1 Representing Motion

1.1 Motion: A First Look

Exercises 1–5: Draw a motion diagram for each motion described below.
- Use the particle model to represent the object as a particle.
- Six to eight dots are appropriate for most motion diagrams.
- Number the positions in order, as shown in Figure 1.4 in the text.

1. A car accelerates forward from a stop sign. It eventually reaches a steady speed of 45 mph.

2. An elevator starts from rest at the 100th floor of the Empire State Building and descends, with no stops, until coming to rest on the ground floor. (Draw this one vertically because the motion is vertical.)

3. A skier starts from rest at the top of a 30° snow-covered slope and steadily speeds up as she skis to the bottom. (Orient your diagram as seen from the side. Label the 30° angle.)
4. The space shuttle orbits the earth in a circular orbit, completing one revolution in 90 minutes.

5. Bob throws a ball at an upward 45° angle from a third-story balcony. The ball lands on the ground below.

Exercises 6–9: For each motion diagram, write a short description of the motion of an object that will match the diagram. Your descriptions should name specific objects and be phrased similarly to the descriptions of Exercises 1 to 5. Note the axis labels on Exercises 8 and 9.

6. A hockey puck slides in a straight line and slows down until it stops.

7. The teacher drops his cell phone from 2m above the ground and it shatters when it hits the ground.

8. A javelin is thrown up in the air at 30° from the ground.

9. A deer moves in the woods at a constant speed to the North. Without changing speed, the deer turns west.