

Property	**Mass**	**Volume**	**Weight**
SI Unit	Kilogram (kg)	Cubic meter (m ³)	Newton (N)
Measurement	Measured using a balance.	Measured using a graduated cylinder, ruler, or volume formulas.	Measured using a scale or spring balance.
Does It Change with Location?	No, mass remains constant regardless of location.	No, volume remains constant unless the object changes shape or state.	Yes, weight changes with the strength of the gravitational field (e.g., on the Moon vs. Earth).
Relationship with Gravity	Independent of gravity.	Independent of gravity.	Directly dependent on gravity.
Physical State	Does not change with physical state (solid, liquid, gas).	Can change with physical state (e.g., water expands when it freezes).	Changes with gravity, not with the physical state.
Example	A 5 kg block of iron has the same mass on Earth as on the Moon.	A 1-liter bottle holds the same volume of liquid, regardless of the liquid's type.	A 5 kg object weighs about 49 N on Earth, but only about 8 N on the Moon.