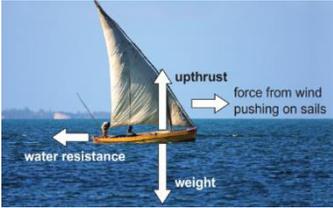


9I Forces and Motion

1. Forces and Movement

| | |
|---------------------------|---|
| Friction | Force between two surfaces sliding across each other. |
| Reducing Friction | Using rollers or wheels / sleds in snowy countries |
| Balanced | When a force acting on an object is the same size as the force in the opposite direction. |
| Constant Speed | Caused by balanced forces acting on an object. |
| Unbalanced | Forces acting in opposite directions are not equal. |
| Resultant | The difference between the forward and backward force. |
| Accelerate | Get faster- caused by unbalanced forces. |
| Boat Force Diagram |  |
| Drag | Acts to slow down objects moving through fluids (liquids/gases) <i>e.g. water resistance and air resistance</i> |
| Top Speed | Dependent on the maximum force a vehicle can move forwards an on the friction/drag acting to slow it down. |

2. Energy For Movement

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|-------------|---------------------------------------|
| Food | Supplies humans the energy they need. |
|-------------|---------------------------------------|

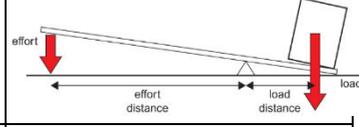
| | |
|--------------------------------|--|
| Solar Energy | Energy stored in food originally came from the Sun. |
| Kinetic Energy | Stored in anything that is moving. |
| Fossil Fuel | Fuels formed by remains of plants / animals that store large amounts of energy. <i>e.g. coal, oil, natural gas</i> |
| Non-Renewable | Resources that will run out one day like fossil fuels. |
| Using Fossil Fuels | Energy stored in oil and natural gas is used for transport. Energy released by burning fuels is transferred by heating for cooking or keeping warm |
| Gravitational Potential | Energy stored in raised objects. |
| Elastic Potential | Energy stored in stretched or squashed objects. |
| Thermal | Energy stored in the movement of particles. Transferred from hot objects to cooler ones by heating. |
| Renewable | Resources that will not run out. <i>e.g. wind, moving water</i> |
| Nuclear Energy | Non-renewable resource used to generate electricity. |
| Electricity | Cannot be stored, has to be generated by renewable or non-renewable resources. |
| Conservation of Energy | Energy cannot be created or destroyed, only transferred. |
| Efficiency | The useful energy transferred compared to the total energy transferred by a device. |
| Dissipated | Energy that spreads out. |
| Transfers | Energy is often transferred by heating or sound. |

3. Speed

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| Speed | How far something can travel in a certain time. |
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| Units | Dependent on measurements taken <i>e.g. miles per hour, metres per second</i> |
| Speed Formula | $\text{speed} = \frac{\text{distance}}{\text{time}}$ |
| Mean Speed | Total distance travelled, divided by the total time taken. |
| Distance-Time Graph | Used to show how fast someone travelled during a journey. Also called a displacement-time graph |
| Displacement | Distance in a straight line between an object and its starting point. |
| Horizontal Line | Shows an object isn't moving on the distance-time graph. |
| Steep Line | Shows an object is moving quickly |
| Relative | Looking speed compared to another object which may be moving. |

4. Turning Forces

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| Lever | Long bar used to lift heavy objects. |
| Pivot / Fulcrum | Point that the lever turns around. |
| Effort | Force applied down on lever. |
| Load | The object being lifted. |
| Lever Diagram |  |
| Force Multiplier | Effort distance is greater than the load distance meaning that the effort force is smaller than the force lifting the load. |
| Distance Multiplier | Large effort force moves a small distance and the load is moved a greater distance. |
| Moment | The turning effect of a force. |

| | |
|-----------------------|---|
| Units | Moments are measured in newton metres (N m) |
| Moment Formula | moment of the force (N m) = force (N) × perpendicular distance from the pivot (m) |
| Equilibrium | Opposing forces are balanced. |

5. More Machines

| | |
|-------------------------------|--|
| Machine | Anything that helps us work with forces. |
| Ramp | A simple machine that means less force is needed to push an object up a slope compared to lifting. |
| Pulleys | Makes lifting a load easier by pulling down a rope. |
| Work | Amount of energy transferred when a force moves something. |
| Units | Work is measured in Joules (J) |
| Work Done Formula | work done (J) = force (N) × distance moved in the direction of the force (m) |
| Conservation of Energy | If a smaller force is needed to move something, the force has to move through a greater distance. |

| Lesson | Memorised? |
|------------------------|------------|
| 1. Forces and Movement | |
| 2. Energy For Movement | |
| 3. Speed | |
| 4. Turning Forces | |
| 5. More Machines | |