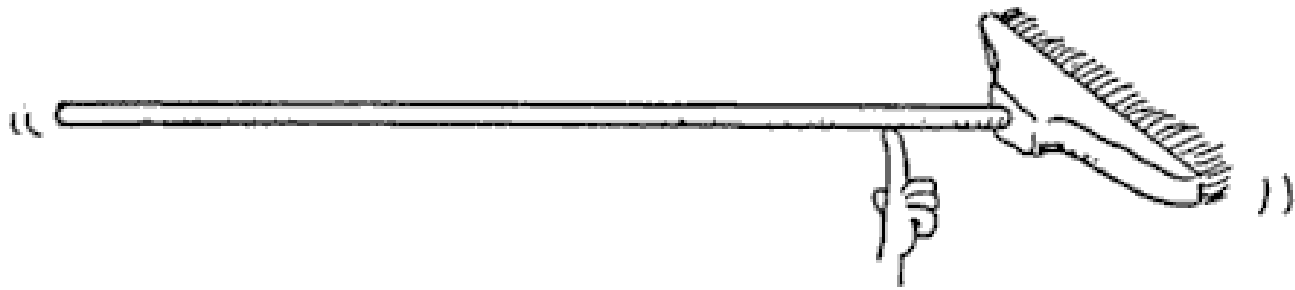


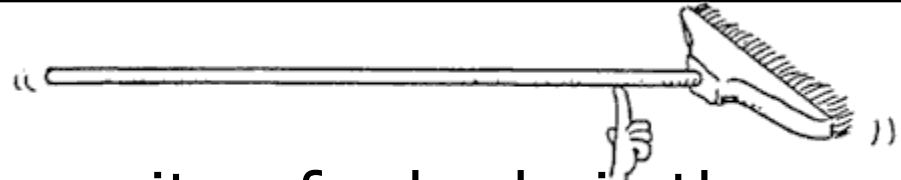
# Centre of Gravity and Stability

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# CENTRE OF GRAVITY

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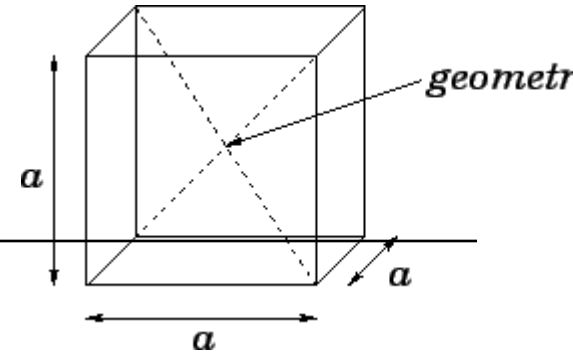


- The centre of gravity of a body is the point about which its weight can be considered to act.
- In a body of uniform density and shape, the centre of gravity will be at the centre of the shape.
- If the line of force is applied to a body and does not pass through the centre of mass then the object will rotate when it moves. It will rotate however about the centre of gravity, which itself will move in a straight line.

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- **If a body has a line of symmetry, the centre of gravity will lie on this line.**
  - This fact is very useful. For example, the centre of gravity of a circular lamina is at the centre of the circle, since the centre of gravity is on each axis of symmetry and they all meet at the centre

# CENTRE OF MASS

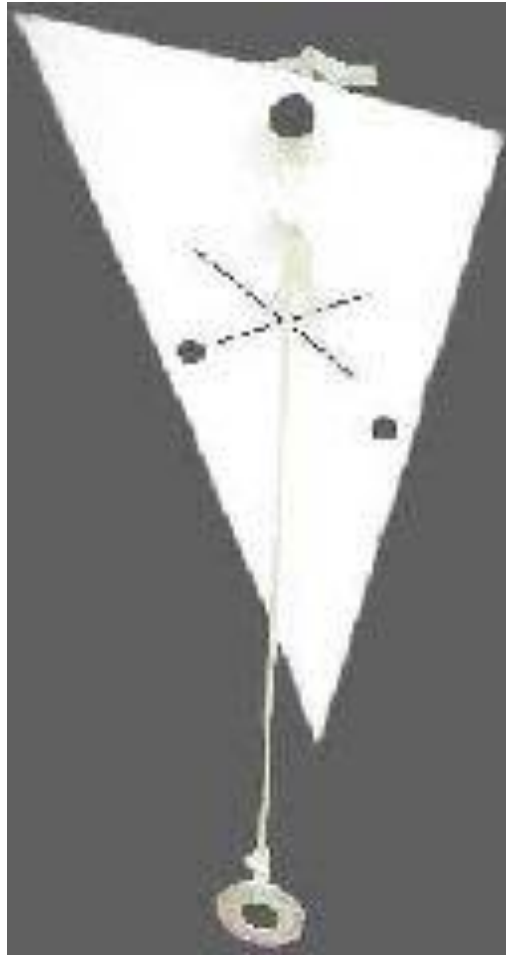
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The centre of mass of a body, is the point at which its entire mass can be considered to act. In most common circumstances the centre of gravity and centre of mass can be considered to be in the same place.

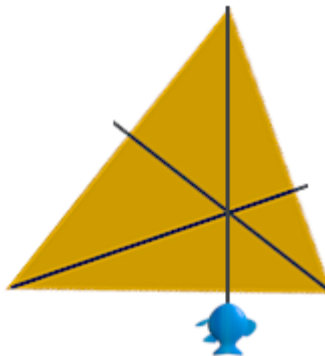
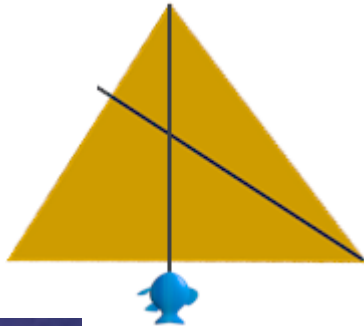
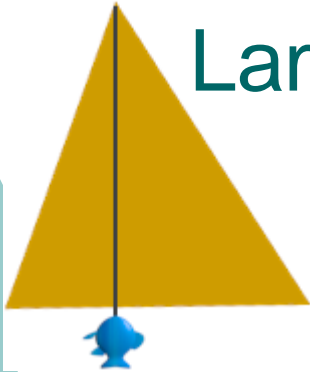
# Finding the centre of mass of a lamina

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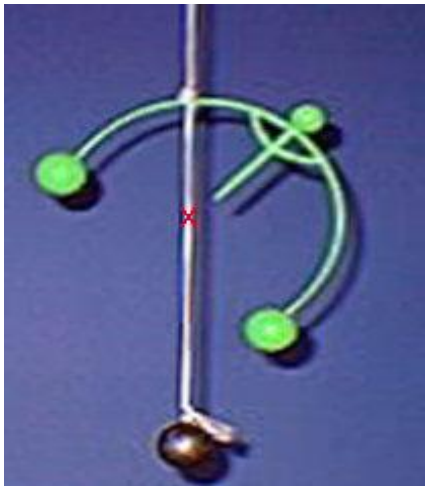


- A **lamina** is a 2-dimensional object. In other words, it is a flat object whose thickness we can ignore.

# Activity- Find the Centre of Gravity of a Lamina



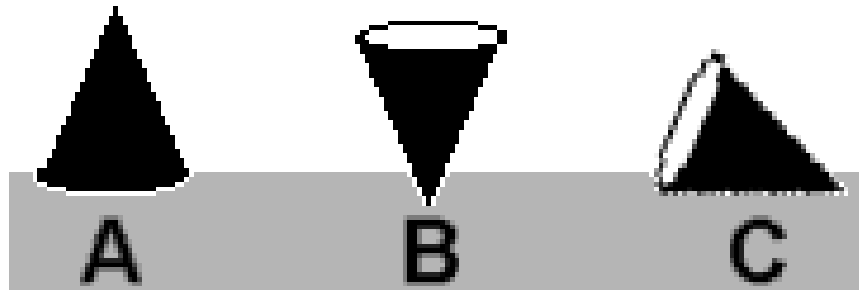
- Find the center of gravity of a lamina using a plumb line.
- Suspend the mass from three different places or vertices and trace the plumb line's location.
- Since the center of gravity will fall below the suspension point (in order to reduce any moment from the object's weight) the center of gravity will be at the intersection of all of the plumb lines.



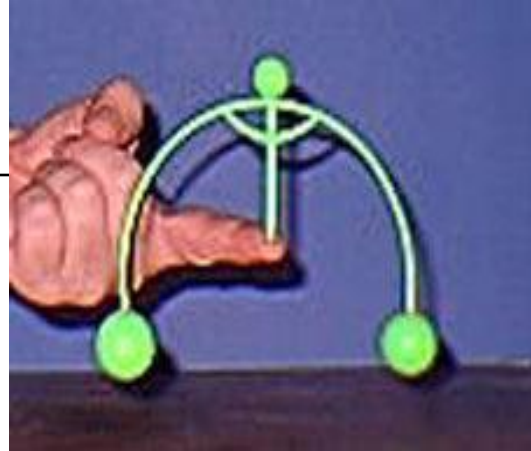
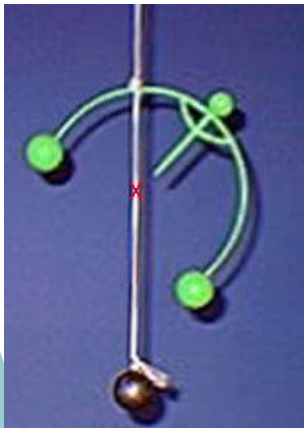
# STABILITY

There are 3 types of equilibrium an object can be in

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- **A** Stable equilibrium -Returns to equilibrium position when slightly displaced.
- **B** Unstable equilibrium- Neither returns to same equilibrium or stays in place when displaced slightly.
- **C** Neutral equilibrium- Remains in displaced position when disturbed.



# Plenary

- For an object to be in stable equilibrium, a vertical line down through its centre of gravity must run within the boundaries of its base; if tilted until this line falls outside the base, the object becomes unstable and topples over

