

### Section 14.1

4. If given 2 molecules and asked to draw a skeletal structure, are isomers and the relationship of isomers?

1. Check the number and they have the same molecular formula.

- If they don't they aren't isomers

- If they do,  $\rightarrow$  proceed to 2)

2. Are the molecules both  $C_3H_8$ ?

- If yes, they are non-polarizable isomers  $\rightarrow$  proceed to 3)

- If no, ask both a different number of C's and/or a different number of H's

- If yes, they are the same molecule  $\rightarrow$  proceed to 4)

- If no, ask the groups and compare to different isomers (isomers of the 3 carbons:  $\rightarrow$  (CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>, CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>)

3. Are the molecules both an asymmetric carbon?

- If yes, they are enantiomers  $\rightarrow$  proceed to 4)

- If no, ask the groups and compare to different isomers (isomers of the 3  $\rightarrow$  (CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>, CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>)

4. Are all of the atoms connected in the same pattern? (The straight and zig-zag chains are attached to each C?)

- If yes, the molecules are the same molecule  $\rightarrow$  proceed to 5)

- If no  $\rightarrow$  (CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>, CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>)

5. If two molecules, one is a molecule and the other is a molecule, they are identical molecules.

5. If given a molecule and asked to draw a skeletal structure:

1. Draw the C-C bond to the molecule. Identify the 3 different groups for each carbon of the C-C.

2. Number the carbons, for the straight chain or (CH<sub>2</sub>) at the carbon number (1-4).

3. To label each carbon, look to see if the C is part of a group (straight chain) or if they are on the same side or opposite sides. If they are on the same side it's cis, if they are on opposite sides it's trans. The straight chain is the 1st side of the C-C, and then to the right side of the C-C. (See 14.1.1)

6. If given a molecule and asked to draw an enantiomer:

1. Draw a mirror image of the molecule. Everything that is on the right side of the original molecule will be on the left side of the enantiomer. Everything on the left side of the original molecule will be on the right side of the enantiomer.

6. If given a molecule and asked to draw a structural isomer:

There are two ways to do this. 1. Draw the molecule in a zig-zag chain (straight chain) or in a zig-zag chain. 2. Draw the molecule in a zig-zag chain and then ask yourself, are the atoms connected in the same pattern? (See 14.1.1). Drawing the molecule but using the 3 carbons, the two molecules should be a structural isomer.