

Forces

True or false?

Place a tick next to the true statements and a cross next to the false ones.

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Objects stop moving when their force runs out.

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The Moon's gravity attracts the Earth.

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The unit for weight is the newton.

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There are no forces acting on an object at rest on a table.

☐

The weight of an object is always equal to its mass.

☐

Unbalanced forces always make objects go faster.

☐

A stationary object has equal and opposite forces acting on it.

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An object at steady speed has equal and opposite forces acting on it.

Answer these questions:

- Why do some objects float on water but other objects sink?

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- The weight of a person standing on the Earth is 700N. For each of the following situations will the force be the **same**, **bigger** or **smaller** than 700N? **Why?**

A skydiver who has just left the aircraft	A person swimming	A person standing on the Moon

Forces - answers



Objects stop moving when their force runs out.

Students often think force is a property of an object i.e. that an object has force and, when the force runs out, it stops moving.



The Moon's gravity attracts the Earth.

Students often think that gravity only works one way e.g. the Earth attracts the Moon but the moon does not attract the Earth.



The unit for weight is the newton.

Students often think mass and weight are the same thing and that weight is measured in kilograms or stone.



There are no forces acting on an object at rest on a table.

Students often think a stationary object has no forces acting on it, rather than balanced forces.



The weight of an object is always equal to its mass.

Students often think mass and weight mean the same thing and are equal at all times.



Unbalanced forces always make objects go faster.

Students often think that an unbalanced force only starts an object moving. They often think acceleration **only** means to 'go faster' rather than being a change in velocity – which also includes **slowing down** and **changing direction** (which may have no impact on the speed).



A stationary object has equal and opposite forces acting on it.

Students often think a stationary object has no forces acting on it, rather than balanced forces.



An object at steady speed has equal and opposite forces acting on it.

Students often think a moving object must have unbalanced forces. As a force is needed to start the object moving student can think this force is still needed to keep the object moving.

1. Why do some objects float on water but other objects sink?

Answer: Objects which float are less dense than water, objects which sink are denser than water.

Misconceptions: Students often think objects float in water because they are 'lighter' than water or sink because they are heavier. They often think all floating objects float because they have air in them and all objects containing air float.

2. The weight of a person standing on the Earth is 700N. For each of the following situations will the force be the **same**, **bigger** or **smaller** than 700N? **Why?**

Answer: Gravitational force increases with mass and decreases with distance. The person standing on the Earth and swimming will experience the same gravitational force. The person sky diving less than them because they are further from the Earth. The person on the Moon will experience even less because the mass of the Moon is less than the mass of the Earth.

Misconceptions: Students often think gravity stops when an object hits the ground. They often think there is more gravity the higher up you go because things dropped from a higher up suffer greater damage when they hit the floor. They often think there is no gravity on the moon and think there is no or less gravity in water.

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