

SECTION 1

Fluids and Buoyant Force

SECTION OBJECTIVES

- Define a fluid.
- Distinguish a gas from a liquid.
- Determine the magnitude of the buoyant force exerted on a floating object or a submerged object.
- Explain why some objects float and some objects sink.

fluid

a nonsolid state of matter in which the atoms or molecules are free to move past each other, as in a gas or a liquid

extension

Integrating Astronomy

Visit go.hrw.com for the activity "Plasmas."



Keyword HF6FLUX

ADVANCED TOPICS

See "Properties of Gases" in **Appendix J: Advanced Topics** to learn more about how gases behave.

DEFINING A FLUID

Matter is normally classified as being in one of three states—solid, liquid, or gaseous. Up to this point, this book's discussion of motion and the causes of motion has dealt primarily with the behavior of solid objects. This chapter concerns the mechanics of liquids and gases.

Figure 1(a) is a photo of a liquid; **Figure 1(b)** shows an example of a gas. Pause for a moment and see if you can identify a common trait between them. One property they have in common is the ability to flow and to alter their shape in the process. Materials that exhibit these properties are called **fluids**. Solid objects are not considered to be fluids because they cannot flow and therefore have a definite shape.

Liquids have a definite volume; gases do not

Even though both gases and liquids are fluids, there is a difference between them: one has a definite volume, and the other does not. Liquids, like solids, have a definite volume, but unlike solids, they do not have a definite shape. Imagine filling the tank of a lawn mower with gasoline. The gasoline, a liquid, changes its shape from that of its original container to that of the tank. If there is a gallon of gasoline in the container before you pour, there will be a gallon in the tank after you pour. Gases, on the other hand, have neither a definite volume nor a definite shape. When a gas is poured from a smaller container into a larger one, the gas not only changes its shape to fit the new container but also spreads out and changes its volume within the container.

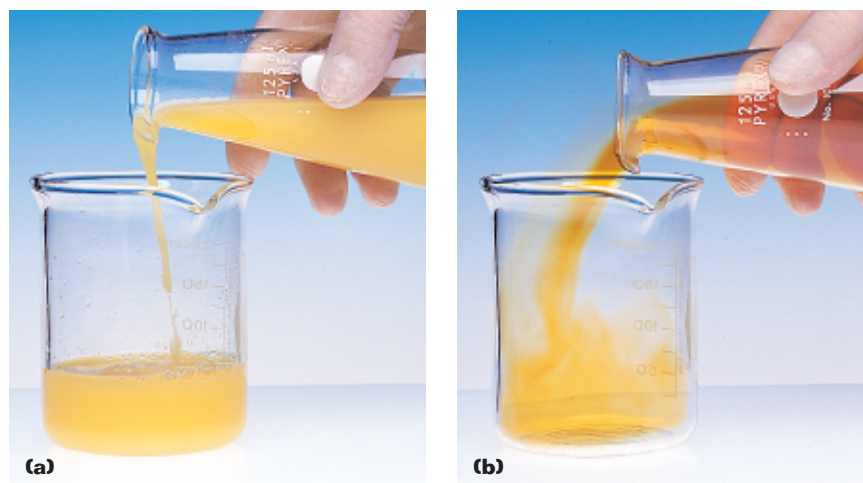


Figure 1

Both (a) liquids and (b) gases are considered fluids because they can flow and change shape.