

IGCSE Physics Worksheet — Stability

Reading Passage

Stability describes how likely an object is to return to its original position after being tilted. It depends mainly on the position of the centre of mass, the size of the base area, and whether the line of action of weight stays inside the base.

Centre of Mass: A low centre of mass increases stability; a high centre of mass decreases stability.

Base Area: A wide base increases stability; a narrow base decreases stability.

Line of Action: If the line of action of weight falls inside the base, the object is stable. If it falls outside, it topples.

Applications: Racing cars have low centres of mass and wide wheelbases. Tall buildings need wide foundations. People lean forward when carrying heavy loads to keep the line of action inside the base.

Multiple Choice Questions

1. An object is more stable when:
 - A. Its centre of mass is high
 - B. Its base area is small
 - C. Its centre of mass is low
 - D. Its weight is small
2. An object will topple when:
 - A. Line of action falls inside base
 - B. Line of action falls outside base
 - C. Object is heavy
 - D. Base is wide
3. Which feature increases stability?
 - A. Narrow base
 - B. High centre of mass
 - C. Low centre of mass
 - D. Tall shape
4. A racing car is stable mainly because it has:
 - A. High centre of mass
 - B. Wide wheelbase

- C. Small mass
- D. Thin wheels

5. People lean forward when carrying heavy loads to:

- A. Reduce weight
- B. Raise centre of mass
- C. Keep line of action inside base
- D. Narrow their base

Structured Questions

- 6. Explain why an object with a low centre of mass is more stable.
- 7. Describe how the base area affects stability.
- 8. A tall cupboard is pushed slightly. Explain why it may topple easily.
- 9. A student stands with feet close together and then far apart. Compare their stability.
- 10. Explain the role of the line of action of weight in determining stability.

hsa.hk

Teacher-Only Answer Key

MCQ Answers: 1. C 2. B 3. C 4. B 5. C

Structured Answers:

6. A low centre of mass requires more tilting before the line of action moves outside the base, making toppling harder.
7. A wide base keeps the line of action inside the base more easily, increasing stability.
8. A tall cupboard has a high centre of mass, so the line of action quickly moves outside the base when pushed.
9. Feet close together create a narrow base (less stable); feet far apart create a wide base (more stable).
10. If the line of action falls inside the base, the object is stable; if it falls outside, it topples.

hsa.hk