

Notes: Mass vs. Weight

What is “mass”?

- Mass measures the _____ of an object.
- All objects made of _____ have inertia - that is, they resist accelerations (Newton’s First Law), but some objects resist more than others.
- Mass is a _____ quantity.
- SI unit of mass is the _____ ().

Preconceptions

- There is 1 major preconception to address:
- is _____ the same as _____.
- Mass is a _____ of an object that measures how much it _____ accelerating.
- An object is _____ to accelerate because it has _____.

Weight

- Weight is a _____ - an interaction between 2 objects involving a push or a pull. One of these objects is typically **VERY** big - the Earth or the Moon, for instance.
- Weight is _____ a property of an object.

What does weight depend on?

- The weight of an object depends on the object’s _____.
- In fact, an object’s weight is _____ to the object’s mass.
- The weight of an object also depends on the object’s _____.
- In fact, an object’s weight is _____ to its _____ at its current location.

Weight

In symbols:

Weight of a 1 kg object

Since _____, the weight of a 1 kg object (that is the object's mass) is:

- $W = (1 \text{ kg})(\quad \text{m/s}^2) = 9.8 \text{ N}$ _____
- $W = (1 \text{ kg})(\quad \text{m/s}^2) = 1.6 \text{ N}$ _____

Mass vs. Weight

- We typically think that an object is difficult to accelerate because it is heavy (has weight) - **but it is heavy because** _____.
- So, objects are difficult to accelerate because they have **mass**.

Practice Problem

An object weighs 1750 N on Earth. If it is accelerated at 2.8 m/s^2 , what is the net force acting on the object?