

## Forces – Air Resistance and Aerodynamics

*In this unit pupils will learn how planes fly! They will learn about the forces that act on a plane to keep it airborne. The unit starts with some history, looking into key milestones of flight and pupils will study some key developments such as the Wright Brothers and Concorde. Pupils will conduct experiments that explain how air resistance and the Bernoulli Principle enables planes to fly.*

### Background information

- *This unit builds on pupil's previous study of forces such as gravity and magnetism.*
- *Forces can be pushes and pulls. All objects need a force to make them move and stop.*
- *Friction slows objects down; water resistance and air resistance are examples of friction.*
- *Newton's theory of gravity is famously thought to be based on Newton seeing an apple fall.*

### Knowledge and Understanding

In this unit pupils will learn:

- Key scientific milestones in the development of flight
- That air has mass and can exert different pressures.
- That fast-moving air creates areas of low pressure. Slow moving air creates high pressure. This is known as the Bernoulli principle.
- That the shape of a wing cause air pressure to change which results in lift and flight.

### Enquiry skills and Key concepts

- Research key facts about the development of flight.
- Investigate how air pressure changes by conducting various experiments.
- Understand how the Bernoulli Principle causes lift on an aircraft wing.
- Design, make and test a paper plane.
- Evaluate different designs; measure and record which planes are the most effective.

### Key Vocabulary:

**Forces:** Pushes or pulls

**Gravity:** A pulling force exerted by the Earth (or anything else that has mass)

**Weight:** The measure of the force of gravity on an object

**Air Resistance:** A type of friction caused by air pushing against any moving object. It can also be called **drag**

**Air Pressure:** The force exerted by air on any surface in contact with it.

**Streamlined:** When an object is shaped to minimise the effects of air or water resistance.

**Thrust:** Is a force or push. It can be used to describe how well an engine such as a jet works.

**Lift:** Is a force that directly opposes the weight of an aeroplane.

**Aerodynamics:** Is the science that describes how air moves around things.