



Figure 1.1 Galaxies, such as the Andromeda galaxy pictured here, are immense in size. The small blue spots in this photo are also galaxies. The same physical laws apply to objects as large as galaxies or objects as small as atoms. The laws of physics are, therefore, surprisingly few in number. (NASA, JPL-Caltech, P. Barnby, Harvard-Smithsonian Center for Astrophysics).

Chapter Outline

- 1.1 Physics: Definitions and Applications
- 1.2 The Scientific Methods
- 1.3 The Language of Physics: Physical Quantities and Units

Introduction

Teacher Support

Teacher Support Before students begin this chapter, it is useful to review the following concepts:

- The definition of the atom and subatomic particles (electron, proton, and neutron)
- Metric units
- Using significant figures in calculations

Teacher Support

Teacher Support The photo of the Andromeda galaxy and its subsequent mentioned in this chapter is meant to show students that the same laws of physics apply to extremely large systems, such as a galaxy, and apply also to smaller systems in our universe. The same laws that govern the movement of

the stars within the Andromeda galaxy also explain the gravitational forces on Earth that all humans experience and interact with every second of their lives.

Take a look at the image above of the Andromeda Galaxy (Figure 1.1), which contains billions of stars. This galaxy is the nearest one to our own galaxy (the Milky Way) but is still a staggering 2.5 million light years from Earth. (A light year is a measurement of the distance light travels in a year.) Yet, the primary force that affects the movement of stars within Andromeda is the same force that we contend with here on Earth—namely, gravity.

You may soon realize that physics plays a much larger role in your life than you thought. This section introduces you to the realm of physics, and discusses applications of physics in other disciplines of study. It also describes the methods by which science is done, and how scientists communicate their results to each other.