

SCIENCE FORM 2

CHAPTER 9 STABILITY

- When an object is stationary or at rest, it is said to be in equilibrium.
- The centre of gravity is the exact point where an object can be balanced.
- The point at which an object can be balanced horizontally is called the centre of gravity of the object.
- The equilibrium point of an object is also its centre of gravity.
- When the ruler is balanced at its centre, it remains in its position.
- However, when the ruler is balanced at some other point away from its centre, it will become unbalanced and tilt to one side.
- The point of equilibrium in regular-shaped objects, such as the ruler in the diagram above, is usually at its centre.
- The point of equilibrium in a triangle or a rectangle is the intersection of diagonal lines drawn from the corners.
- An object with a higher centre of gravity is less stable.
- An object with a larger base area is more stable.
- When two objects have the same shape and size, the heavier object is more stable.

Relationship Between Centre of Gravity and Stability.

- When an object is in equilibrium, it is supported either at its centre of gravity or at a point vertically above or below its centre of gravity.
- Stability refers to an object's ability to remain in its original position.
- The stability of an object is its ability to return to its original position when the object is moved or tilted slightly.
- It is in unstable equilibrium if it continues to move further from its original position after being displaced and then released.
- It is in neutral equilibrium if it remains in its displaced position.

Factors that affect stability.

- The position of the centre of gravity.
 - A lower centre of gravity gives more stability to an object.
- The size of the base area.
 - An object with a large base has better support and more stability compared to an object with a smaller base.
- The weight of the object.
 - A heavier object is more stable than a lighter one. If an object has different densities, the heavier part of it will have a lower centre of gravity.

Daily Life

- Racing cars are made more stable by having most of their weight as low down as possible. This ensures a low centre of gravity for the cars. Their wheels are also kept far apart to give them a wide base.
- A weight lifter bends his leg and keeps them wide apart.
- The passengers of a double-decker bus are not allowed to stand on the upper deck.