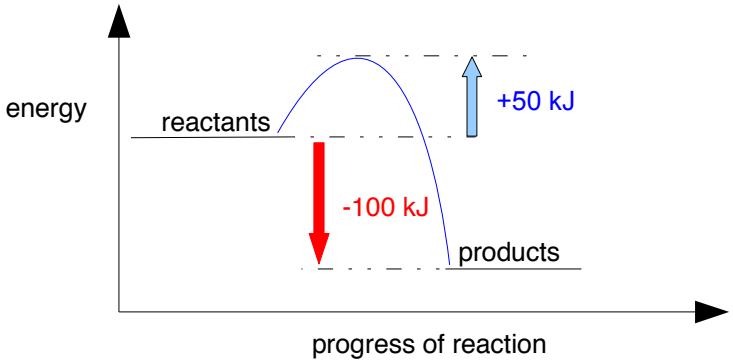
RATES OF REACTION - COLLISION THEORY

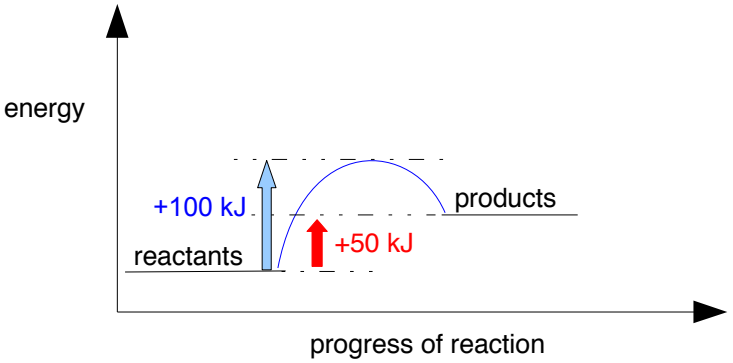
1. The hydrogen end of the H-Cl bond will be slightly positive and the chlorine end slightly negative. If the chlorine approaches the carbon-carbon double bond first, it will simply be repelled by the electrons in the C=C bond and will bounce away. If the hydrogen end of the H-Cl bond approaches the C=C bond, it will be attracted by the electrons in that bond, and can interact with them causing a reaction. This is the only collision orientation which allows a reaction to take place.

2. a) Activation energy is the minimum amount of energy that is needed in order for a reaction to occur.

b)

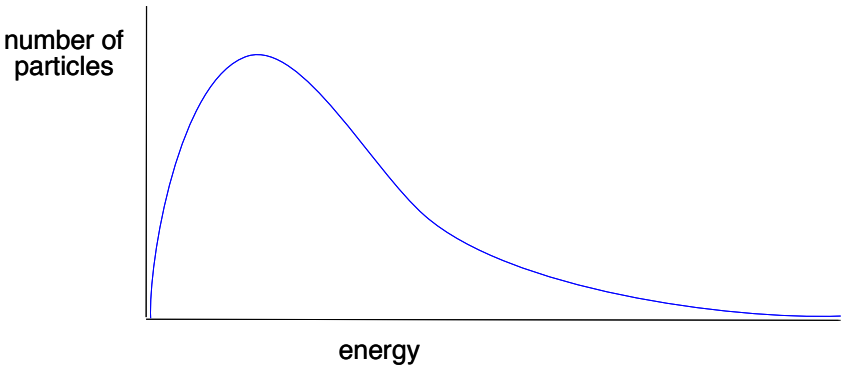


c)



d) Reactions involve breaking some bonds and making new ones. Activation energy is involved in breaking the original bonds.

3. a)



(Your curve should start steep and gradually get less steep until it hits the peak. It should approach the energy axis at the right-hand side, but not actually meet it. You may find versions of this curve which start differently - shallow to start with, and then getting steeper before looking the same as the curve above. That is what you get if you plot number of particles against their speed rather than their energy, although several sources mislabel it as if it was energy.)

b)