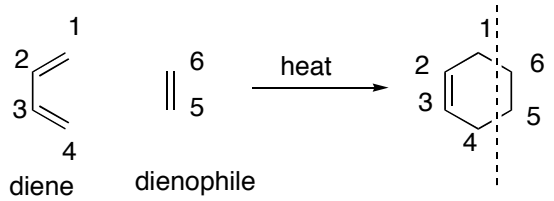
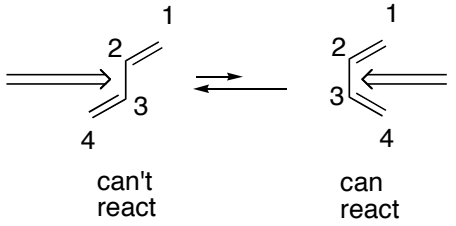
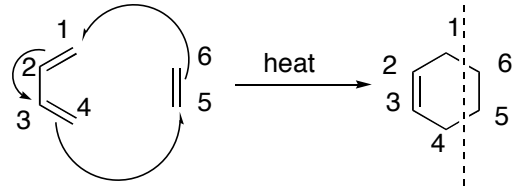
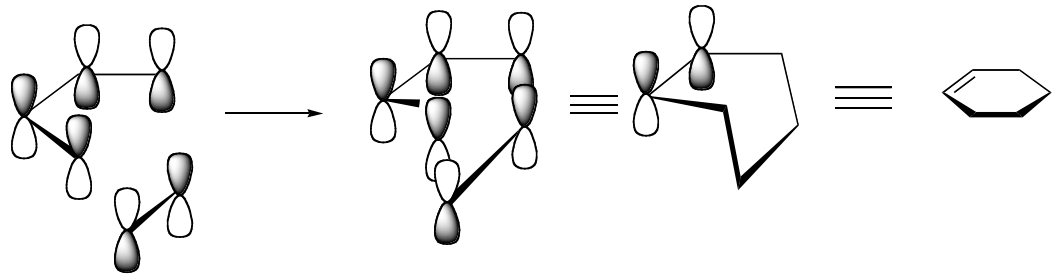
Section 15.11 The Diels-Alder Reaction. The Reaction of Conjugated Dienes (Dienes) with Electron-Poor Alkenes (Dienophiles) to make Cyclohexenes.

Quick Overview Summary

1.	
2.	s-cis diene conformational requirement: The diene must be locked or be able to single-bond rotate it's way into the "s-cis" conformation in order to react "transoid" or "s-trans" -relative to the **s**ingle bond  "cisoid" or "s-cis" -meaning that it's "cis" relative to the **s**ingle bond -even though the single bond is capable of rotation
3.	Rate Factors 1. Dienophile ▪ activated by electron withdrawing groups ("W" or "EWG") for electronic reasons 2. Diene: ▪ Deactivated by substituents that make it harder or less stable to exist in the s-cis conformation. This is true when a diene alkene has a Z-substituent. ▪ Steric factors equal, activated somewhat by electron donating groups ("D" or "EDG")
4.	Concerted Mechanism  All bond making and breaking happens at once: *3 π-bonds break *2 σ-bonds and 1π-bond form The diene is really the "nucleophile" (HOMO) The dienophile is really the "electrophile" (LUMO)
5.	Orbital Picture 
6.	Product Prediction Highlights ▪ Try to match up the 4 diene and 2 dienophile carbons with the product o The product double bond will be between C2 and C3 of the diene ▪ Substituents are spectators ▪ 1,4/1,2 Rule: when asymmetric dienes react with asymmetric dienophiles o Match δ- end of nucleophilic diene with δ+ end of electrophilic dienophile ▪ For disubstituted dienophiles: o cis-substituents end up cis, and trans-substituents end up trans