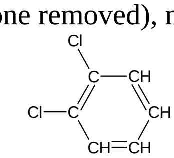
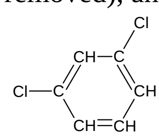
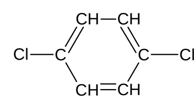
You should know the rules for naming hydrocarbons (see handout)

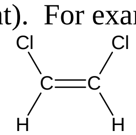
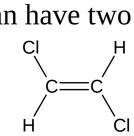
Hydrocarbons (24.2, class notes)

What are hydrocarbons?	Molecules that consist of only carbon and hydrogen.
What are the four classes of hydrocarbons?	Alkanes, alkenes, alkynes, aromatics (containing a benzene ring).
Distinguish between saturated and unsaturated hydrocarbons.	Saturated: hydrocarbons with only single bonds (alkanes & cyclo-alkanes). Unsaturated: hydrocarbons with double and triple bonds.
What is the major source of hydrocarbons?	Fossil fuels: coal, crude oil (petroleum), natural gas.
What uses do hydrocarbons have?	As fuels and as chemical raw materials.
What is the shape around carbon in a hydrocarbon?	Tetrahedral.
How is benzene special with respect to reactivity? Why is this?	Benzene is generally unreactive. For example, it will not undergo addition reactions. This is because benzene has two resonance structures. This resonance stabilizes benzene. Benzene will undergo substitution reactions more easily than addition reactions because a substitution reaction does not require the disruption of the delocalized pi electron network (pg. 1024-5).
What is special about the naming of benzene derivatives?	Common names for benzene derivatives employ the prefixes: ortho- (one removed), meta- (two removed), and para- (opposite).    1,2-dichlorobenzene (orthodichlorobenzene) 1,3-dichlorobenzene (metadichlorobenzene) 1,4-dichlorobenzene (paradichlorobenzene)

8.5, 24.3

What two bond types exist in hydrocarbons? Which are present in single and double bonds?	Sigma (σ) and pi (π) bonds. A sigma bond is present in all carbon-carbon bonds. Additional bonds will be pi bonds. Thus, a triple bond will have one sigma bond and two pi bonds.
What is the shape of a pi bond?	A pi bond is the hybrid orbital that results from the overlap of two p-orbitals (figure 8.14). A single pi bond appears as two oblong shapes – one above and one below the bond axis.
What are two important features associated with pi-bonds?	1) They prevent the free rotation of carbons around the bond axis. 2) they are weaker than sigma bonds and thus, they are easily broken during chemical reactions.

Isomers (24.2, class notes)

What are isomers?	Isomers are two or more molecules that have the same chemical formula but different structures.
What kinds of isomers exist? Describe each.	Structural and geometric. Structural isomers can be formed by a rearrangement of atoms. For example, CH_3–O–CH_3 and CH_3CH_2–OH are structural isomers. Geometric isomers may exist when carbons that are not free to rotate (such as a when a double bond or cyclic structure is present). For example, ClCH=CHCl can have two structures:   **cis**-1,2-dichloroethene **trans**-1,2-dichloroethene Notice "cis" means "same side" and "trans" means "opposite side". Also note that if each carbon were bonded to two chlorines there would be only one possible compound (i.e. no isomers).
How does the length of the carbon chain effect the boiling/melting point of a molecule?	Longer the carbon chains have a greater number of sites for attraction between molecules (due to London forces), and thus higher boiling and melting points.