

- Which two states of matter require containers? Do the containers have to be different? If so, why?
- List three products that are manufactured because of the malleability of their materials, and three products that are manufactured because of the ductility of their materials.
- Oxygen is considered to be a pure substance. The oxygen molecules that you are breathing in at this moment may have come from a tree outside your classroom, pond scum in a nearby drainage ditch, or algae growing on the inside of a school window. Does their origin make any difference in their properties? Explain.
- Which of the following properties of sulfur are physical properties?
  - Its melting point is  $112\text{ }^{\circ}\text{C}$ .
  - It is a yellow solid.
  - It reacts with hydrogen to form a gas.
  - Its density is  $2.97\text{ g/cm}^3$ .
  - It combines with oxygen.
- Density cannot be measured directly. It is calculated by dividing the mass (in g) of a sample by its volume (in  $\text{cm}^3$ ). What is the density of gasoline if 1 L ( $1000\text{ cm}^3$ ) of gasoline has a mass of 700 g?
- Suppose that you had two rings of the same size (volume), but one was 10K gold and the other was 18K gold. Which ring would feel heavier? Explain.
- The ability to conduct heat is a physical property. Metals have a high thermal conductivity while wood and plastic do not. Using this property, explain from a safety point of view which would be better: pots with metal or wooden handles?
- Which of the following properties of zinc are chemical properties?
  - It melts at  $419\text{ }^{\circ}\text{C}$ .
  - It is a grey metal.
  - It corrodes in moist air.
  - It conducts electricity.
  - Its density is  $7.1\text{ g/cm}^3$ .
- Which property of matter is responsible for each of the following observations?
  - A counterfeit diamond has fine scratches and chips on it.
  - Small amounts of sugar are each weighed and then added, one at a time, to 100 mL of water until no more can dissolve.
  - Silver is flattened with a hammer and shaped into a bracelet.
  - A liquid ignites when exposed to a flame.
- Complete Table 6.

Table 6

Substance	Property	Useful for
helium gas	less dense than air	
	burns quickly	powering vehicles
nitroglycerin	explosive	

- Erosion is an important geological process. Which state(s) of matter experience(s) erosion? Which state(s) of matter cause(s) erosion? Explain how erosion occurs.
- In the past, a quick test for pure gold was to bite the coin or nugget. What property do you think this was testing? Explain.
- Is the X-ray machine at an airport checking the physical or the chemical properties of the substances in your luggage? Explain.
- What is the property of hairspray that makes it useful?
- Identify five things you use regularly because their special properties make them useful.