecting page	Quick challenges	Ask 'Why do we see an object when it is not a light source?' Challenge them to draw a

41 (Year 3 book)		diagram of their ideas. Check they have a straight line from the light source travelling to the object, hitting it, bouncing off and travelling to their eyes. Correct misconceptions.	
Whole class learning Darken the room and ask the children to predict where a torch will shine. Use a mirror to reflect light onto a ball and then ask the children to bounce the light of the mirror onto different objects. Build a mirror maze.	1. Children build their own mirror mazes using boxes, some mirrors and a torch. 2. In groups, the children are challenged to make light travel around corners. 3. Children present what they have learnt.		
Unit 3.2 Shadow shapes			
NC Statutory Learning Objectives	• To recognise that shadows are formed when the light from a light source is blocked by a solid object. • To find patterns in the way that the size of shadows change. • To design and carry out a fair test.	Success criteria	• I can draw a diagram that explains how shadows are formed. • I can sort materials into those that are opaque, translucent and transparent. • I can investigate how to make shadows bigger or smaller.
Scientific language	Shadow, transparent, translucent, opaque, description		
Making shadows page 44 (Year 3 book)	Quick challenges	Shine a torch onto a screen and get the children to draw what they see. Do the same through a comb. Ask the children to explain why the shadow is formed. Show 'How does light create shadows?'	
Whole class learning Ask the children 'Do opaque, translucent or transparent materials make the darkest shadows?	6. Children predict which will make the darkest shadows, test them in a fair test and record their findings. Finally they write whether their discoveries matched their prediction. 7. Children make a shadowgraph using a torch, screen and puppet. 8. Children use data loggers with a light sensor to investigate the best material for blackout blinds.		
Planning with shadows page 45 (Year 3 book)	Quick challenges	Show children the How shadows are made-shadow puppets' video. Ask them to think about what makes them bigger. Question them about their ideas and identify which can be tested.	
Whole class learning Ask them to think about what makes shadows bigger. Question them about their ideas and identify which can be tested. Explain that they need to plan and carry out their own experiment.	8. Children investigate moving the light source further away and measuring the shadow. They present their findings so as to bring out any patterns they have discovered.		
Unit 3.3 Magic mirrors			

Learning Objectives	• To research and gather some key facts about how mirrors have been made over the centuries. • To make a simple mirror and create a list of the key uses.	Success criteria	• I can make a timeline of important ways of making mirrors. • I can name at least ten different uses of mirrors. • I can decide on the best way to show you my results.

Scientific language	Mirror, mesopotamia, coating, kaleidoscope, timeline	
Past reflections page 48 (Year 3 book)	Quick challenges	Introduce the idea of although mirrors have been around a long time they have not always been made of coated glass.
Whole class learning Introduce the children to the different research projects.	8. Children research either: history of mirrors, map of the world showing where mirrors where first used, two key landmarks in the history of mirrors, how mirrors are made today, mirrors and astronomers. Each group presents their discoveries.	
Making mirrors page 49 (Year 3 book)	Quick challenges	Show the children the YouTube clip Mirrors. Discuss what makes the mirror work.
Whole class learning Tell the children they are going to make a simple mirror out of everyday materials. Model.	9. Children make their own mirrors and list uses of them. 10. Children make kaleidoscopes.	
End of topic assessment	Children to all complete the interactive activity 'Mirror, mirror' topic test to assess knowledge.	

Power it up!	
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Unit 5.1 Living with electricity

NC Statutory Learning Objectives	• To identify common appliances that run on electricity. • To classify and record appliances as mains or battery operated. • To understand the difference between mains and battery-operated appliances. • To understand that electricity can be dangerous.	Success criteria	• I can identify common appliances that run on electricity. • I can compare things that are powered by mains or battery-operated electricity supplies. • I can record findings. • I can describe or explain simply some advantages of either mains or battery supplies. • I can explain how to keep safe when working with electricity.

Scientific language	Battery, bulb, mains, rechargeable	
Which source? page 68	Quick challenges	Walk around with a device that is portable but you are using it on mains. Discuss why it isn't very good. Use a control with dead batteries and discuss the problem.
Whole class learning Establish that mains electricity is needed to power large appliances while batteries can be used in smaller, portable appliances. Explain that mains electricity is made in power stations and brought to users by high-power lines. Point out that voltage is used to indicate the energy available from a supply of electricity.	13. Children brainstorm a list of electrical appliances and sort into mains or battery-operated. 14. Children consider life without electricity and write a diary. 15. Children make their own battery from a lemon, coins and nails.	
What a shocker! page 69	Quick challenges	Allow the children to discuss the dangers of electricity.
Whole class learning What the video about safety in the home, while listing all the dangers. Show the children a 13A socket, 13A plug, a light fitting and a length of flex. Demonstrate how water (salty) conducts electricity and why we have pull cords in bathrooms.	9. Children investigate light fittings and plugs. 10. They produce a poster to warn of the dangers of electricity.	

<table>
<tr><td colspan="4">Unit 5.2 Let's make circuits</td></tr>
<tr><td>NC Statutory Learning Objectives</td><td>• To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
• To identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
• To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</td><td>Success criteria</td><td>• I can construct a simple series circuit.
• I can name different parts of a circuit.
• I can make systematic observations about changing components in a circuit.
• I can explain any patterns encountered in changing a circuit.</td></tr>
<tr><td colspan="2">Scientific language</td><td colspan="2">Cell, bulb, circuit, components, terminals, wires, switch</td></tr>
<tr><td colspan="2">Simple circuits page 72</td><td>Quick challenges</td><td>Place components under a cloth and play which one is missing.</td></tr>
<tr><td colspan="2">Whole class learning
Show children a circuit and get them to make it. Show the children a table lamp unplugged, switch off and bulb blown. Ask the children to suggest why it is not working. Carry out suggestions and make conclusions.</td><td colspan="2">9. In groups, children build their own circuits using batteries, switches, bulbs and buzzers and investigate the following:
A disconnected wire.
A switch turned off and whether it matters where it is put in the circuit.
Batteries wrong way and whether it matters which way it is connected.
A complete circuit.
10. Children draw pictures of circuits made.</td></tr>
<tr><td colspan="2">Changing circuits page 73</td><td>Quick challenges</td><td>Discuss the difference between a range of bulbs and their uses.</td></tr>
<tr><td colspan="2">Whole class learning
Make two circuits and discuss which is the brightest bulb. Demonstrate ways to test brightness</td><td colspan="2">9. In groups, they plan how they will test: What happens to the brightness of one bulb when more batteries are added? What happens to the brightness of each bulb when more bulbs are added? They report back their findings.</td></tr>
<tr><td colspan="4">Unit 5.3 Be alarmed!</td></tr>
<tr><td>Learning Objectives</td><td>• To recognise some common conductors and insulators, and associate metals with being good conductors.
• To use a simple circuit to create a devise.</td><td>Success criteria</td><td>• I can name some conductors.
• I can name some insulators.
• I can generalise about the types of materials which are good conductors.</td></tr>
</table>

	• To apply prior learning to a problem or question.		• I can make a simple circuit to light a bulb. • I can use my knowledge of circuits to make other components work. • I can use previous results and knowledge to suggest answers to problems. • I can make systematic observations about a circuit.
Scientific language	Conductors, insulators, circuit		
Conductors page 76	Quick challenges	Use a ghost ball to demonstrate a human circuit and how making a break stops the ball singing.	
Whole class learning Introduce the word 'conductor' and discuss its meaning. Now introduce 'insulator' and discuss.	9. Children investigate what materials are conductors and insulators and write a summary of what they have found out. 10. They watch Tigtag video quiz on conductors and insulators.		
Crime fighters page 77	Quick challenges	Play a game where a contact makes a buzz. Challenge the children to make a circuit with a buzzer.	
Whole class learning Tell the children they have been asked to design an alarm circuit to protect a gold nugget. Discuss what the alarm might be.	11. In groups, children plan how they will construct the alarm circuit, making labelled drawings. 12. Children write a short report to say how their alarm will protect the gold nugget.		
End of topic assessment	Children to all complete the interactive activity 'Power it up!' topic test to assess knowledge.		

Brilliant bubbles	
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Unit 6.1 I'm forever blowing bubbles			
Working Scientifically NC Statutory Learning Objectives	• To identify, observe and record variables that affect bubbles. • To set up practical enquiries and fair tests.	Success criteria	• I can plan a fair test to find out about the effect of changing bubble mixtures. • I can identify new questions as a result of my observations or tests. • I can share what I have found out, scientifically.
Scientific language	Diluted, concentrated, concentration, sphere		
Better bubbles page 82	Quick challenges	Experiment with blowing bubbles. Watch Tigtag video 'Gases – big reveal' Demonstrate putting something in a bubble. Discuss concentration and dilution.	
Whole class learning Explain that the children are going to investigate the amount of washing up liquid to make the best bubble. Establish what is meant by the best bubble and check they understand concentration.	16. Children plan a systematic investigation changing only one thing and ensuring it is a fair test 17. Different groups investigate how temperature, brand of washing up liquid, type of water could affect the bubble.		
Even better bubbles! page 83	Quick challenges	Children make 'bubble rainbow snakes'. Make a huge bubble around the children in a paddling pool.	
Whole class learning Introduce the children to glycerine: a stick substance to make bubbles last longer. Explain experiment.	11. Children investigate how much glycerine needs to be added to make the best bubbles and right the recipe. 12. Children explore whether they can make different shaped bubbles.		
Unit 6.2 Sweetie bubbles			
Working Scientifically NC Statutory Learning Objectives	• To test how much air sweets contain. • To evaluate an experiment, commenting on the design and data. • To carry out a survey to find the best tasting sherbet. • To present survey results and consider further questions.	Success criteria	• I can talk about how we could improve our test. • I can plan how to carry out a survey. • I can present my survey results in effective ways. • I can explain what I found out.
Scientific language	Melt, estimate, gas, carbon dioxide		
Sherbet fizz page 88	Quick challenges	Taste sherbet and popping candy. Mix citric acid and bicarbonate of soda together in a balloon and watch it inflate.	
Whole class learning			

Discuss hygiene rules and demonstrate how to make sherbet.	11. In groups, children experiment making the sweetest, fizziest and tangiest sherbet and write recipes. 12. Children survey which sherbet the class like best, present results and write a report to a sweet company.	
Paying for air? page 89	Quick challenges	Make close observational drawings of an aero bar, Malterser and Crunchie, then float them on water compared to normal chocolate.
Whole class learning Estimate how much air the class think is in each bar as a fraction or percentage. Melt a piece of aero and then estimate how much the volume has changed.	10. In groups, children explore getting bubbles back into the chocolate. 11. They investigate how to measure the amount of air in Crunchie and Maltersers, generating questions from what they discover.	

Unit 6.3 Yeasty bubbles

Learning Objectives	• To plan and carry out a fair test. • To identify similarities, differences and changes in results from experiments.	Success criteria	• I can talk about how to carry out a fair test. • I can plan a fair test. • I can explain any patterns or differences in my results.
Scientific language	Yeast, ferment		
Use your loaf page 92	Quick challenges	Children observe different breads closely and look at which ingredients they all have.	
Whole class learning Explain that the children are going to investigate making bread using what they have found out but using different flour.	11. Children investigate the best flour to make bread. 12. They investigate adding bicarbonate of soda.		
Small but mighty page 94	Quick challenges	Children explore yeast.	
Whole class learning Tell the children they are going to set up some fair tests to find out more about yeast. Discuss what they need to do.	13. In groups, children plan and carry out fair test to see the effect of the following: Temperature of water Amount of water Amount of sugar Yeast type Amount of yeast Sugar type		
End of topic assessment	Children to all complete the activity 'Brilliant bubbles!' topic test to assess knowledge.		