WHAT IS THE DIFFERENCE BETWEEN MASS AND WEIGHT?

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Right girls and boys, it's time to dip our toes into the wonderful world of science and explore the difference between mass and weight.

Most of you already use these two words on an almost daily basis (especially if, like me, you're conscious of your weight and spend hours agonizing over how much muscle mass you built during your last visit to the gym). But do you really know the difference between weight and mass? Have you been confusing mass with weight? It's very easy to do when you're not entirely sure of how science actually defines them. Even though they're both linked, I've put together a fairly comprehensive description which, more importantly, is written in layman's terms and not scientific babble! Here goes…

WHAT IS MASS?

Mass is a scientific measure of the amount of matter an object is made up of. No matter where you are at given moment in time, mass is constant. So, whether you're walking to the shop to stock up on groceries or bouncing around on the moon, your mass is the same. Obviously, if you're on a diet that's not the answer you want to hear but don't panic - we'll get to the all-important definition of weight shortly.

Here are some other key points about mass:
1. Mass is indestructible. As you've seen above, no matter where you are in the universe your mass will never change
2. Mass can never be zero. What we mean by this is that everything in the universe has mass. If it didn't it simply wouldn't exist
3. Mass is not related to gravity, centrifugal force, etc and these forces have no effect whatsoever on your mass
4. Mass is commonly measured in kilograms and grams.
Hopefully, the descriptions above have given you a good idea of what mass really is. Don't fall into the trap of thinking that this unit of measure is not important - it is. After all, without the huge mass that makes up planet Earth we'd have no gravity - a great way to save money on fuel as you can simply float to work, but not so great when you’re trying to drink your morning espresso on your way to the office.

**WHAT IS WEIGHT?**

Weight is a form of measurement that is dependent on gravity and, unlike mass, your weight can vary depending on where you are in the universe. Weight is a pretty important measure not only to dieters the world over but also to the scientists and egg heads who design things like space shuttles and boats - opposite end of the spectrum, but it's all about perspective.

But how can weight vary whilst mass has to remain constant? It's fairly simple: weight is a variable i.e. it can change based on the amount of gravitational pull an object exerts on a body. Scientists have defined weight using this equation:

**Formula:** Weight (W) = Mass (M) multiplied by gravitational acceleration (g). (W = mg)

Simple, right?

**Here are some key points about weight:**

1. The weight of an object changes based on where it is. If you've decided to visit the moon to test out this theory then you'll find that, in a matter of hours, you will have slashed your weight by two thirds (in your face, Slimming World!)
2. Weight is a vector and its direction of pull is towards the center of the planet you're stood on. What? Sorry, I did promise layman's terms: gravity, which is created by the mass of an object, moves towards the center of the object and it is gravity that determines your, or any other object's, weight.
3. The weight of any given object can go up or down depending on the amount of gravity acting on it. More gravity - the heavier the object. Less gravity - the lighter the object.
4. Unlike mass, weight can be zero. An example of this is an astronaut floating in space - there's no gravity acting on his body and, therefore, he has no weight.
5. Weight is commonly measured in Newtons.

**THE DIFFERENCE BETWEEN MASS AND WEIGHT - CLARIFICATION**

Ok, hopefully we've cleared up any lingering doubts you may have about the whole mass vs weight debate - **mass** is a measure of the amount of matter in an object and **weight** is the amount of force that gravity has on an object. As you can see, it's not quite a clear cut topic, but do keep these points in mind and prepare to wow your friends and family with your newfound knowledge of the scientific arts.

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