# What is Newton's First Law?

Worksheet

An object at rest stays at rest, and an object in motion stays in motion at constant velocity, unless acted on by a net external force: ΣF = 0 means zero acceleration.

## Questions

1. Newton's First Law is also known as the law of…

A) gravity
B) inertia
C) momentum
D) action-reaction

2. If the net force on an object is zero, the object…

A) always stops
B) accelerates
C) keeps constant velocity
D) speeds up

3. A ball rolling on a frictionless floor forever illustrates…

A) Newton's second law
B) Newton's first law
C) Newton's third law
D) the law of gravitation

4. Which has more inertia?

A) A tennis ball
B) A bowling ball
C) Neither, inertia is the same
D) Inertia depends on speed

5. A 2 kg book rests on a table. The table pushes up with 19.6 N and gravity pulls down 19.6 N. Is the book in equilibrium?

6. A hockey puck slides on frictionless ice at 8 m/s. What is its velocity after 10 s with no forces acting?

7. A 60 N push and a 60 N friction force act on a crate in opposite directions. Does it accelerate?

8. Define: What is Newton's First Law?

9. Define: What is inertia?

10. Define: What does ΣF = 0 mean?

# Answer Key

1. B) inertia — It's the law of inertia — resistance to a change in motion.

2. C) keeps constant velocity — ΣF = 0 means zero acceleration, so velocity stays constant (including staying at rest).

3. B) Newton's first law — With no net force, it keeps moving at constant velocity — the law of inertia.

4. B) A bowling ball — Inertia increases with mass — the bowling ball has more.

5. ΣF = 19.6 − 19.6 = 0 N Since ΣF = 0, a = 0 → the book stays at rest (Newton's first law).

6. ΣF = 0 ⇒ a = 0 Velocity stays constant: v = 8 m/s (unchanged).

7. ΣF = 60 − 60 = 0 N a = ΣF/m = 0 → no, it continues at constant velocity (or stays at rest).

8. An object stays at rest or moves at constant velocity unless a net external force acts on it.

9. An object's resistance to a change in its state of motion; more mass means more inertia.

10. The net force is zero, so acceleration is zero — velocity stays constant.