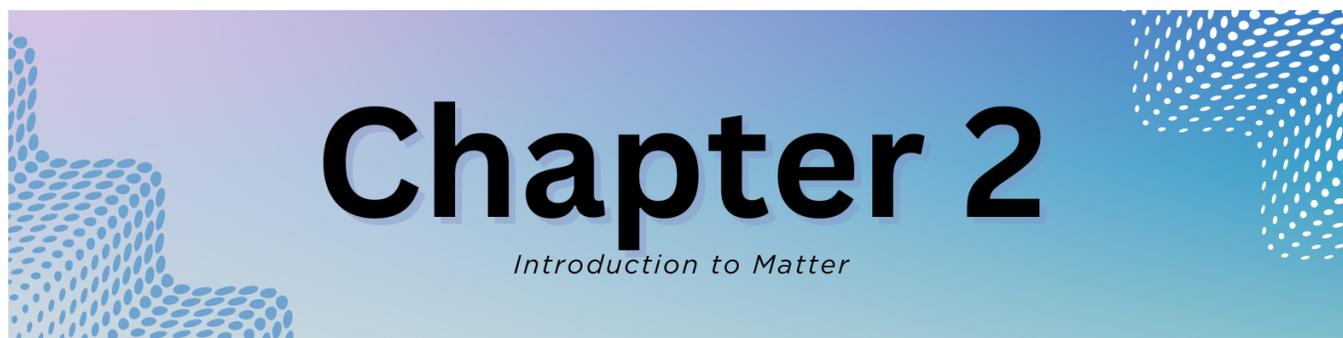


CHAPTER OVERVIEW

2: Matter - An Introduction



We are all familiar with "stuff" - what we call *matter*. The definition of **Matter** is anything that has mass and volume (takes up space). For most common objects that we deal with every day, it is fairly simple to demonstrate that they have mass and take up space. You might be able to imagine, however, the difficulty for people several hundred years ago to demonstrate that air has mass and volume. Air (and all other gases) are invisible to the eye, have very small masses compared to equal amounts of solids and liquids, and are quite easy to compress (change volume). Without sensitive equipment, it would have been difficult to convince people that gases are matter. Today, we can measure the mass of a small balloon when it is deflated and then blow it up, tie it off, and measure its mass again to detect the additional mass due to the air inside. The mass of air, under room conditions, that occupies a one quart jar is approximately 0.0002 pounds. This small amount of mass would have been difficult to measure in times before balances were designed to accurately measure very small masses. Later, scientists were able to compress gases into such a small volume that the gases turned into liquids, which made it clear that gases are matter.



Figure 2.2: Everything from an ant, to a truck, to the earth and even the entire galaxy is composed of matter. Images used with permission from Wikipedia (CC_SA-BY-3.0; credit [High Contrast](#))

Even though the universe consists of "things" as wildly different as ants and galaxies, the matter that makes up all of these "things" is composed of a very limited number of building blocks. Like thousands of words comprise the English language, if those words are broken down to their "building blocks", we would have only 26 letters. In this chapter, we will delve into the different types of matter according to their composition, properties, and behavior.

Chapter Sections

- [2.1: Classifications of Matter](#)
- [2.2: Properties of Matter](#)
- [2.3: Intensive vs. Extensive Properties](#)
- [2.4: Changes in Matter](#)
- [2.5: Energy - What Drives Changes in Matter](#)

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