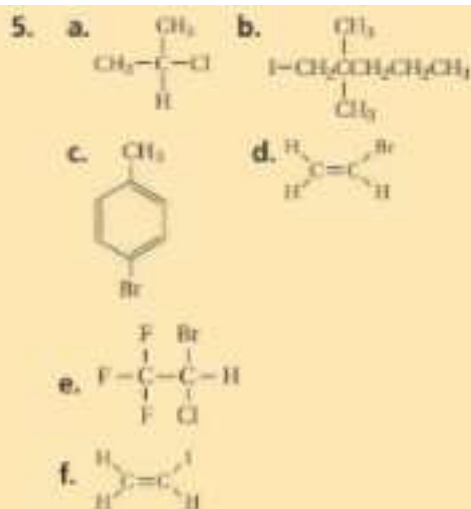

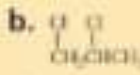
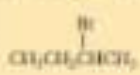
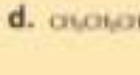


- according to their functional groups
- RX, where X is a covalently bonded halogen substituent such as fluorine, chlorine, bromine, or iodine
- They are used to introduce new functional groups to organic molecules.
- OH, hydroxyl group; alcohol
 - NH₂, amino group; amine
 - COOH, carboxyl group; carboxylic acid
 - Br, halogen; halocarbon
 - C—O—C—, ether group; ether
 - I, halogen; halocarbon



6. Chloroethane would have a higher boiling point because of the increased strength of the interactions between halocarbon molecules compared to those between hydrocarbons.
7. CHCl₂CH₂CH₃, 1,1-dichloropropane
 CH₂ClCHClCH₃, 1,2-dichloropropane
 CH₂Cl₂CH₃, 2,2-dichloropropane
 CH₂ClCH₂CH₂Cl, 1,3-dichloropropane
8. $\text{CH}_3\text{CHBrCH}_3 + \text{KOH} \rightarrow \text{CH}_3\text{CHOHCH}_3 + \text{KBr}$

9. ROH
10. to introduce new functional groups to organic molecules and to convert alkenes to alkanes
11. ROR
12. RNH₂, R₂NH, R₃N
13. a. 2-butanol, sec-butyl alcohol
 b. propanamine, propylamine
 c. propoxybutane, butyl propyl ether

14. a.  b. 
- c.  d. 
15. **BIG IDEA** Students' paragraphs should mention that substitution reactions involve atom substitution, and addition reactions involve atom addition. Check students' example reactions.

16. A carbonyl group is a carbon atom double bonded to an oxygen atom. aldehyde: carbon of the carbonyl group is always joined to at least one hydrogen (RCHO); ketone: carbon is joined to two other carbons (RCOR)
17. RCOOH or RCO₂H
18. The loss of hydrogen (H₂) also results in the loss of two electrons.
19. RCOOR or RCO₂R
20. a. butanal
b. 2-butanone
c. no reaction
21. a. propanal b. 3-hexanone
c. pentanoic acid
22. a. CH₃CH₂CH₂CH₂COOH
b. CH₃CH₂CH₂CHO
c. CH₃COCH₂CH₂CH₃
23. **BIG IDEA** The fewer hydrogen atoms and the more oxygen atoms a compound has, the more oxidized it is.
24. They form when unsaturated monomers react and link to one another.
25. They form by the joining of monomers, usually with loss of water.
26. A polymer is a large molecule formed by the covalent bonding of repeating small molecules. Monomers are the smaller molecules, or the repeating unit of a polymer.
27. an unsaturated carbon-carbon bond
28. an amide bond; Nylon, Kevlar, and Nomex are polyamides.
29. Water is a product of most condensation polymerizations.
30. Students' analogies might include putting together a toddler's plastic pop beads, stringing a bead necklace, or making a paperclip or popcorn chain.
31. Answers will vary.