UNIT I

SHIP'S STABILITY

- When an object is afloat, it is acted upon by two forces; the downward force of gravity and the upward force of buoyancy

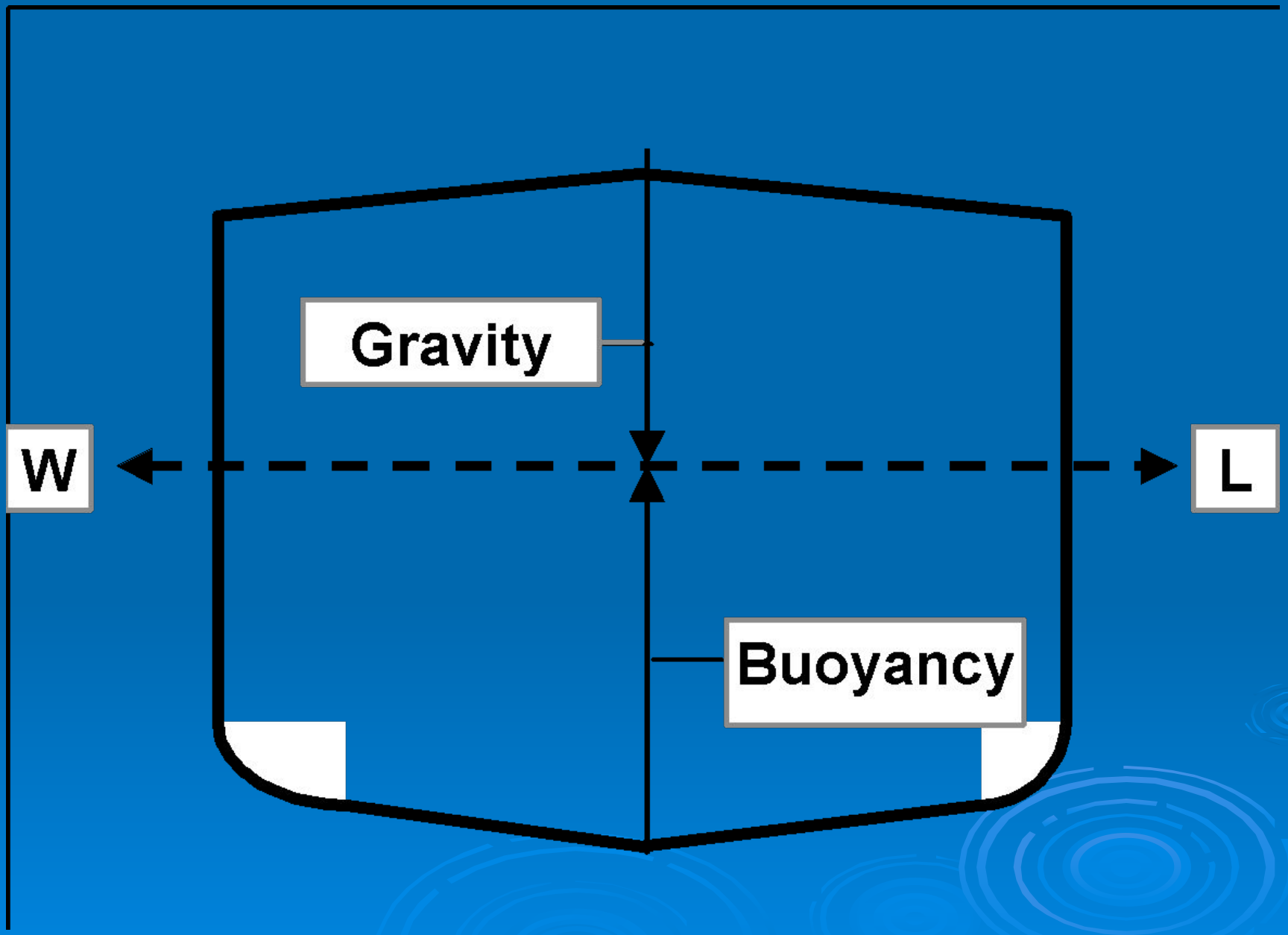
- Buoyancy is the ability of an object to float.

If an object is placed into water and the weight of this object is greater than the weight of an equal volume of water, the object will sink. It sinks because the force of buoyancy is less than the weight of the object.

However, if the weight of the object is less than the weight of an equal volume of water, the object will float

- Centre of gravity is the point of application of the gravitational force on the ship.

- Centre of buoyancy is the point of application of the buoyancy force on a ship.


Gravity
W
L
Buoyancy

- When cargo is loaded to one side of a ship, there will be a temporary shift in the centre of gravity. Once the ship tilts to one side, the centre of buoyancy will also shift.

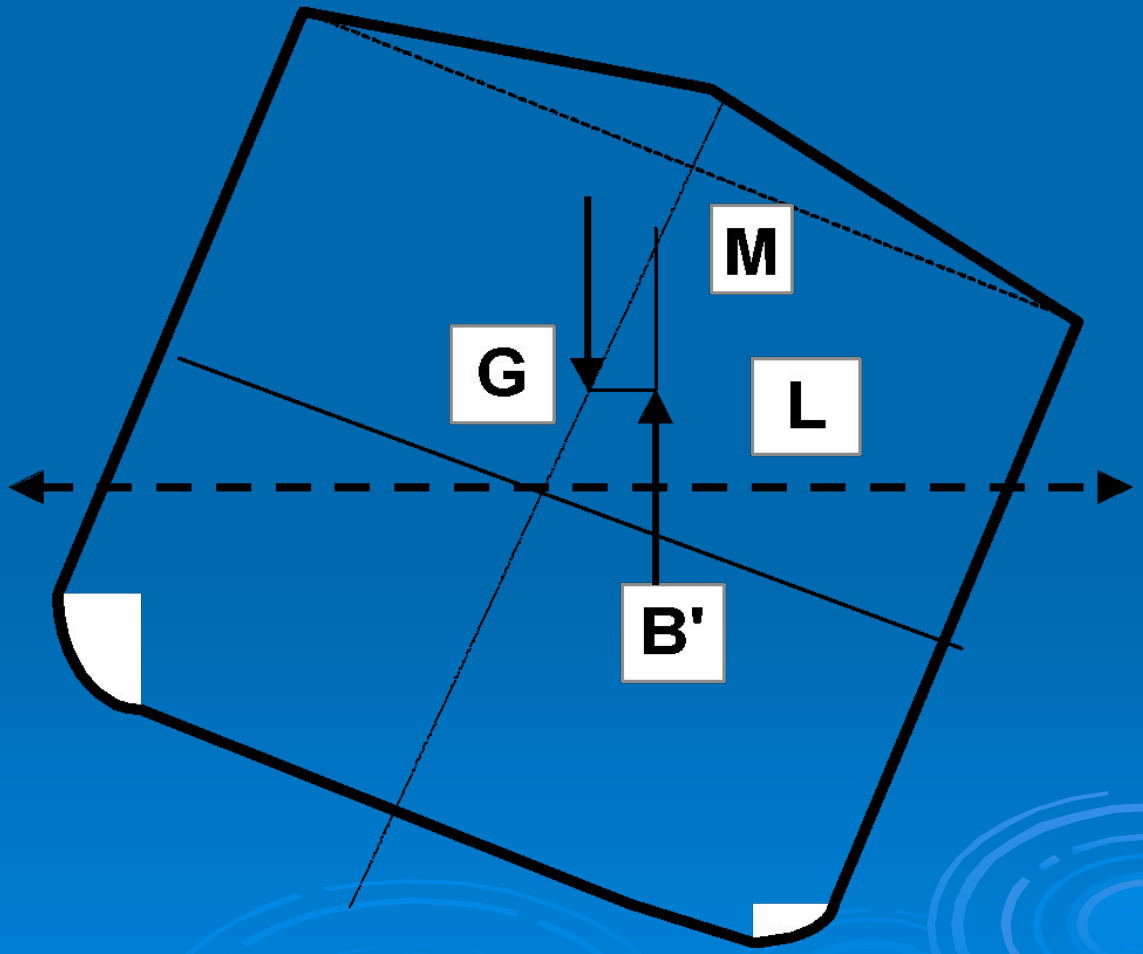
- The ship's centre of gravity determines the ship's stability.

Stability may be defined as the ability of a vessel to return to her initial position after inclination.

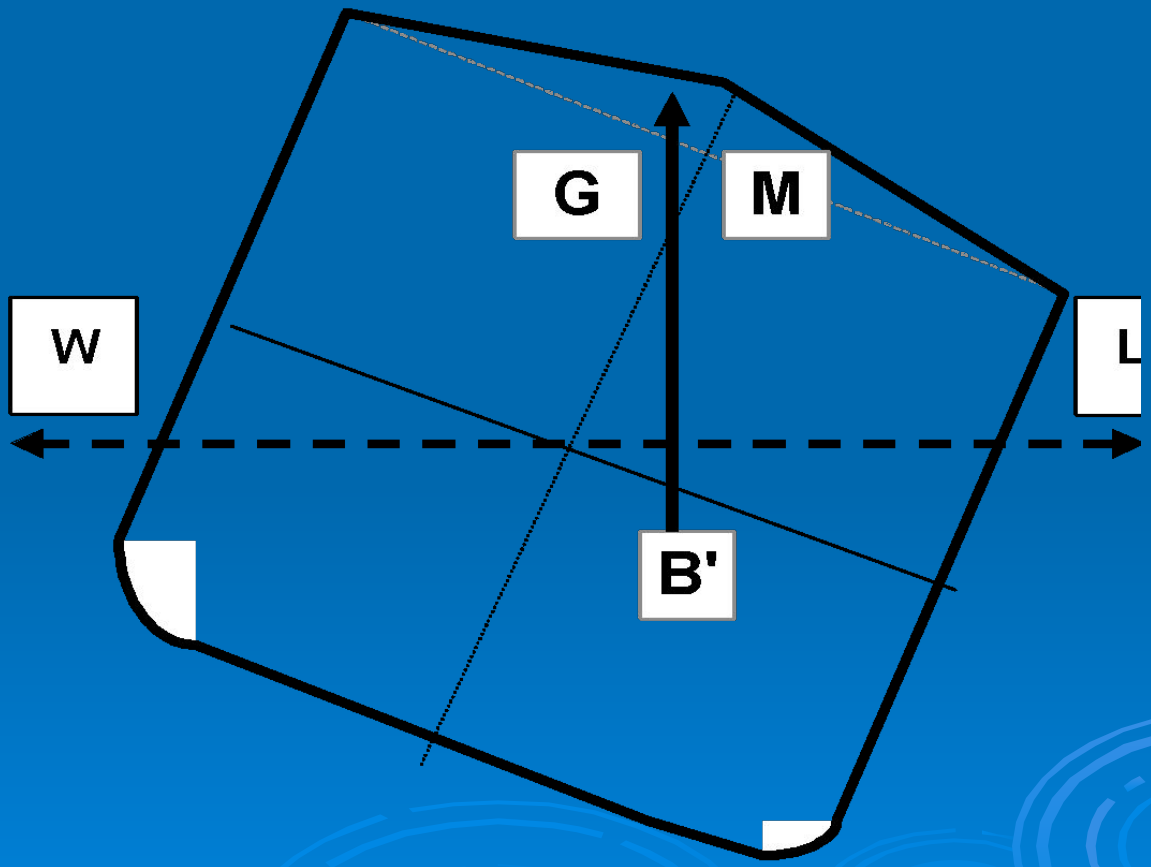
GM

- G-GRAVITY
- M-METACENTRE

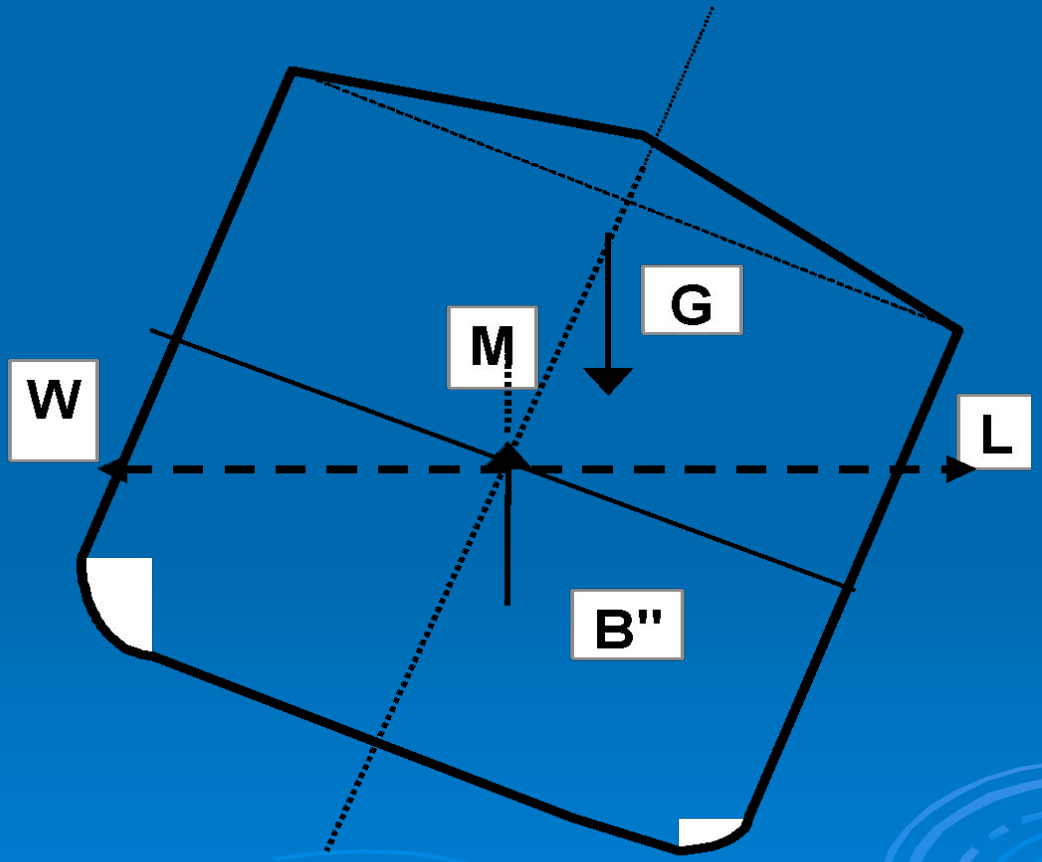
Positive stability - M above G



Neutral stability - M and G in same position



Negative stability - M below G



State that the following sentences true or false according to the text.

- **1-**Two forces act upon the object when it is afloat.

- **2-**The centre of gravitational force is centre of buoyancy.

3-If ship inclines, the centre of buoyancy changes.

4-If M is below G, this means that the ship is not stable.

SOME WORDS

Deflection (n) - Deviation, being deflected

Equilibrium (n) - Balance

Incline (v) - To deviate from a vertical position, to lean, to slope

Shift (v) - To change position or direction

Sink (v) - To fall down below the surface of the water, to submerge

Stable (adj.) - Steady, fixed

Tilt (v) - To incline, to slope

B-Underline the true word or phrase in italics

- **1-**The gravitational force is ***upward / downward*** force.

- **2-**If metacentre is ***above / below*** centre of gravity , this ship will be stable.

- **3**-When the force of buoyancy is less than the weight of the object, it ***sinks / floats.***