Mechanics - Physical Quantities

A physical quantity is a **physical property** of a phenomenon, body, or substance that can be **quantified** by measurement.

By physical property, we mean any thing whose value when measured describes the state of a **physical system**. The physical system is the portion of our **observable universe** chosen for analysis (and everything outside the system is the **environment**). Deciding which is environment and which is system is up to you. You will have to decide which environment-system allocation best models the property you are researching.

Let’s suppose you’re might be looking at the lake outside your window and you want to know the amount of water in the lake that you can see. You quickly realize that it’s hard to keep track of all the movements of water in the ocean because there’s this chaotic motion in very different directions: up, down, forward, backward, and slanted combinations of these directions. So you have to make a simpler physical system. A very popular choice for a physical system is the **isolated system**. By this we mean that the system has no interaction with the environment. You basically ignore the chaotic motion of the water on the surface and just think of the water particles as having no mixing with the sand and what not. It is just a container whose volume can easily be found.

Now let’s think about quantification. Quantification or quantitation is a complicated term used to describe the act of counting and measuring. The aim of this is to convert complicated things like what we sense, observe, and experience into simple objects called “quantities” that are in the language of mother nature, mathematics. Mathematics allows us to express very to explain phenomena in a “relatively” smooth manner. Quantities are mathematical objects that can be compared to each other in terms of “more”, “less” or “equal” using numerical values assigned to them by some sort of measurement.