

Can you feel the force?



1. What is gravity and why is Isaac Newton linked to it?
2. What is friction and how does it affect the design of sports shoes?
3. Can you carry out a sycamore seeds enquiry to help you understand more about air resistance?
4. Can you explain what happens when objects are dropped from a height (Galileo and Apollo 15)?
5. Why will a car always move faster than a boat?
6. What helps you to climb hills on your bicycle? (levers, pulleys and gears)

We learn the following scientific knowledge and skills:

- Explain that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object? **(1)**
- Identify the effects of air resistance and friction that act between moving surfaces? **(2,3)**
- Observe how different objects fall and raise questions about the effect of air resistance? **(3,4,)**
- Identify the effects of water resistance by making and testing boats of different shapes **(5)**
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect? **(6)**
- Explore how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation? **(1,4)**

Hook for Learning:

- Test sports shoes to see on which surface their shoe works best.
- Investigate air resistance using spinners.
- 'The Man Who Walked Between the Towers' Mordicai Gerstein

As Talkers can we...?

- Capture the listener's interest when delivering a presentation?
- Present conflicting views of an argument and reach a considered conclusion.

Using Technology can we...?

- Research Galileo and Apollo 15?
- Create a PowerPoint to explain my understanding of gravity to others?

As Mathematicians can we...?

- Create a bar chart to represent the time it takes for different objects to fall.

Vocabulary:

- gravity
- air resistance
- water resistance
- friction
- surface
- force
- effect
- move
- accelerate
- decelerate
- parachute
- levers
- change
- direction
- brake
- mechanism
- pulley
- gear
- spring
- theory of gravitation
- Galileo Galilei
- Isaac Newton

As Thinkers can we...?

- Recognise the difference between sensible risks and fool-hardy risks?
- Link ideas between science and maths to solve problems and present findings.
- Use a range of criteria to reflect on own and others work.

As Writers can we...?

- Write a newspaper report to explain what happened during the Apollo 15 space mission.

Previous Knowledge from Year 3: Are you attractive enough?

- I can spot a pattern between how much force is applied and how far an object moves
- I can explain how the greater the friction, the more force is needed to move something
- I can use arrows to show forces acting in scientific diagrams
- I know some forces need contact, but magnetism and gravity are non-contact forces

Expected outcomes from this unit:

Exceeding:

- I can explain what a thermal air current is and how it creates lift
- I can suggest ways in which an adult could be lifted off the floor with the least amount of force
- I can explain why things float or sink

Secure:

- I know the difference between Mass and weight and what they are measured in
- I know the greater the density, the greater the mass and the greater the weight
- I can explain what happens if you drop objects of a similar shape, but different weights from the same height
- I can explain how air resistance affects the speed at which objects fall
- I know some mechanisms allow a smaller force to have a greater effect (levers, pulleys, gears)
- I know levers have a load, an effort and a fulcrum
- I know how cogs can increase rotation