Your notes

KS3 Science: revision notes

P1.1 Forces

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Forces

- A **force** is a push or a pull. **Forces** are measured in newtons (N) with a **newton meter** (force meter).
- **Forces** are drawn as arrows: the length shows the size and the arrowhead shows the direction.
- Contact **forces** need touching: **friction**, **air resistance**, water resistance, upthrust, tension and the reaction force from a surface.
- Non-contact **forces** act at a distance: gravity (**weight**), magnetism and static electricity.

Balanced and unbalanced forces

- **Balanced forces** are equal in size and opposite in direction. The **resultant force** is zero, so a still object stays still and a moving object keeps moving at the same speed.
- Unbalanced **forces** give a **resultant force**, which makes an object speed up, slow down or change direction.
- To find the **resultant force**, add **forces** acting in the same direction and subtract **forces** acting in opposite directions: 10 N to the right and 4 N to the left give 6 N to the right.
- **Interaction pairs**: when two objects interact, they push or pull on each other with equal and opposite **forces**. If you push on a wall, the wall pushes back on you.

Springs, friction and drag

- **Extension** = stretched length – original length. For a spring, the **extension** is proportional to the **force** (Hooke's law), up to a limit.
- **Elastic deformation**: the object returns to its original shape when the **force** is removed. Plastic deformation: it stays changed.

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- **Friction** acts between surfaces and opposes motion. It is useful for grip and brakes, but wears parts and wastes energy as heat. Lubricants such as oil reduce it.
- Drag (air or water resistance) increases with speed. A **streamlined** shape reduces drag.

Accuracy and precision

- Accurate measurements are close to the true value.
- Precise measurements are close to each other when repeated.

Key terms

Force	A push or a pull, measured in newtons (N).
Newton meter	An instrument that measures force.
Resultant force	The single force that has the same effect as all the forces acting on an object.
Balanced forces	Equal and opposite forces, so the resultant force is zero.
Friction	A force between surfaces that opposes motion.
Air resistance	A force that opposes objects moving through air.
Upthrust	The upward push of a liquid or gas on an object.
Weight	The force of gravity on an object.
Interaction pair	Two equal and opposite forces that two objects exert on each other.
Extension	How much longer a spring gets when it is stretched.
Elastic deformation	A change of shape that goes back when the force is removed.
Streamlined	Shaped to reduce air or water resistance.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is the unit of force?
2. Which instrument measures force?
3. What is the resultant of 10 N to the right and 4 N to the left?
4. What happens to an object when the forces on it are balanced?
5. Which force opposes motion between two surfaces?
6. Which of these is a non-contact force?
7. A spring is 10 cm long. A force stretches it to 14 cm. What is the extension?
8. What does it mean if a spring is deformed elastically?

Your notes

Answers

1. The newton (N)
2. A newton meter
3. 6 N to the right
4. It stays still or keeps moving at a steady speed
5. Friction
6. Gravity
7. 4 cm
8. It goes back to its original shape when the force is removed

What to do next

Practise 14 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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