Subject	Term	Unit
Science - Year 5	Spring	Forces

Intent	Interweaving knowledge and enquiry to discover the world around us.

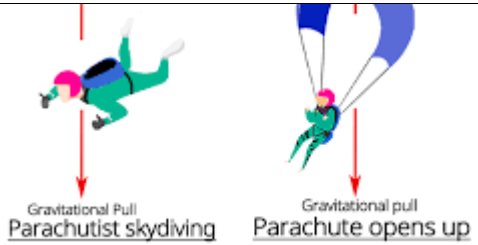
Prior knowledge	National Curriculum
• compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

What?	To understand specific forces such as gravity, friction and air resistance. To understand how levers, gears and pulley work in simple machines.
Why?	The children will start to understand how objects speed up and slow down and how simple machines work. This will be beneficial in later life and will be a basis for understanding engineering.
How?	Through observation and enquiry, testing different objects and seeing the effects of forces on them.

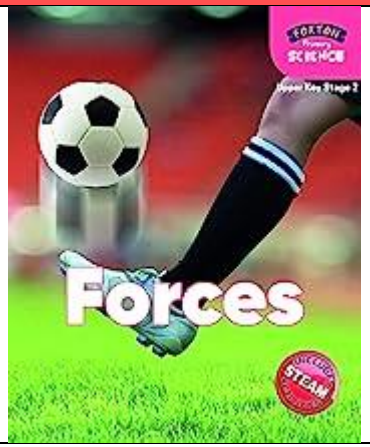
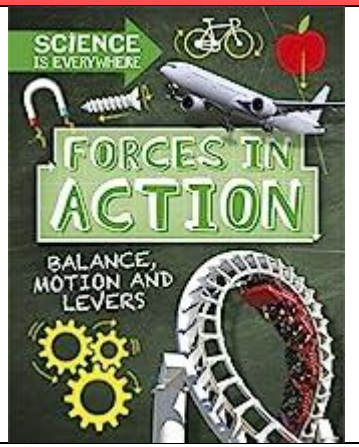
Vocabulary	
Force	A push or pull
Gravity	A force that pulls objects towards the centre of the Earth
Friction	A force caused by two surfaces touching each other

Air Resistance	A kind of friction that slows objects down when they travel through air
Water Resistance	A kind of friction that slows objects down when they travel through water
Buoyancy	An object's ability to float
Up thrust	A force that pushes objects in water or air
Streamline	To shape an object in a way that reduces the effect of air resistance or water resistance
Pulley	A wheel with a belt which can be used to lift objects
Gear	Interlocking wheels which transfer movement
Lever	A straight object used for lifting

SOME OBJECTIVES MAY BE BROKEN DOWN OVER TWO LESSONS	
Objective	**Learning**
Can I explain what gravity is?	**Identifying and classifying** Remind children of pushes and pulls from Year 3. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Investigate dropping different objects- does it matter which height we drop the object from? Look at Isaac Newton and how he discovered that gravity existed. https://www.bbc.co.uk/teach/class-clips-video/science-ks2-discovering-the-work-of-Sir-Isaac-Newton/zr4mf4j Why was he so important? What developments has this led to?
Can I investigate the effects of friction acting between moving surfaces?	**Comparative Testing** Learn about what friction is and some ways in which it can be measured. Identify instances of high and low friction and conduct friction investigations comparing surfaces and the friction created. Investigate different materials on a slope with different materials- fair test experiment. Ask the children to time how long it takes for a car to move down the slope. Record times in a table. Extend from year 3 by explaining that friction helps objects to slow down and stop. Show using a bike brake. The more friction, the _____ the object.

Can I explain how does air resistance works on moving objects?	 **Pattern Seeking** s of card. Can they feel the resistance? esistance affects moving objects. nner and time the fall. Cut off 1cm from the wings each time and see what hey notice? Why does this happen? there is. That means the parachute fell slower.
Can I explain how does water resistance works on moving objects?	 **Pattern Seeking** water. Learn about water resistance and how it can slow a moving object ecord the patterns between the force and the object's movement. Fair test ough a measuring cylinder and time the time taken to fall. fall.
Can I explain how was the titanic effected by forces?	**Research** Research the implications and causes of forces and speed had on titanic and the reasons why it sank. Consider why water resistance didn't slow the ship down quick enough. Write a report. Ask the children to explain how the weight overcame the water resistance. https://snapshotscience.co.uk/why-did-the-titanic-sink/
Can I investigate the impact levers have when a small force is applied: is it a greater effect or smaller effect?	 tifying a ples of lev  it get easier? rge force.
Can I investigate the impact pulleys have when a small force is applied: is it a greater effect or smaller effect?	**Identifying and classifying** Show the children a pulley. Explain how it works. Use the pulleys from the lego kits/ science room. Ask the children to pull different weights in a plastic bag, going up in 100g intervals. Complete without a pulley and with a pulley. Use a newton meter to measure the pull needed. Does it get easier to pull with a pulley? Record data in a table. Weight | Force without a pulley | Force with a pulley
Can I investigate if gears allow a smaller force to have a greater effect?	 **Research** v they work together in transmissions. Look at a variety of transmission. Make reater depth about how gears work and discuss whether they are like pulleys and , they have a greater effect.

Websites
https://snapshotscience.co.uk/why-did-the-titanic-sink/ https://www.bbc.co.uk/bitesize/topics/znmmn39/articles/zb784xs https://www.bbc.co.uk/teach/class-clips-video/science-ks2-mechanisms/zghr96f

Recommended Reads		
		

Golden Thread
Forces