

CHECK YOUR UNDERSTANDING—SUGGESTED ANSWERS

- Liquids and gases need containers because both can flow. A gas requires a container that completely encloses it because gases flow in all directions.
- There will be a great variety of answers. Examples of products manufactured because of the malleability of their materials are car bodies, play dough, and gold jewellery; examples of products manufactured because of the ductility of their materials are wires for electrical systems or suspension bridges, nails, and spaghetti pasta.
- Oxygen is the same wherever it comes from. Pure substances, both compounds and elements, are always the same throughout.
- (a), (b), and (d) are physical properties.
- 0.7 g/cm^3
- The 18k ring would feel heavier because it has more grams per cm^3 .
- Metal handles will get much hotter because the metal will conduct the heat from the pot. Wooden handles will conduct more poorly and stay cooler. They would be safer as they would be less likely to cause burns on the hands. (Students may also note that wooden handles, however, could cause a different safety problem when used on a gas stove, as they could conceivably catch fire.)
- (c) is a chemical property.
- (a) A counterfeit diamond does not have the hardness of a diamond.
(b) The solubility of sugar is a set amount—approximately 2 g/mL .
(c) Silver is a very malleable metal.
(d) The liquid is flammable.

10.

Substance	Property	Useful for
helium gas	less dense than air	balloons
gasoline, ethanol, propane	burns quickly	powering vehicles
nitroglycerin	explosive	demolition, breaking up rock, tunnelling

- Solids are the only states of matter capable of being eroded, because erosion does not follow of its own accord. Liquids and gases do the eroding. When they flow past solids, they dislodge particles of solid.
- Biting the gold was a reasonable test for gold because pure gold is quite soft. An alloy or "fool's gold" would be much harder.
- X-ray machines are checking the physical properties of substances, because there are no new substances or properties being produced. (This may not be true for the tests for possible explosive residue, which may be looking for chemical reactions of some sort.)
- Hairspray is useful specifically because it forms a solid varnish that makes hair less flexible.
- Answers will vary considerably, but should be in the following form:

Substance	Property(ies)
chewing gum	sweet, chewy
soap	dissolves dirt
sandpaper	rough surface

Technology Connections

Students can use the Internet to explore the very chemical nature of food, and how the chemistry of the food we eat can make us healthy or unhealthy. Challenge students to locate and compare the properties (e.g., texture, melting point, taste) and chemical composition of a variety of chocolate bars. Encourage students to share their findings with the class through oral presentations and posters.