UNIT M


4. Gases are more easily compressed because of the large spaces between molecules.

6. A dense gas that is concentrated at the bottom of a container can be poured because its particles can move relative to each other. Chunks of solids, such as sugar crystals, can be poured.

8. Your illustration should resemble the particulate view in Figure M.3, page M.4.


12. a, c, d.

14. Physical—the particles simply change state.

16. Pick out the ball bearings (no change); use the magnetic property of steel to pick up the ball bearings with a magnet (no change); dissolve the salt in water and filter or pick out the ball bearings (physical change).

18. b, c, d.

20. Heterogeneous.

22. Examples include glass products, plastic products, aluminum foil, cleaning and grooming solutions, and the air.


26. It is a pure substance, one kind of matter, but heterogeneous.

28. The photograph alone does not provide enough information to answer the question. You probably know, however, that dishwashing liquid is a mixture.

30. a is a mixture because different substances are visible. b could be a pure substance in two different states, but it is probably a mixture. c could be either a pure substance or a mixture because it may be one kind of matter or two or more types of matter with similar appearance.

32. Your sketch should show one type of particle (a pure substance), but in more than one state (heterogeneous).

34. Compounds: a, b, c. Elements: d, e.


38. Yes. For example, limestone decomposes into lime and carbon dioxide.

40. (a) elements: 2, 3; compounds: 1, 4, 5. (b) In general, if there are two or more words in the name, the substance is a compound. One exception in this question is chloromethane, which is one word but a compound. Other important exceptions include water and ammonia. The name of an element is always a single word.
42. There is no evidence that A can be broken down into two or more other pure substances by a chemical or physical change, but only two methods have been tried. A is most likely an element, but the evidence is not conclusive.

<table>
<thead>
<tr>
<th></th>
<th>G, L, S</th>
<th>P, M</th>
<th>HOM, HET</th>
<th>E, C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck engine exhaust</td>
<td>All, but mostly G</td>
<td>M</td>
<td>HET</td>
<td>—</td>
</tr>
<tr>
<td>Potting soil</td>
<td>S</td>
<td>M</td>
<td>HET</td>
<td>—</td>
</tr>
<tr>
<td>Oxygen in a steel cylinder</td>
<td>G</td>
<td>P</td>
<td>HOM</td>
<td>E</td>
</tr>
<tr>
<td>A noncarbonated soft drink</td>
<td>L</td>
<td>M</td>
<td>HOM</td>
<td>—</td>
</tr>
<tr>
<td>Table sugar</td>
<td>S</td>
<td>P</td>
<td>HOM</td>
<td>C</td>
</tr>
</tbody>
</table>

46. Gravitational forces are attractive only; electrostatic forces can be attractive or repulsive. Magnetic forces can be attractive or repulsive also. All three can be acting simultaneously.


52. a, b.

54. Kinetic energy is greatest when the swing moves through its lowest point. Potential energy is at a maximum when the swing is at its highest point.

56. A gaseous substance was driven off by the heating process.

58. Examples include electrical energy being converted to mechanical energy (washing machine), light energy (light bulb), or heat energy (oven). These changes are good because they are useful to you, but are bad because they are not 100% efficient and thus wasteful.