Maths in the science curriculum

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Topic: Plants Observing the parts of the plant. Focus- using the language of geometry. Ask learners to observe and describe a variety of plants. Ask children to describe a variety of potted plants challenging them on leaf size, shape, texture, colour, stem colour, appearance and arrangement of leave on the plant using terminology linked to geometry e.g. rectangular, round, spheres, cubes, edges, faces etc. Can they sort each natural object into different categories e.g. triangles in nature or circles and spheres in nature? If possible allow the learners to observe the roots for a while. Children could create a poster for each plant and if they can't find its name-they could name it themselves using their descriptions.	Topic: Living things and their habitat Multi- link Dinosaurs (It can be any animal- whatever works) Build a dinosaur from cubes, giving each colour cube a different value (e.g. red =50, black = 25, blue =10, green =5, brown =1) Give a total for the dinosaur (e.g.240 - This number can easily be differentiated Hot, Hotter, BYSO). Explain that there are two rules: 1. The dinosaur must be attractive (use different colours) 2. The cubes must total the number you have chosen. Ask the children to prove that their finished dinosaur adds up to the total. Now the children need to suggest how to keep their dinosaur (animal) alive. What do they need to provide for it to survive? They could build a habitat out of a shoebox for example. Discuss that different animals need different food sources, depending whether they are meat eaters or plant eaters. Can the children classify their dinosaurs into carnivores and herbivores? What's an omnivore? Which animals would fit into each category?	Topic: Plants: Children grow their own plants. Discuss how to measure the plants e.g. where to measure from and how future measures are always taken from the same place. Learners need to be comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser. At each measure, children could make a plasticine model of the seedling. Children **design their own** data table. Could include, number of days (multiples of 5) amount of water given and height of plant. Children could convert number of days the plant takes to grow into hours, minutes and even seconds (BYSO) Children could label the parts of the plant and describe **the uses for them.** Looking for patterns in the structure of fruits that relate to how the seeds are dispersed. Children might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. Children may measure how quickly the colour moves through the plant. Another investigation might include answering the question – what's the tallest living thing in school? Simple tree measure here: https://www.wikihow.com/Measure-the-Height-of-a-Tree	Topic: Sound Measure the loudest and quietest places around school using the Decibel X meter on the iPads. Hot- bar chart results Hotter – bar chart results and describe the sound wave patterns. BYSO-heat map of school after transferring their results into categories. Does the volume effect the distance at which you can hear the sound? Use trundle wheels or other measuring equipment to measure distance. Discuss the issues around fair testing/being systematic with the children when collecting the results.	Topic: Properties and changes in materials: 1. Create numicon penguins – (could link to the Race to the South Pole). measure the proportion of each colour of numicon as a fraction, decimal and percentage. Children need to be systematic in their approach. To link to science, ask children to suggest different ways of keeping the penguin cold (use an ice cube) and set up a fair test using a variety of different materials as insulators. The primary focus here would be the working scientifically strand of the curriculum. 2. Creating plasticine boats - same weight of plasticine – create a boat that floats and one that sinks. Collect data in their own way and present their conclusions concisely. The accuracy in measuring and reading scales will be important here. 3. Using square numbers to create square shaped paper rafts – see which 'raft' will hold the greatest number of cubes – or even coins and you can compare the amount of money lost to the depths of the oceans!	Topic: Animals including humans Do all smarties contain the same number of each colour? Explain that you would like to see that data presented in at least three different ways per group. (good opportunity to draw a pie chart) Use this opportunity to discuss discrete and continuous data. Once the children have presented the data in different ways – ask them the advantages and disadvantages of each way. (they could build a bar chart out of the smarties and take a photo graph) Return to the original question. Children makes statements on the most /least popular colour. Find the mode, median and mean of the number of smarties in each pack. Compare the data for two colours from ten packs. Work out the percentages of a certain colour from each pack. Work out the ratio of green and orange smarties? Work out the probability of finding a green smarty in your tube? Now to link to science: the children will obviously want to eat the smarties so provides a good link with healthy/unhealthy living and the impact of diet upon humans. Ask children to draw up a list of foods they think and healthy vs those that are not. Discuss how some foods deemed healthy are actually not that healthy and vice versa. E.g. how certain fat is actually good for us, however we need a range of foods to maintain healthy bodies Children to sort the range of items on their lists into carbohydrates, proteins, fats and vitamins. Ask children how they will display the data? Children to then make statements and display their data on a poster to show their understanding of healthy eating.
Everyday materials Clothing for "– any character you want from your story!" Investigate how waterproof fabrics are, how strong they are, how reflective the colours are, which fabrics people like, whether the materials are opaque of transparent. Etc. Another example could be to help the three little pigs to initiate tests on house building. Can we build walls and design a test to evaluate their strength? Record how many bricks would be used to build each wall.	Topic: Plants: Challenge learners to find as many different measurements for a tomato (for example). How tall, how round, how tall, how heavy? Use <>= to compare the sizes. Do plants need light to grow? Write a later stating that a character from your book left their curtains drawn when they went away on holiday and their plants didn't die. Do they agree with their character? Can they devise a test that proves their character right or wrong? Encourage children to devise their own comparative tests of 2 plants. 1 with access to light, one without. Ask them to plan it with a. prediction, methods, equipment, what they will record and how often they will record their data etc. They could grow some seedlings measure the height of the seedling each day.	Topic: Forces including magnets Testing surfaces on a vehicle. Use a slope to investigate the impact of cars with different wheels, or wheels covered with different materials, maybe even how vehicles carrying progressively greater loads (Lego Wedo 2.0 is great for this). Set up a fair test through class discussion.	Topic: Living things and their habitat Using Venn and Carroll diagrams to compare and classify animals and plants. Use J2E to develop keys to identify animals and plants.	Topic: Earth and Space Links to maths: Crater experiment: 1. Which "meteorite has created the largest crater?" Measure the width of each crater in sand. Children design the experiment to make it fair and then perform the experiment 3 times for each ball. Children to gather the information in a way designed by themselves. Ideally they will be use the average to work out a final result and understand why this will give them a more accurate result. 2. Create a scale model of the solar system. Watch a short clip called 'the powers of 10' which zooms out 10 meters into space, then back again. Now look at Vincent Van Gogh 'starry night'. What do the children see? Focus on the stars and the moon. Children are then going to create scale models of the solar system and the only way to do this is to use the diameters of the planets and scale them down. If the	Topic: Evolution and inheritance Eaten or beaten: The characteristic colour or pattern on a seed can influence its survival. This might affect whether it will grow to adulthood and therefore whether its genes are passed on. This activity shows learners that some seeds are better camouflaged and are therefore more likely to have their genes passed on. Prepare 5 different types of large seeds (e.g. pumpkin, green lentil, brown broad bean, white bean) ensuring you have 100 of each (fifty would work as the children could double it to get a percentage). Scatter the seeds over a measured 1 m square on grass. Then give each group 30 seconds to retrieve as many seeds as possible. After collecting and counting these seeds, simple subtraction should tell the learners how many of each seed type were not collected and used in a repeat test by another group. The results should show a difference in numbers based on how well camouflaged the seeds are. Lead a discussion as to the effect of camouflage on the number of new plants that will

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				earth's diameter is equivalent to 10 cm, work out the other diameters using scaling for the others plants actually diameter and create a model to scale. The next step would be to use the models the children have made to create a scaled solar system.	grow for future generations. Children will see how camouflage could make a plant more successful. Children to work out the percentages of those found/not found and present their data appropriately. To extend some, you may also discuss - What would happen if an animal arrived in the area- increasing the number of seeds that are eaten.
Animals including humans. Pond dipping – the children become pond detectives - using nets go to Dingley Dell and collect as many creates as they can (a figure of 8 motion with the nett works best - discuss with the children how many times to "sweep" with the nets – how can they make it fair? Children then but the contents of their net sweeps into a container and count the number of creatures they have in their containers. Use a spoon and a hand lens for closet inspection. Record the findings using tally charts, bar charts and pictograms – J2E has good options for presenting this data. If outside the bar chart could be created from meter sticks, twigs, tiles, post its etc and with photographic evidence being used.	Topic: Animals including humans Pattern seeking: Spiders! Spider Webs – Ask the children – How much silk would a spider need to spin a web? Give children pre-drawn webs (8 spokes) whereby they need to draw the layers in between. The children can give each layer a numerical value. Can they spot any patterns? (e.g. is the answer always odd or even. If there are 8 'spokes to the web – they will be even, not matter what value you give each layer). Another way is asking the children to measure the total lengths of the webs. Could they draw a giant spiders web in chalk on the playground, or create one from masking tape and measure the total length of silk? Other mathematical facts the children could investigate include: - Jumping spiders can leap 50 times their body length - Spiders can run up to 70 body lengths per second. - A strand of spider silk the width of a pencil, could stop a Boeing 747 in flight. - Spiders can carry 170 times their body weight walking across a ceiling.	Topic: Rocks Go for a 'rock hunt' in Dingley Dell and ask the children to be "rock detectives". Children to write down or draw any examples of objects they think are made from rock (e.g. bricks, playground, benches). Ask learners to describe the rocks, using words such as strong, rigid, rough, shiny, dull, waterproof. BBC Bitesize rocks game may be useful. Using the collection of rocks, investigate the different properties for each one (e.g. do they have grains, crystals or fossils in them? Can the children sort and classify them into logical groups? Children could use Carroll diagrams to show off their logical sorting skills. E.g. grains visible/not visible vs dark and light-coloured rocks.	Topic: States of matter Measure the melting rates of different materials – butter, chocolate, fudge, margarine and wax – sent up an appropriate fair test as a class through class discussion. Also investigate: would a bigger sample size change the melting time? Ask the children to convert between seconds, minutes and hours. Predict how long it would take if the sample was ten times bigger.	Topic: Living things and their habitat Compare and contrast different a large amount of data from animals and plants and draw conclusions from the data. Children could improve their statements by using addition and subtraction knowledge. Or even find averages for each animal type. E.g. the average number of young produced by mammals compared to amphibians.	Topic: Light Which material makes the best curtains? Teach the children that lux is a unit of measure for light ranging from 0-3000 (0=darkness and 3000=dangerously bright light – don't look back into the sun!) Children to plan, predict and design their own experiment which will answer the question above. Use a lux meter on the iPad to measure the amount of light penetrating through each material. Children to display their findings
Topic: Seasonal change: Ice – measure how fast it will take for ice to melt around school. Ask the children will the ice melt within one minute? Children to make predictions on how fast it will melt? Place ice around school and see where it will melt the most quickly. Additionally, ask children to collect natural, seasonal objects from outside and then freeze them. Identify the changes to the object once it has been frozen and thawed.	Topic: Use of everyday materials 1. Does the shape of a piece of paper affect how it falls? Build on 2D shape knowledge Ask the children to design an experiment to observe how different pieces of paper fall through the air. Discuss what they could investigate: e.g. Will the shape of the paper make a difference to the speed of descent? Will the number of sides make it faster or slower? Will it make a difference if the shape is symmetrical or asymmetrical? Will the size of the shape effect the result? How can we measure the time? Which materials could we use to make the paper fall more quickly or slowly? 3. Grouping materials – collect everyday materials – hard, soft, magnetic, dull, heavy, see through etc. Can they use mathematical language to describe the objects (e.g. number of edges, sides,	Topic: Light A good quality light source, an object that will cast a shadow, a tape measure and a screen will create a very clear investigation for children to link their maths to science. Ask one child to hold an object to the projector and another to measure the distance from the object to the light source and the size of the shadow. Discuss what happens as a class to formulate the science question. For example, when we move the object, what happens to the size of the shadow? Ask the children to predict what might happen before conducting the test and recording the results. Ideally have the children design their own recording charts. Can the children then convert their results into an appropriate graph – a line graph would work best with the axis pre-drawn.	Topic: Electricity Make a simple circuit with a cell and a bulb. Disconnect the wire and bridge the gap with a group of materials to see if they are electrical conductors of not. Children then group materials into electrical conductors and non-electrical conductors. Can they establish a rule for what makes a conductor? Ask children to predict what would happen if they added another cell? How could they measure the amount? Of light (iPads Lux meter). Children try different combinations to see what makes the bulb brighter or duller.	Topic: Forces Return of space mission - parachutes – in groups, learners to evaluate one of: different shapes, sizes, materials, numbers and lengths of string so that the class determines the best arrangement for parachutes using a fair test they have designed themselves. Allow them to then make the best replica of a parachute using the information they have gathered/presented to each other to save an "astronaut egg"	Topic: Electricity Make an electro magnet by winding wire around a steel nail 30-50 times. Connect the ends of the wire to the terminals of a 1.5V cell and observe that the nail will now pick up paper clips. Children have made an electromagnet just like those used in automatic locks on doors and in many other electrical devices. Challenge learners by varying the strength of the magnet with different voltages. Children to record and present recordings as they chose. A thought – does the amount of times you wind the wire around the nail effect it's ability to pick up paper clips? Worth trying yourself first.

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	vertices and faces.) When they have established groups, ask the children to subdivide the groups, examining one another's groups and speaking and listening about the groups will aid the children's learning. You might introduce a new material and ask them to group it.				
					Extra activities linked to maths: Memory bottles. Plastic bottle, water and cooking/baby oil. Give learners different challenges e.g.: - Mix 1part oil and 1part water. - Mix the oil and water so they have a 1:1 ratio. - Have at least 3 parts oil. - Show the bottle having 75% water in it. - 5 parts oil to 10 parts water. - If 40% of the liquid is oil, and this totals 120 mL, how much water is in the bottle. - If I double or half the oil, how much water will I have?

	Place Value
	Measurement
	Geometry
	Proportionality
	Classification or sorting