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**.

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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**

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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

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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**

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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

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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

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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**

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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** (N) = **k** (N/m) x **e** (m)

- Stretched springs holding a weight are in **equilibrium**

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Lesson 12: Forces Badger assessment

Key points to learn:

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

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