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27. List three types of radiation that are released as a result of radioactive decay.
28. What are isotopes?
29. Write the nuclear symbols that represent each of the following.
- proton (one symbol)
 - neutron (one symbol)
 - beta decay (two symbols)
 - gamma decay (one symbol)
 - alpha decay (two symbols)
30. (a) How are the atoms in oxygen-16 and oxygen-17 similar?
(b) How are they different?
31. How does the release of a beta particle from the nucleus of an atom turn the atom into a different element?
32. Draw a Bohr model showing the number of protons, neutrons, and the electron arrangement (including pairs and single electrons) for the following isotopes.
- silicon-28
 - silicon-32
 - beryllium-7
 - beryllium-10
33. Copy and complete the following table in your notebook.

Isotope	Mass Number	Atomic Number	Number of Neutrons
helium-3			
helium-4			
		7	7
		7	8
	18		10
	20		10

34. How does a fusion nuclear reaction differ from a fission nuclear reaction?
35. What are the two main uses for fission nuclear reactions?

Understanding Key Ideas

36. Use the following list of elements: helium, oxygen, nickel, tin, sodium, chlorine, nitrogen, krypton, and gold. Which of these element(s) could be described by the following descriptions?
- most common ion charge is 2+
 - forms a 3- ion
 - unreactive
 - non-metal
 - metal
 - alkali metal
37. Write the skeleton equation for each reaction, and then balance.
- sodium + oxygen \rightarrow sodium oxide
 - magnesium + copper(II) chloride \rightarrow copper + magnesium chloride
 - calcium carbonate \rightarrow calcium oxide + carbon dioxide
 - chromium(III) chloride + potassium hydroxide \rightarrow potassium chloride + chromium(III) hydroxide
 - sodium acetate + manganese(II) nitrate \rightarrow manganese(II) acetate + sodium nitrate
38. Which of the following compounds are hydrocarbons? Explain how you know.
- C_4H_{10}
 - C_3H_7OH
 - C_6H_6
 - $Ca(HCO_3)_2$
 - H_2O
39. Classify each chemical reaction, and then write a balanced formula equation for each.
- $NaF \rightarrow$
 - $Li + N_2 \rightarrow$
 - $CH_4 + O_2 \rightarrow$
 - $K_2CrO_4 + AgNO_3 \rightarrow$
 - $LiI + Br_2 \rightarrow$
 - $Cd + I_2 \rightarrow$
 - $C_3H_8 + O_2 \rightarrow$
 - $MgSO_4 + In \rightarrow$
 - $AlCl_3 + Ru(NO_3)_3 \rightarrow$
 - $H_2CO_3 + Mg(OH)_2 \rightarrow$