6 Centre of gravity

The CENTRE OF GRAVITY is the place where all of an object's weight balances.

Have you ever wondered why a spoon balances on your finger? And why will it only balance with the bowl end nearer your finger (Picture 1)? The answer to both of these questions is because of forces. When the spoon is in balance, the forces pulling down on one side equal the forces pulling down on the other (Picture 2).
In this case the force is the invisible force of gravity. We call the place where an object will balance 'the centre of gravity'. The centre of gravity of the balancing spoon is exactly where it touches the finger, that is, on the pivot.

▲ **(Picture 1) An object will balance if you can place it over its centre of gravity.**

Finding the centre of gravity

We can find out the centre of gravity of any object by trial and error. We keep trying to balance it at different places until it stays at rest. This is quite easy to do with a spoon, but more difficult

▼ **(Picture 2) Because these baskets are the same weight, the pivot point is half-way along the rod and over the woman's shoulder. This allows her to balance the weights and so carry them easily.**

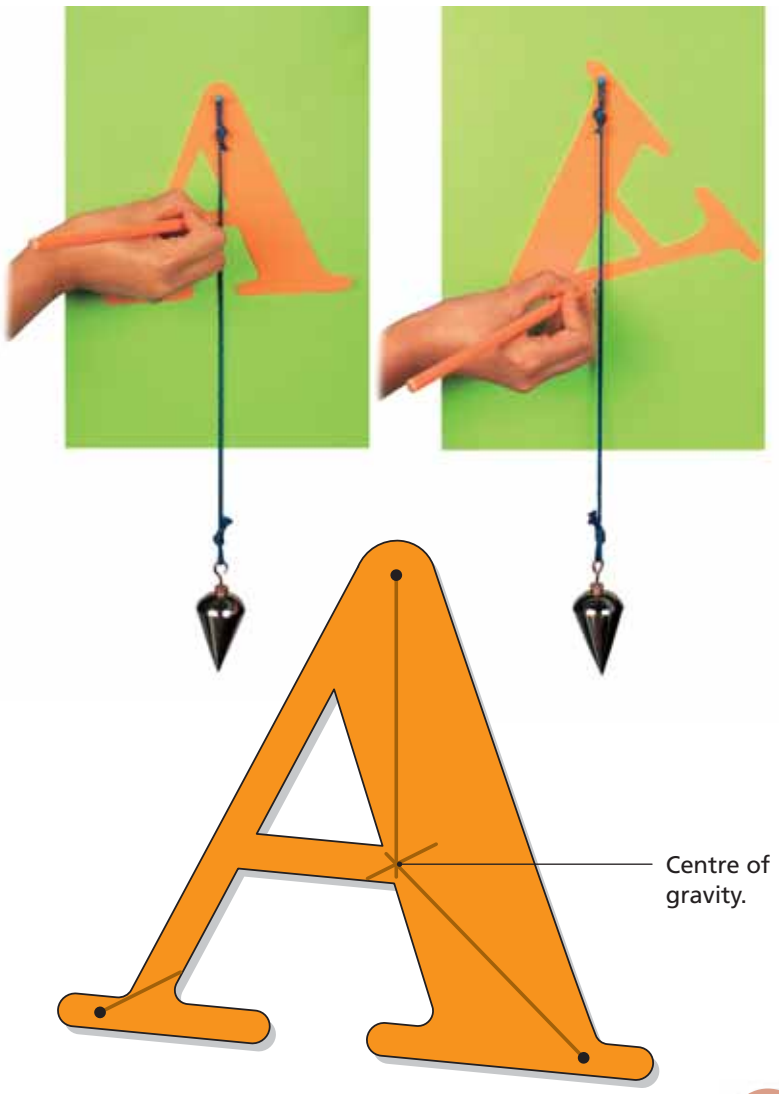
◀ **(Picture 3) A plumb line is a weight fastened to one end of a string and allowed to swing freely.**

for complicated shapes. We can use a plumb line (Picture 3) to help us find the centre of gravity, or balancing point, of any object.

Picture 4 shows how to find the centre of gravity of an irregular object, in this case a letter A that has been cut out of cardboard.

▼ **(Picture 4) Finding the centre of gravity of an object using a plumb line. Suspend the plumb line and object from the same pin so they swing freely. Let them come to rest, then mark the position of the string.**

Repeat this at two other places on the object. The centre of gravity is where the lines cross.



Making use of the centre of gravity

It is often useful to know where a centre of gravity is so that an object can be made stable. A dune buggy, for example, has a low centre of gravity, so that it does not roll over when it turns a corner (Picture 5). If most of the weight of an object is 'high up', then the object is top heavy and is likely to topple over easily.

▲▶ **(Picture 5) These are objects with low and high centres of gravity. The dune buggy has a low centre of gravity and is less likely to fall over than the leaning tower of Pisa.**

Summary

- **The centre of gravity is the place where the weight of an object balances.**
- **A lower centre of gravity makes an object less liable to topple over.**

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