

Forces: Friction

Aim: To identify the effects of friction by investigating brakes. To investigate the effects of friction.	Success Criteria: I can explain the effects of friction on a moving vehicle. I can investigate the effects of friction created by different materials. I can recognise and control variables in an investigation.	Resources: Lesson Pack Tricycles or scooters - one per group, if possible. The lesson does not require these to be ridden. Thick card cut into playing card-sized pieces Five different materials to test (e.g. carpet, vinyl flooring, tin foil, towels, bubble wrap, plastic) Stopwatch
	Key/New Words: Friction, force, brake, prediction, investigation, measure, observe, variables, results.	Preparation: Differentiated Investigating Friction Activity Sheet - per child

Prior Learning: The children will have learnt about friction in Year 3 and in Lesson 1 of this unit.

Learning Sequence

	What Is Friction? Children discuss the statements about friction and decide if they are true or false. Share the answers and explain them using the information on the Lesson Presentation . <i>Can children explain how friction affects a moving vehicle?</i>	
	Friction in Action: Using the Lesson Presentation , discuss how brakes on a bicycle make use of the force of friction.	
	Design a Brake Pad: Explain the context of the investigation and how to carry it out, referring to the Lesson Presentation .	
	Reliable Results: Discuss the variables with the children, pointing out the need to keep the variables not being tested or measured the same in order to gather reliable results. Groups of children discuss how they can try to keep the controlled variables consistent. <i>Can children recognise and discuss how they will control variables in an investigation?</i>	
	Find the Best Brake Pad: Children complete their prediction on the differentiated Investigating Friction Activity Sheet . They will then conduct the investigation and complete the table on the activity sheet with their results. Once completed, the children will demonstrate which material they think makes the best brake pad, and explain their choice on the activity sheet. You may wish to film or photograph the children's demonstrations, or they could present them to the rest of the class. <i>Can children investigate the effects of friction created by different materials?</i>	
	★ Use key words to explain their prediction and choice of material. ★★ Write their own explanations. ★★★ Make generalisations about the properties of materials that create most friction.	
	Solve and Explain: In pairs, children discuss how to solve the problem on the Lesson Presentation , explaining the science behind their solution. Share children's ideas and share the example answer with the class.	

Taskit

Investigateit:

Can you adapt a shoe to improve its grip? Test a shoe by sliding it down ramps of different heights. Then adapt the shoe by adding different materials to it. Test it on the ramps again to see if it grips the ramps better and slides more slowly.

Makeit:

Can you design and make a marble race? Stick different papers and cards across a ramp. You could try sandpaper, corrugated cardboard, foil or tissue paper. Hold one marble for each type of paper at the top of the ramp. Release the marbles and see which one reaches the bottom of the ramp first!