



This photograph shows the interior of Grand Central Terminal in New York City. Light from the window reflects off dust particles that are being moved by the motion of the molecules in air.

Atoms and molecules are always in motion.

If you have ever looked at a bright beam of sunlight, you may have seen dust particles floating in the air. If you were to watch carefully, you might notice that the dust does not fall toward the floor but instead seems to dart about in all different directions. Molecules in air are constantly moving and hitting the dust particles. Because the molecules are moving in many directions, they collide with the dust particles from different directions. This action causes the darting motion of the dust that you observe.

Atoms and molecules are always in motion. Sometimes this motion is easy to observe, such as when you see evidence of molecules in air bouncing dust particles around. Water molecules move too. When you place a drop of food coloring into water, the motion of the water molecules eventually causes the food coloring to spread throughout the water.

The motion of individual atoms and molecules is hard to observe in solid objects, such as a table. The atoms and molecules in a table cannot move about freely like the ones in water and air. However, the atoms and molecules in a table are constantly moving—by shaking back and forth, or by twisting—even if they stay in the same place.

5.1 Review

KEY CONCEPTS

1. What are atoms? (8.3.a)
2. What is the smallest particle of a substance that is still considered to be that substance? (8.3.a)
3. Why do dust particles in the air appear to be moving in different directions? (8.3.a)

CRITICAL THINKING

4. **Apply** How does tea flavor spread from a tea bag throughout a cup of hot water?
5. **Infer** If a water molecule (H_2O) has two hydrogen atoms and one oxygen atom, how would you describe the make-up of a carbon dioxide molecule (CO_2)?

CHALLENGE

6. **Synthesize** Assume that a water balloon has the same number of water molecules as a helium balloon has helium atoms. If the mass of the water is 4.5 times greater than the mass of the helium, how does the mass of a water molecule compare with the mass of a helium atom?