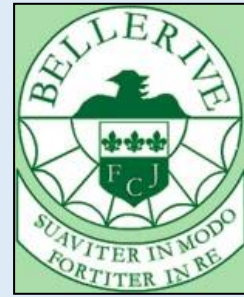


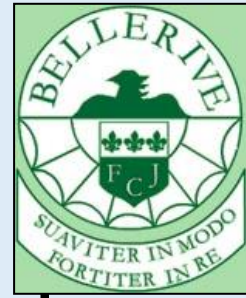
Lesson 1: Introduction to forces



Key points to learn:

- Forces are measured in newtons, N and can be measured with a newton meter
- Forces are nearly always **pushes** and **pulls**
- Forces can make objects: speed up or start moving/ slow down or stop moving/ change direction/ turn/ change shape
- Some common forces you have already met are **gravity, friction, air and water resistance and magnetic.**

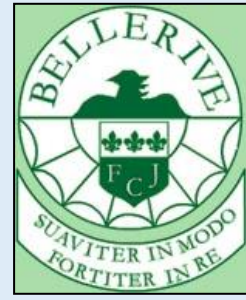
Lesson 2: Force diagrams



Key points to learn:

- Forces can be separated into contact and non-contact forces
- Some common contact forces are: **friction, air resistance, upthrust, weight, thrust, lift and normal**
- Some common non-contact forces are: **gravity, magnetic and static**
- Forces can be represented on free-body diagrams using **arrows** to show their **direction** and **magnitude**

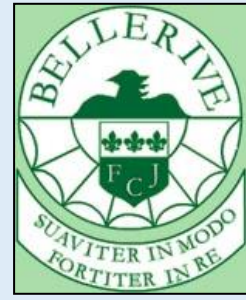
Lesson 3: Forces and motion



Key points to learn:

- **Balanced** forces produce **no change in movement**
- **Unbalanced** forces **change the speed or direction** of moving objects.
- An object will move in the direction of the largest (resultant) force acting on the object

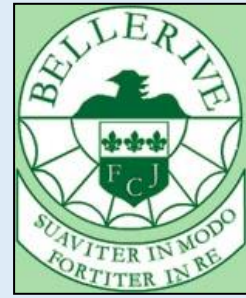
Lesson 4-5: Friction



Key points to learn:

- **Friction** is a **resistive force** that acts in the **opposite direction to movement**
- Friction can be **useful** e.g. allowing objects to **start and stop**
- Friction can be a **disadvantage** as it **slows you down**

Lesson 6: Water resistance



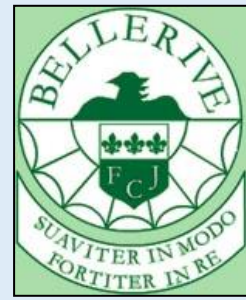
Key points to learn:

- Water resistance is a **frictional force** that slows down moving objects
- Objects can be **streamlined** to reduce the effects of water resistance

page 45

WS pages 2-6

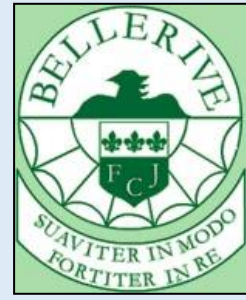
Lesson 7-8: Air resistance



Key points to learn:

- Air resistance is a **frictional force** that slows down moving objects
- Objects can be **streamlined** to reduce the effects of air resistance
- Air resistance limits the **maximum, top speed** of an object

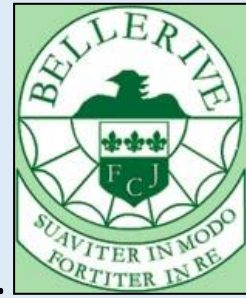
Lesson 9: Upthrust



Key points to learn:

- Upthrust is a **force** that acts **upwards** on objects immersed in **water**
- If the force of **upthrust is equal to, or greater than**, the weight of an object it will **float**
- If the force of **upthrust is less than** the objects weight it will **sink**

Lesson 10-11: Forces and Elasticity



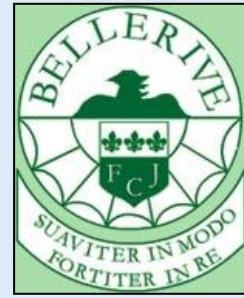
Key points to learn:

- **Elastic** objects will **return to their original shape** after being stretched/compressed
- Hooke's law states that the **extension of a spring is directly proportional to the force** applied
- $F \text{ (N)} = k \text{ (N/m)} \times e \text{ (m)}$
- Stretched springs holding a weight are in **equilibrium**

page 54

WS pages 2-6

Lesson 12: Forces Badger assessment



Key points to learn:

- **All key points from previous lessons apply**

page 42-43, 45-46, 48-49, 54 & 57

WS pages 2-6