

Understand Concepts

0. What is chemistry?

1. List the symbols for the following elements: iron, sodium, antimony, tungsten. Explain why these symbols do not correspond to the English names of the elements.

12. If you know the melting point of a pure substance, what does it tell you about its boiling point? Its freezing point?

13. Which compound or compounds listed in **Table 1.3** contain the element sodium? The element chlorine?

14. What information does the chemical formula for a compound provide about the submicroscopic structure of the compound?

15. What is mass?

16. If you say that sulfur is yellow, you are stating a property of sulfur. What is meant by property? Is color a physical or a chemical property?

17. List three properties of iron.

18. What is the solvent in an aqueous solution of salt? Why are aqueous solutions important?

19. Could two objects with the same volume have different masses? Which, if either, would contain more matter?

20. What is meant by pure matter?

21. What is energy? What part does it play in chemistry?

22. Distinguish between exothermic and endothermic reactions, and give an example of each.

23. How is a qualitative observation different from a quantitative observation? Give an example of each.

24. Explain how a mixture is different from a compound.

25. What is an element? A compound? Give an example of each.

26. Sucrose ($C_{12}H_{22}O_{11}$), is 51.5 percent oxygen by mass and only 6.4 percent hydrogen by mass, yet there are twice as many hydrogen atoms as oxygen atoms in the formula of sucrose. How can this be?

27. Classify these as chemical changes or physical changes.

a) Water boils.

b) A match burns.

c) Sugar dissolves in tea.

d) Sodium reacts with water.

e) Ice cream melts.

28. Classify these as heterogeneous or homogeneous mixtures.

a) salt water

b) vegetable soup

c) 14-k gold

d) concrete

29. What is meant by density? Is there any way that a bag of plastic foam balls could be heavier than a bag of stones?

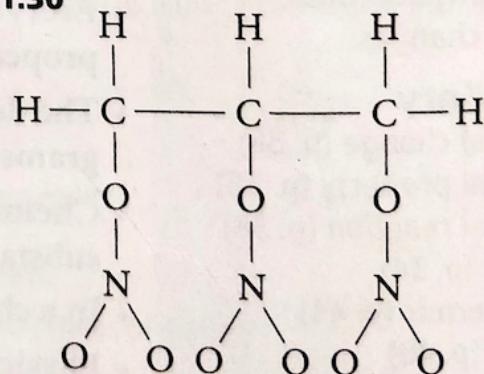
30. Gold freezes at 1064°C . What is the melting point of gold?

31. Mercury freezes at -38.9°C ; nitrogen boils at -195.8°C . How can a boiling point be lower than a freezing point?

32. Use **Table D.5**, page 850. Over what temperature range is iron (Fe) a liquid? How does this liquid temperature range compare with that of krypton (Kr)?

33. Is the diagram in **Figure 1.30** a molecule of nitroglycerin or a model of nitroglycerin? Explain.

■ **Figure 1.30**



34. The chemical formula of water is H_2O . The chemical formula of hydrogen peroxide is H_2O_2 . Which compound has the highest percentage of hydrogen by mass?