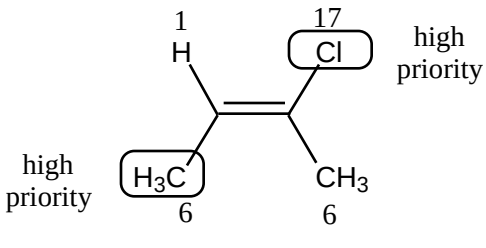
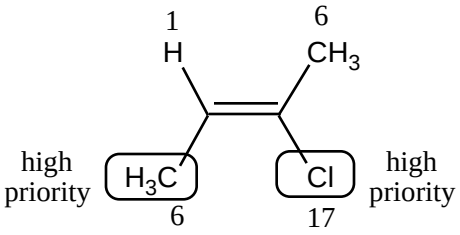
Assigning Group Priorities- The Cahn, Ingold, Prelog rules:

1. Look at the atoms directly attached to each carbon of the double bond. Rank them according to decreasing <u>atomic</u> <u>number.</u>

   priority of common atoms: I > Br > Cl > S > F > O > N > C > H



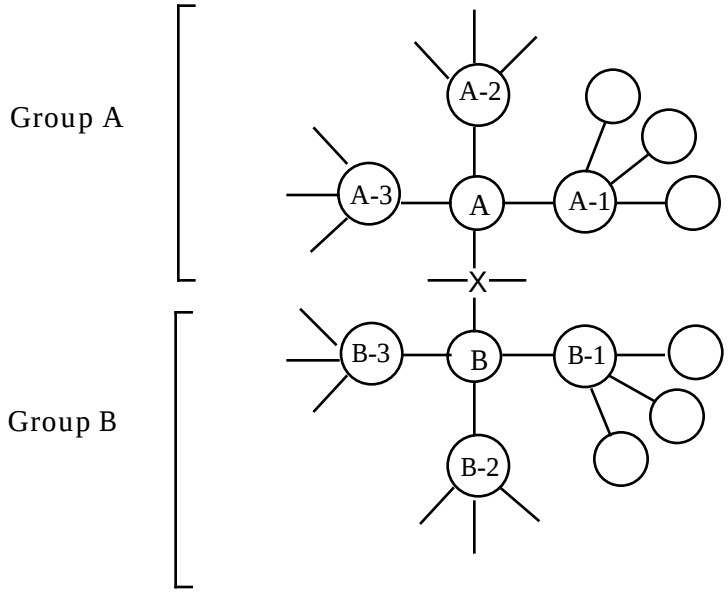
(E)-2-chloro-2-butene



(Z)-2-chloro-2-butene

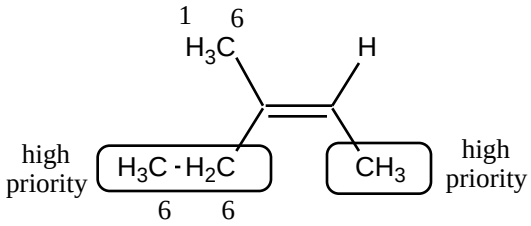
   If both high priority atoms are on the same side of the double bond it is designated **Z** (zusammen= together). If the high priority atoms are on opposite sides of the double bond, it is designated as **E** (entgegen= across).

2. a. If the two atoms attached to the double bond carbon are identical (designated A and B below), look at all the atoms directly attached to the identical atoms in questions (designated A-1, A-2, A-3 and B-1, B-2, B-3). Assign priorities to all these atoms based on atomic number (1 is the highest priority, 3 the lowest).



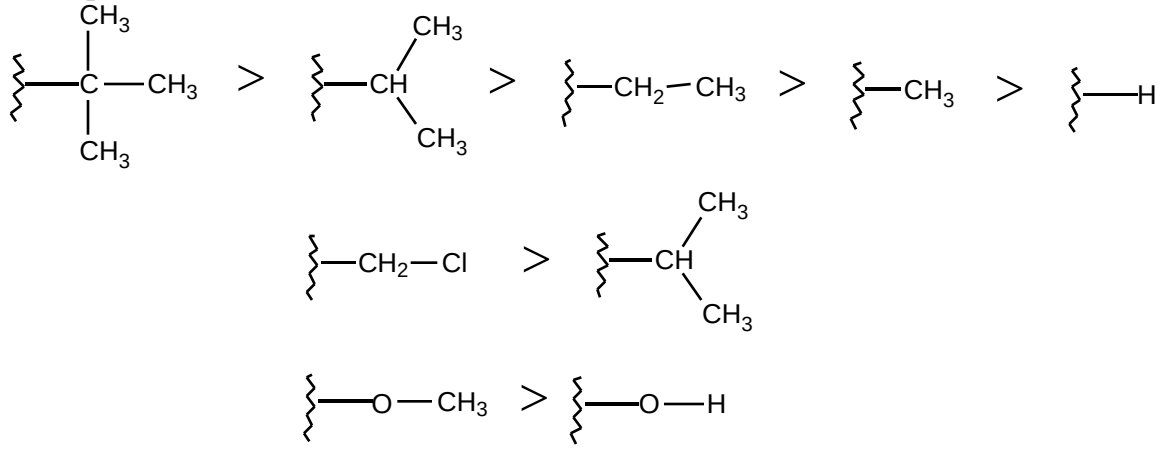
   b. Compare the highest priority atoms, i.e. compare A-1 with B-1. If A-1 is a higher priority atoms than B-1, then A is higher priority than B. If A-1 and B-1 are the same atom, then compare the second highest priority atoms directly bonded to A and B (A-2 with B-2); if A-2 is a higher priority atom than B-2, then A is higher priority than B. If A-2 and B-2 are identical atoms, compare A-3 with B-3.

c. If a difference still can not be found, move out to the next highest priority group (A-1 and B-1 in the diagram) and repeat the process.



(Z)-3-methyl-2-pentene

examples:



3. Multiple bonds are considered equivalent to the same number of single bonded atoms.