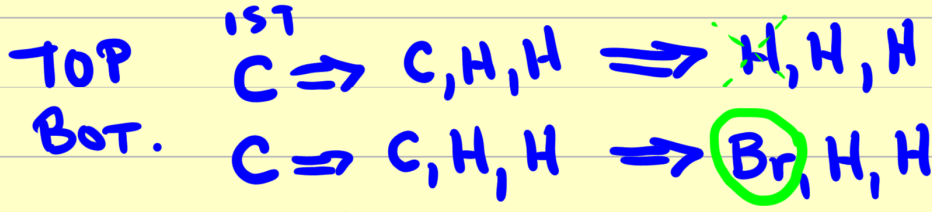
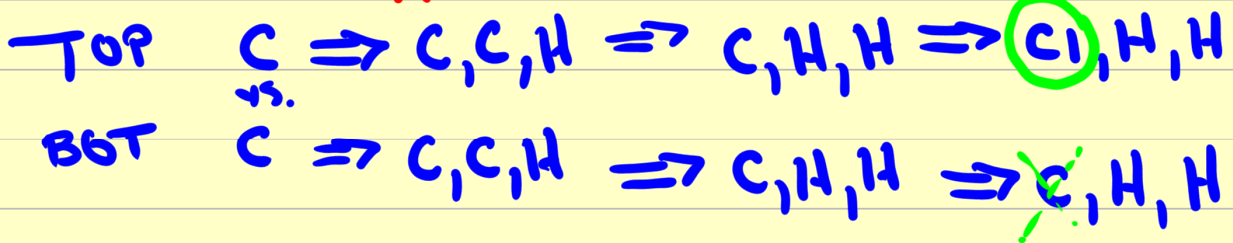


LEFT HALF



RIGHT HALF



∴ THIS IS (E)-

ALICYCLIC COMPOUNDS.

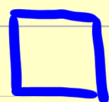
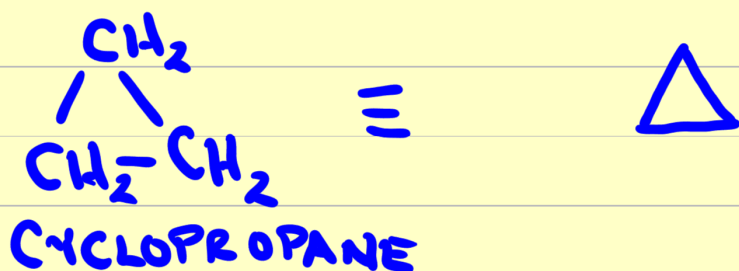
- MANY EXAMPLES OF HYDROCARBONS WHICH ARE CYCLIC

- sp^3 , sp^2 VERY COMMON

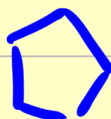
- sp NOT SO MUCH. - 180° ANGLE
IS TOUGH IN SMALL RINGS.

impossible for triple bonds to exist (and be stable) for anything smaller than a cyclooctyne

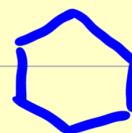
CONSIDER SMALLEST ONE:



CYCLOBUTANE



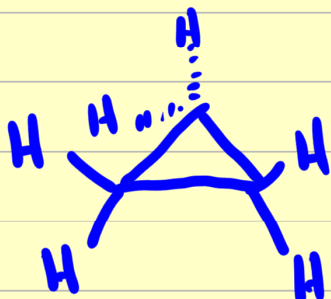
CYCLOPENTANE



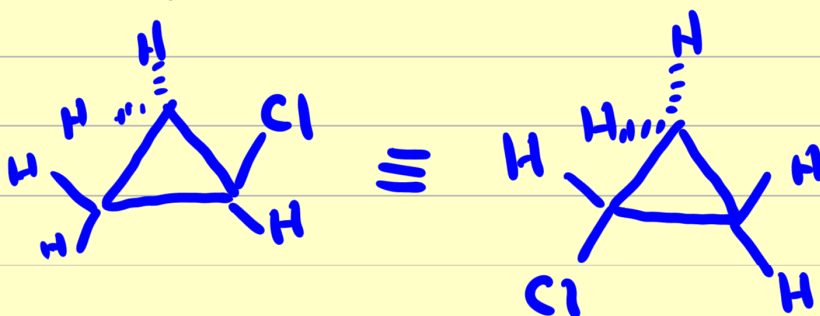
CYCLO-
HEXANE

CYCLOPROPANE - KNOWN BUT
STRAINED - SINCE sp^3 C'S ARE
FORCED TO HAVE C-C-C ANGLES
OF 60°

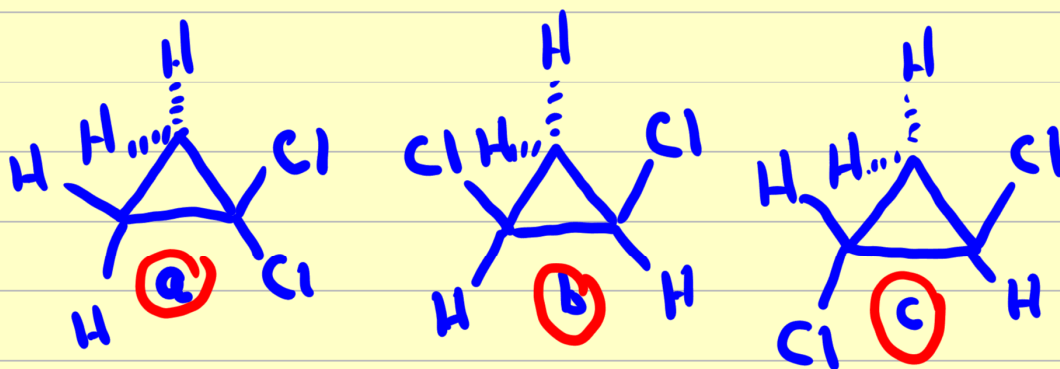
- ALL C ATOMS ARE IN A PLANE



- IF ONE SUBSTITUENT,
JUST ONE CPD.



- BUT IF 2-CHLORO GROUPS,
3- POSSIBILITIES



(a) IS A STRUCTURAL ISOMER OF THE
OTHER TWO (POSITIONAL)

(b), (c) ARE STEREOISOMERS OF EACH
OTHER

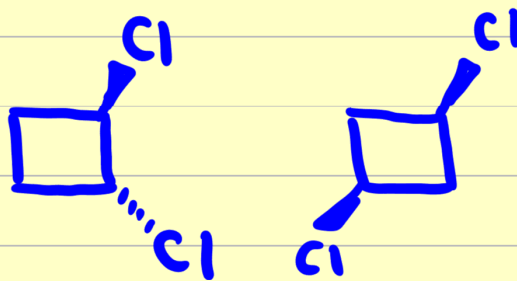
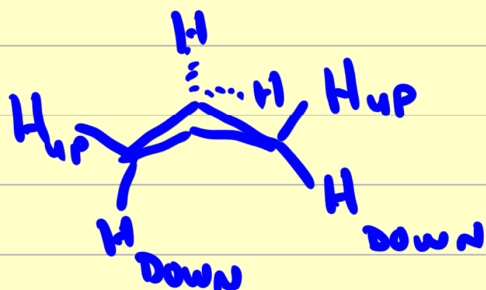
NAMING - THE OLD CIS- AND TRANS-
NAMES ARE USUALLY USED
FOR THESE

b- TWO Cl'S ARE BOTH ABOVE THE
PLANE OF THE RING \therefore CIS-

c- ONE Cl ABOVE, ONE Cl BELOW
PLANE \therefore TRANS-

CYCLOBUTANE, CYCLOPENTANE

- NOT QUITE PLANAR, BUT CONFORMA-
TION CHANGES ARE ESOTERIC



STRAINED ~~but~~ LESS SO.

C-C-C angles about 88° , so not as bad as cyclopropane

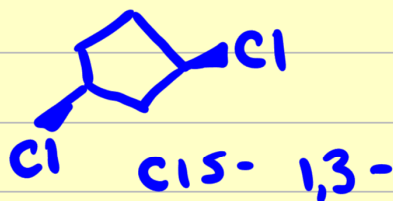


ALMOST UNSTRAINED.

C-C-C bond angles at ca. 104° , only 5.5° off perfection



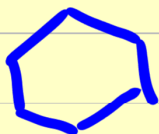
trans-1,2.



cis-1,3-

CYCLOHEXANES

- CONFORMATION WELL UNDERSTOOD, RELIABLE



- IF FLAT, 120° BOND ANGLES FOR sp^3 CARBONS.

- MOLECULE CAN DO BETTER

AT CLOSE TO 109.5° ($\sim 111^\circ$ FOR REAL)

- TWO LIMITING POSSIBILITIES

so no angle strain to speak of in simple cyclohexanes



CHAIR



BOAT