Introduction

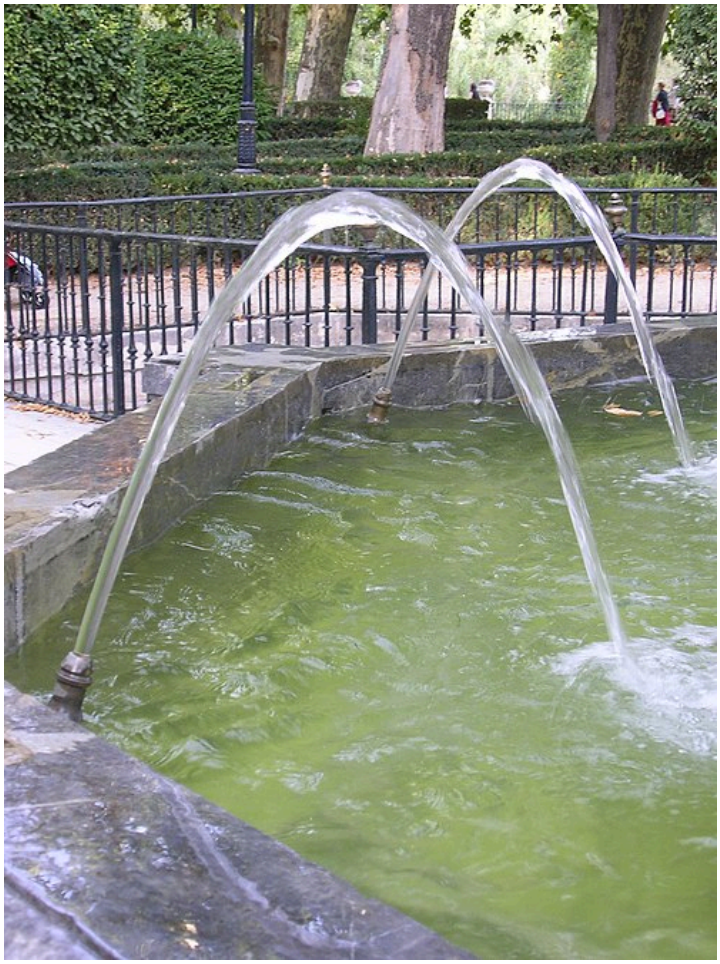

Figure 4.1 Water emerges from a fountain pipe with some initial velocity and follows a parabolic trajectory as the force of gravity acts downward on the water molecules. This is an example of projectile motion, which is discussed in Section 4.3. (Photo credit: GuidoB, Wikimedia Commons)

In Chapter 3: Motion Along a Straight Line, we defined the initial concepts that help us to understand motion: displacement, velocity, and acceleration. In this chapter, we extend those concepts that were developed in one-dimension to two and three dimensions. After all, most objects in our universe do not move in straight lines; rather, they follow curved paths. From kicked footballs to the flight paths of birds to the orbital motions of moons and planets most motion follows curved trajectories. The water molecules following the parabolic path in the photo above is typical for situations in which an object is is launched. Without the force of gravity, the molecules would follow a straight line, but the gravity acts downward and changes the path the molecules follow.

In this chapter we also explore two special types of motion in two dimensions: projectile motion and circular motion. Last, we conclude with a discussion of relative motion. In the chapter-opening picture, each jet has a relative motion with respect to any other jet in the group or to the people observing the air show on the ground.

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