THE WINTERTON FEDERATION MEDIUM TERM PLAN SCIENCE Spring 2 YEAR 5

Lets Get Moving	Learning Objective	Activity – Switched On Science	STEM Activities	Success Criteria
Session 1	To explain some of the effects of gravity. To plan, carry out and explain fair tests.	Show three different balls of about the same size but of different weight. Ask them what would happen if you dropped them from the same height at the same time. Gather their answers. Then drop the balls and show them that they all hit the ground at the same time. Reinforce this by showing the following YouTube clip: https:// www.youtube.com/watch?v=Z789eth4lF Discuss in more detail some ideas about gravity. Explain that something is pulling the balls down towards the centre of the Earth and this is a force called gravity. Then tell them all about Galileo's experiment at Pisa. Present a collection of everyday objects to weigh using a force meter. Record their results in a table. Explain that gravity is pulling each object downwards with a force. This force is also called weight. The force meter measures this force (weight) in units called newtons. Show a globe and hold a matchstick man at the top. Ask them to draw on the whiteboard what gravity does to the man. Repeat this with the man at the South Pole and near to the equator. They should always draw the man being pulled towards the centre of the Earth and not downwards. Next, ask the children to draw a picture of the Earth with clouds all around it. Ask them to draw a picture to show which direction the rain falls and why. They can use 'How does gravity act?' (Activity resource book, page 30). Get the children to research the contributions that Galileo and Isaac Newton made to the discovery of gravity. Write two newspaper		I can explain what makes objects fall to the Earth. I can plan a fair test to find out how well different objects fall. I can extend my investigation and tests as a result of my observations.

		articles about the scientists, their key experiments and how this helped to develop the theory of gravity. They can use 'Read all about it' (Activity resource book, page 31) as a scaffold. Finally, ask children to draw a picture of the Moon and think what would happen if they could walk on it. Discuss the fact that the Moon has gravity but the downward pull is not as strong as it is on Earth. This makes walking very diferent, but means you can jump much higher. To illustrate this, show the YouTube clip of Neil Armstrong walking on the Moon: www.youtube.com/ watch?v=RMINSD7MmT4		
Session 2		Ask children to run across the playground, holding a large sheet of card in front of them. Back in the classroom, discuss what they experienced. Ask them to explain what is happening in a drawing using the idea of forces. Discuss the concept of air resistance as a force that slows down objects as they move through the air. Ask the children to explain, using drawings, the forces that might act on a kite, a sail or a large boat. Explain that air resistance also tries to slow down objects that move through the air, such as jet planes. Get into groups: Explain to the children that they are going to develop their skills of investigating as they find out more about how objects fall. Choose from the three investigations below. Think about the factors they are investigating: in particular, what they need to keep the same, what they need to change and what they need to measure. Also ask them to think about the best way of recording their results and to explain clearly what their results tell them about their investigation. Choose from the following:		

		1. Falling cup cakes cases: The children time how long different cupcake cases take to fall from the same height. They can record their results in a table and then analyse them in a conclusion. 2. Falling rotocopters: The children make various designs of rotocopters out of paper and/or other materials. They can then design a fair test to see which design means that it fies the furthest, longest or quickest. You will have to guide them on what is meant by the word 'best'. These step-by-step instructions will help you with this activity: www. exploratorium.edu/science_explorer /rotocopter.html 3. Falling parachutes: The children investigate various designs of parachutes and test various questions. For example, does the size or material of the parachute affect how long it takes to fall? Do parachutes work better if they have holes or slips in the fabric? Some could go on to identify new questions to test as a result of the observations they make.		
Session 3	To observe a variety of forces that slow things down. To set up, carry out and make sense of a variety of investigations	Looking for a fun experiment? Show children the following YouTube clip: www.youtube. com/watch?v=Z7zkDWPKG-o. Discuss what's going on. Roll some tins along the floor. Ask children to guess what might happen. Discuss why the tins move at different speeds even though you gave them the same kind of push. Tell children they are going to develop more investigation skills. Choose one of these investigations:		I can plan a fair test to investigate friction and water resistance. I can make some detailed observations and present them clearly. I can come up with a sensible conclusion.

		1. Sticky stuff: Ask the children to investigate how non-stick a cooking pan is. Discuss how they might do this. For example, cook the same food in different pans for the same time, at the same heat. Compare how much sticks. Note the safety requirements. And remember to focus on making the test fair. 2. Sliding surfaces: Ask the children to investigate on which surfaces objects slide most easily. Try this with at least three different surfaces – e.g., wood, vinyl and carpet. Ask them what they think might happen. Differentiate by the amount of guidance you give each group. They might use a force meter to measure the force needed to start an object moving on a fat surface. Or they could use it to measure the height of a slope on which the object will start to slide down. Focus on deciding on what evidence to collect and relating the results to the predictions. 3. The big trainer test: Investigate the forces need to pull different trainers across different surfaces by using a force meter. Focus on measuring accurately and ensuring the results are reliable by repeating the tests to check them. Challenge the children to investigate friction by transferring jelly cubes from one bowl to another with chopsticks. Now add a little sunflower oil to the jelly cubes and move more of them to another bowl. Compare the difference. Then ask the children to explain what is going on. Use tablets or computers to play the fun, interactive game 'Forces in action': www. sciencekids.co.nz/gamesactivities/forcesinaction. html		
Session 4		Mmake some sailing boats out of paper. Encourage them to make them different sizes, and to vary the size and shape of their		

		sails. Get them to blow the boats in water around an obstacle course using straws to do this. Encourage them to discuss in talking partners the different forces that were involved in moving and stopping the boats. Ask them if there were any particular designs that worked well. Remember to emphasise the point that water resistance is a force that slows down an object as it moves through water. Show children a tall cylinder full of water. Ask them what they could do with this, and a small piece of plasticine, to find out which shape moves most easily through water. Help decide what to measure: for example, the time it takes for the plasticine to fall halfway or all the way down the cylinder. Encourage them to think about the work they have done in mathematics about different shaped solids. They could make some of these out of the plasticine. Ensure children are clear about what they need to change and measure in their fair test. Encourage them to repeat their test several times in order to average out their results. Finally, ask them to explain the results in terms of how the shape of the object affects the size of the water resistance. Group consolidation: Show children some photos of ships		
Session 5	To be able to explain how levers, pulleys, springs and gears transfer force and motion. To design and make machines that use levers, pulleys, springs and gears	Show an example of a machine with a lever, pulley, spring or gear. Use talking partners to discuss how they work. Children draw and label how each of the machines transfer force and/or motion on whiteboard Provide children with a collection of everyday machines that use springs, levers pulley or gears. This might include: A stapler A hand whisk with gears A pair of scissors A bicycle A wheelbarrow Pulleys on a blind A picture of a fagpole A spring-loaded mousetrap A bottle		I can explain how levers, springs, pulleys and gears transmit force and motion. I can make some simple machines. I can design and make a Rube Goldberg machine containing at least four different simple machines.

		opener A geared toy A spring-loaded ball pen A pair of scales (with springs) A fshing rod Ask your children to sort the objects into those that have a lever, pulley, spring or gear. Children make a variety of these machines out of everyday items. For a pulley, your children could use coat hangers and other materials: www.sciencetech. technomuses.ca/english/schoolzone/activities_ mach1.cfm For a lever, they could make a catapult from a coat hanger and elastic bands. See: science. wonderhowto.com/how-to/build-catapult-outrubber-bands-wire-hanger-321541 For a lever, the children could make a rubber band/store card fipper toy. See: www. scittscience.co.uk/2011/09/make-a-rubberband-fipper-toy Build working gears out of paper using this resource: www.instructables.com/id/How-toBuild-Gears-from-Junkmail-and-Cardstock Group consolidation: Use the interactive resource 'Sorting machines' (My Rising Stars) to group machines into various types.		
Session 6		An additional Activity - Make a Machine from Rising Stars Unit plan.		