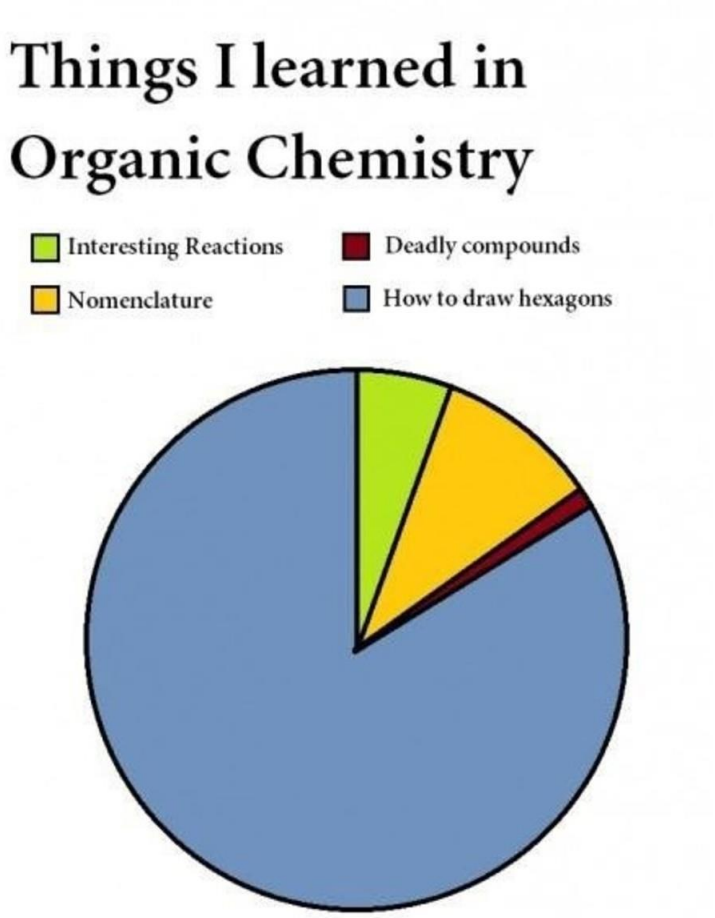
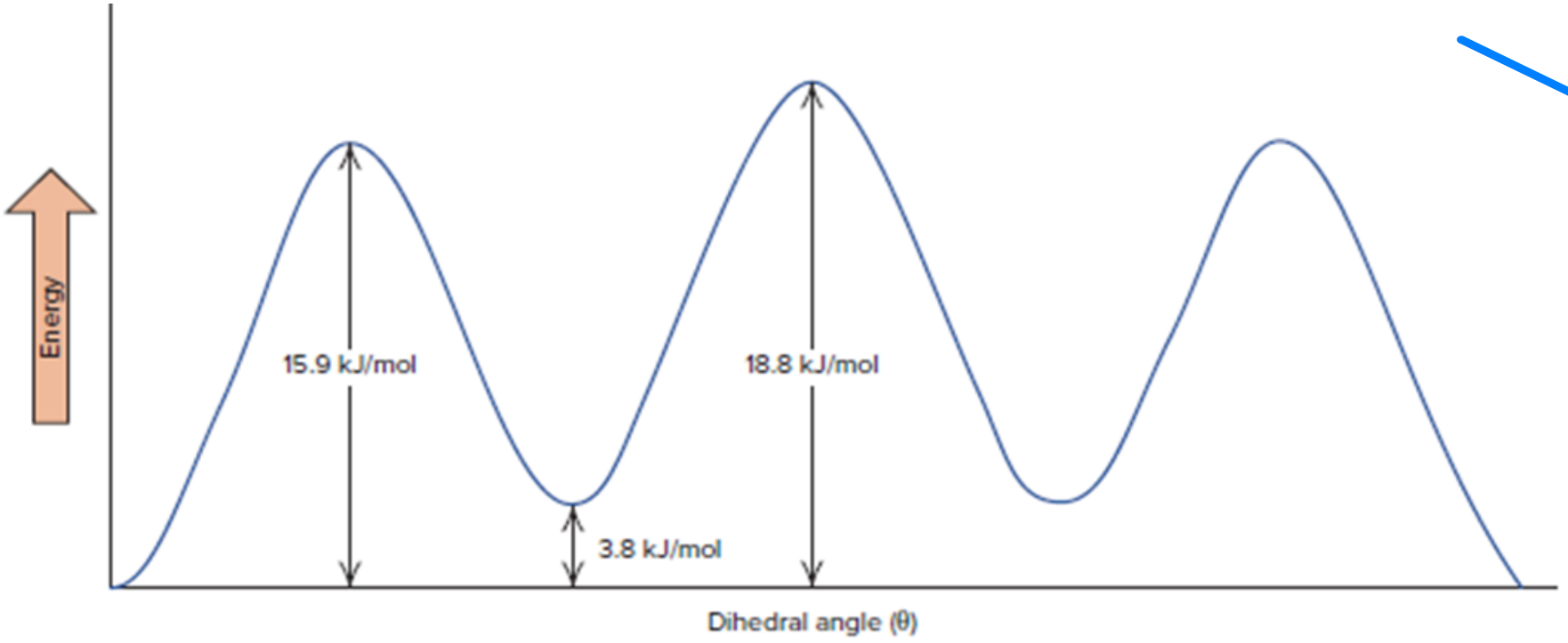
Nov 11-15 Practice Problems

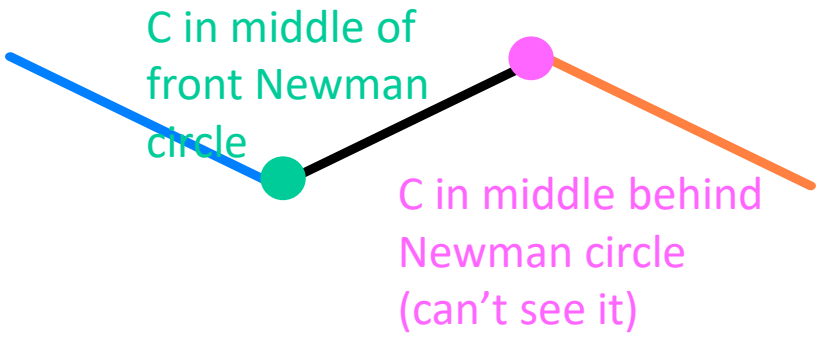


Due dates:

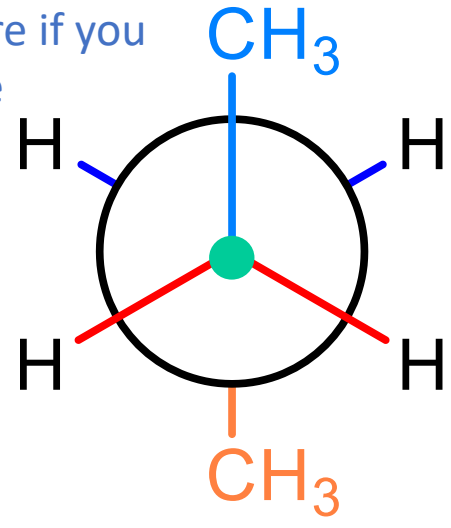
- Quiz 7 due Friday (on last week's content)
- Graded Review 7 end of this week as usual
- Office hours **Tuesday 5:30pm to 6:30pm in 104 Pulp and Paper Building**

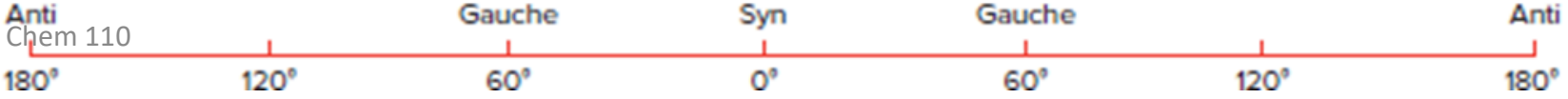
Q1: Fill in all the associated Newman projections for butane. Ensure the correct projection matches with the associated potential energy. Draw the most stable conformation as a sawhorse diagram.





Can use CH3 or just sticks here if you like





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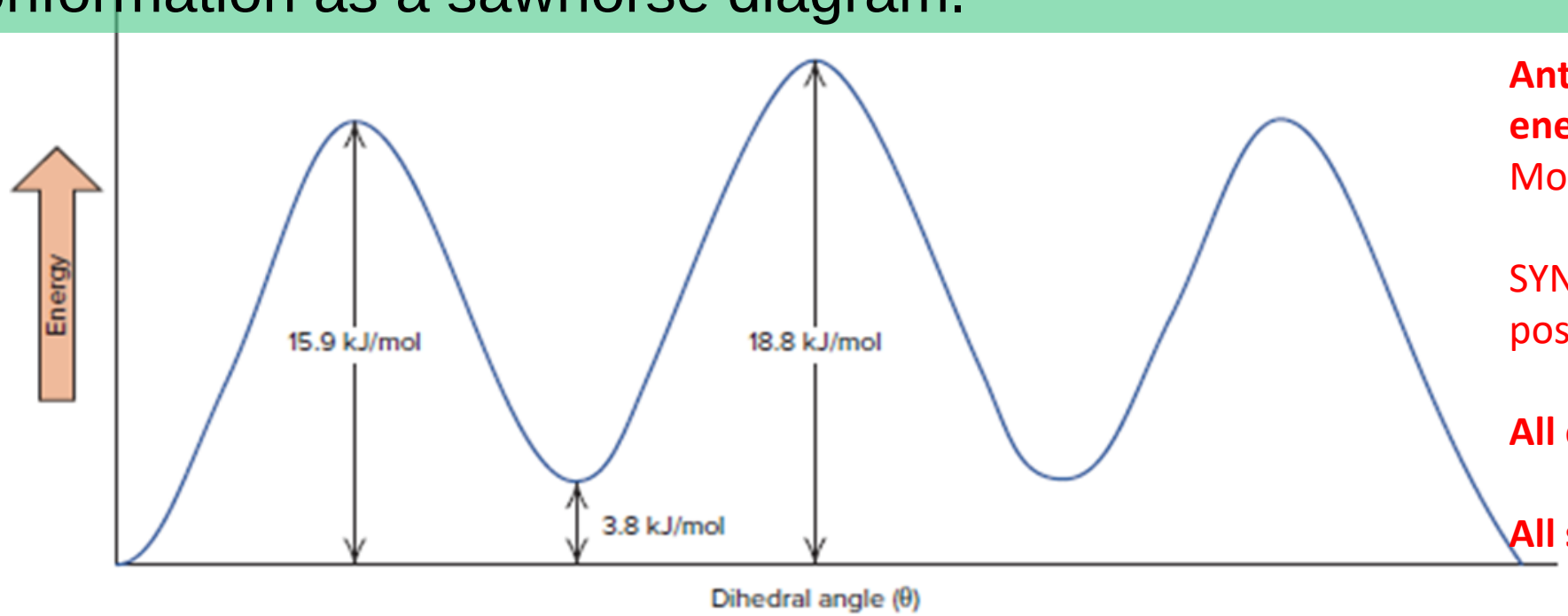
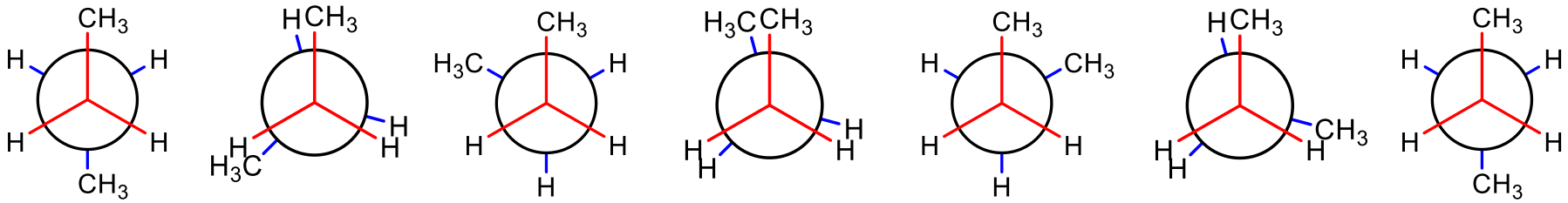


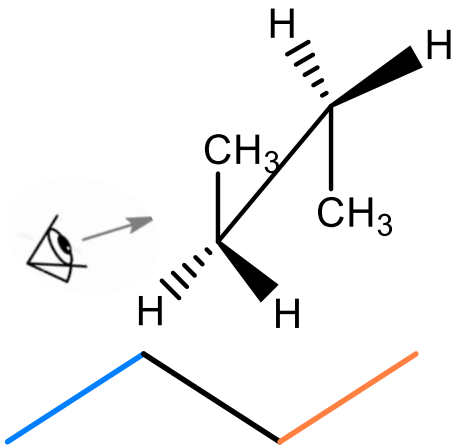
Anti: Most stable state with lowest energy. Bulky group in anti position. Most stable!

SYN: Most bulky group in SYN position. **Highest energy.**

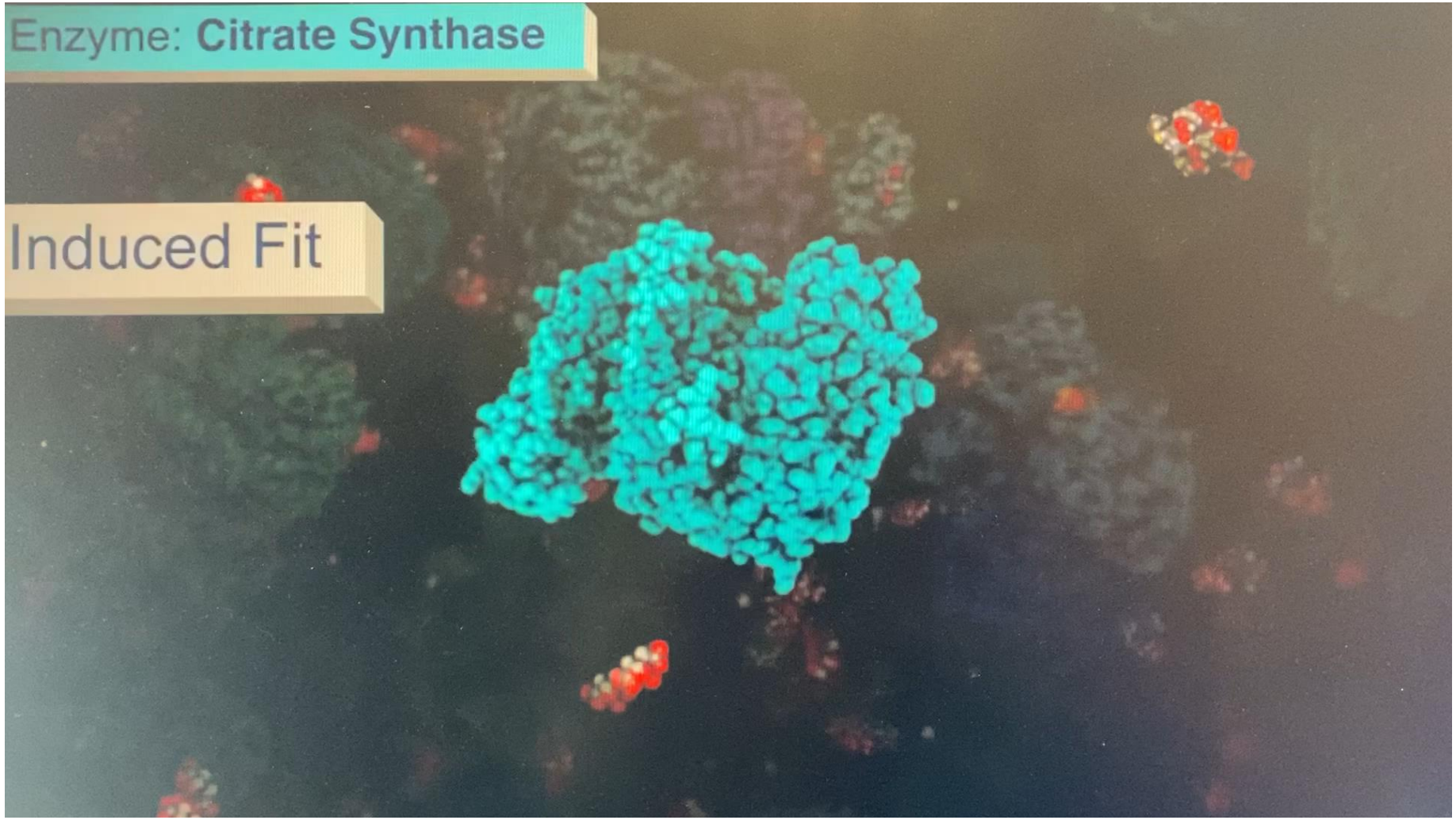
All eclipsed are high energy

All staggered are low energy

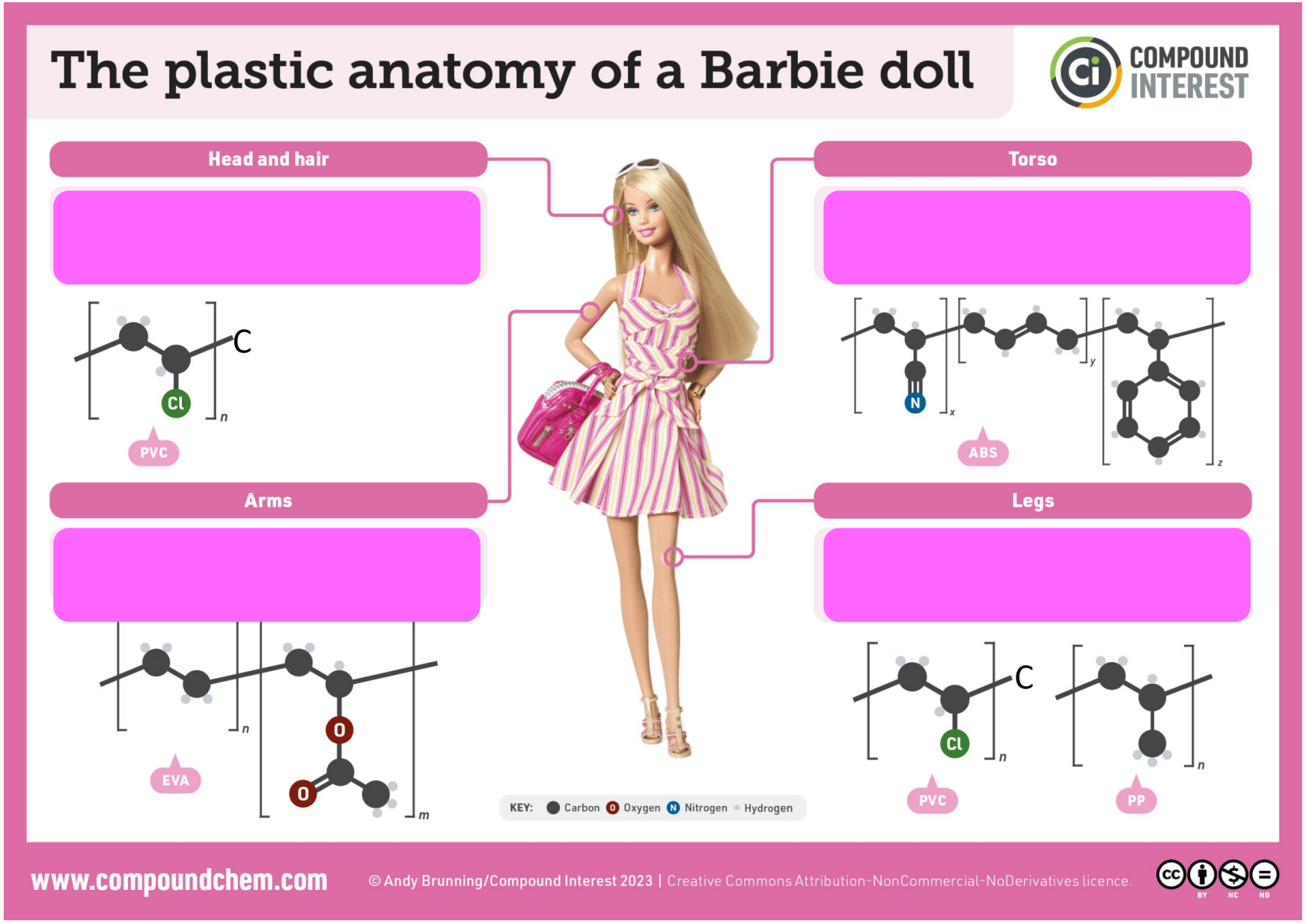




Structure/conformation impacts function on larger scale.



Q2: Circle and name the functional groups in these molecules. Specify primary, unsubstituted, etc. Note all the grey circles are carbon.



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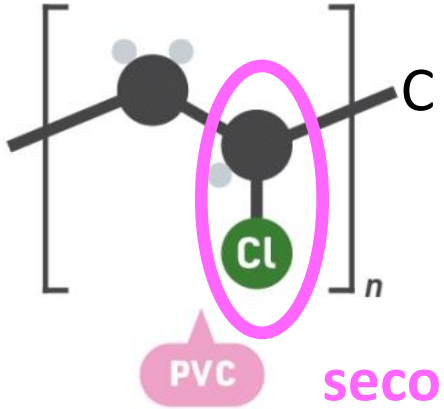
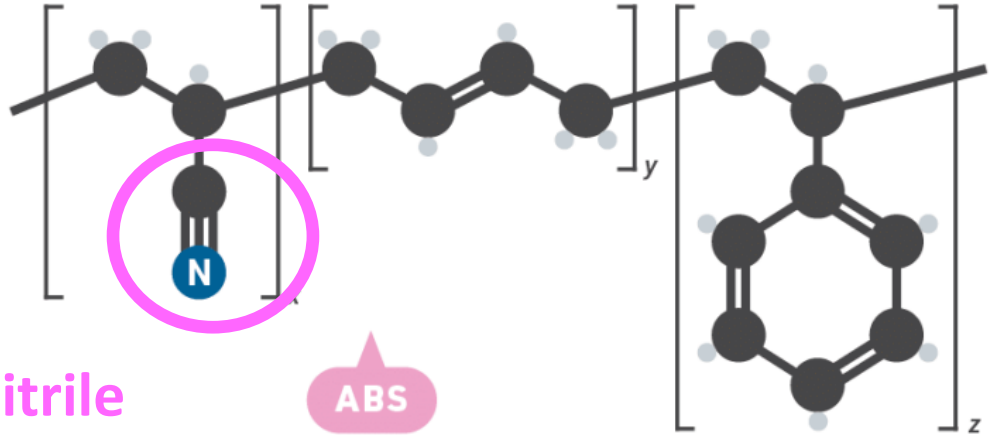
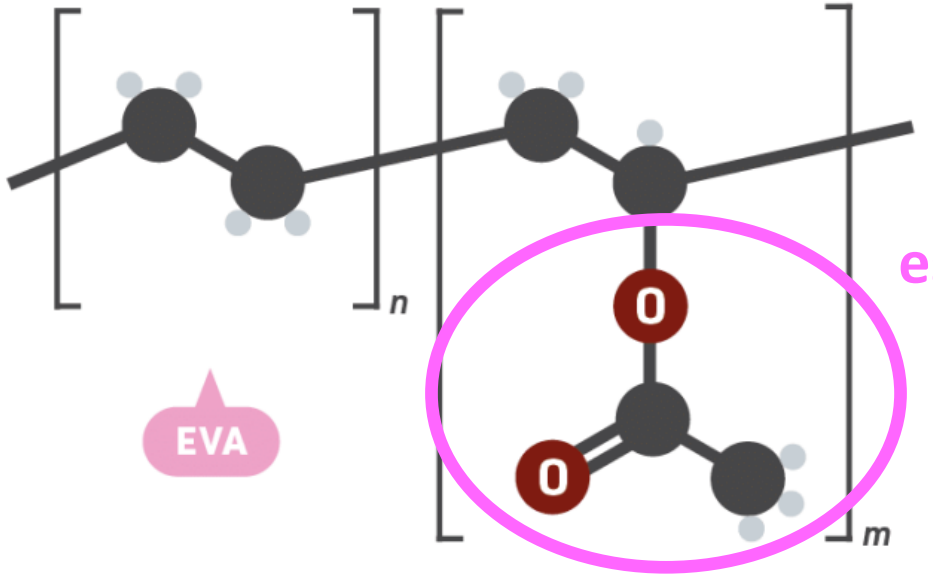


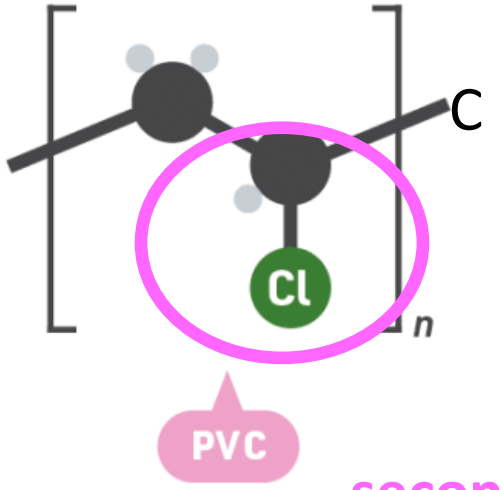
secondary halide

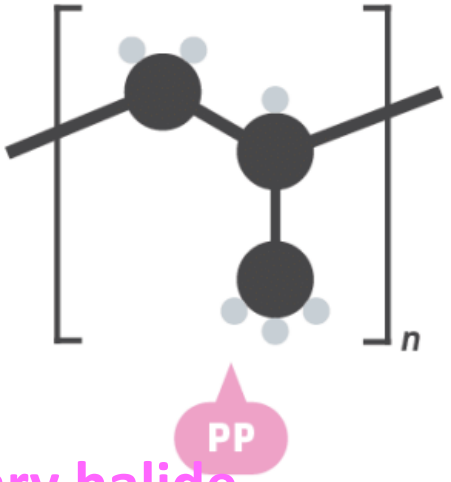


nitrile



ester





secondary halide

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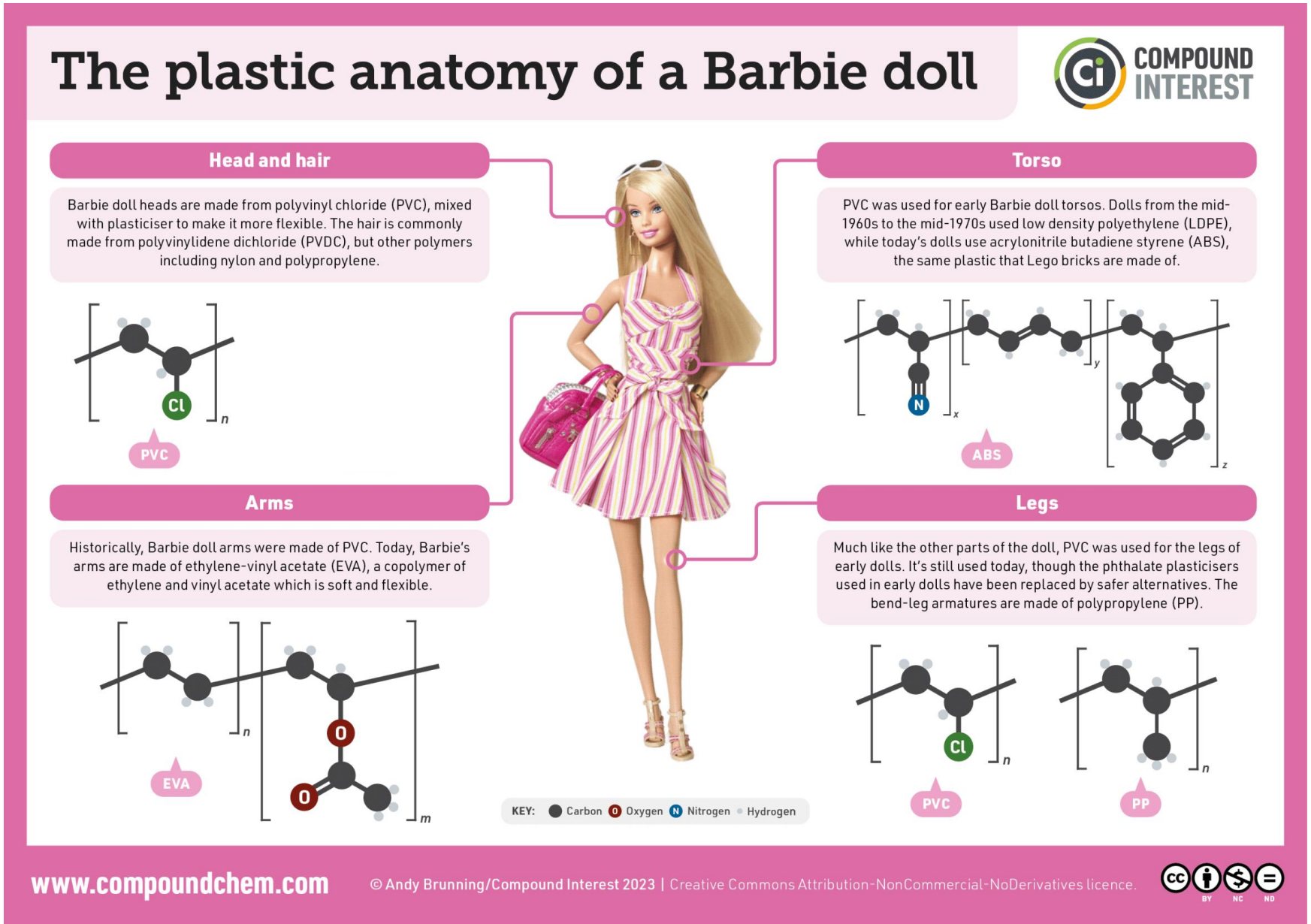
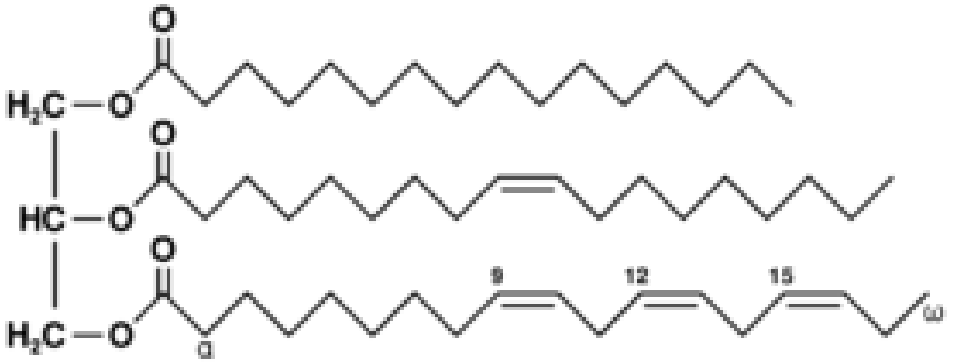
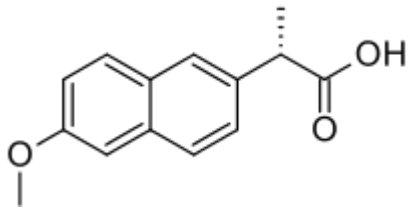


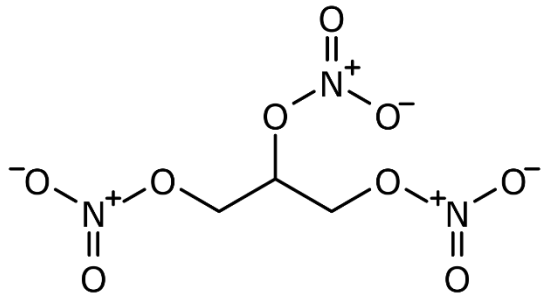
Q3: Circle and name the functional groups in these molecules. Specify primary, unsubstituted, etc.



triglyceride



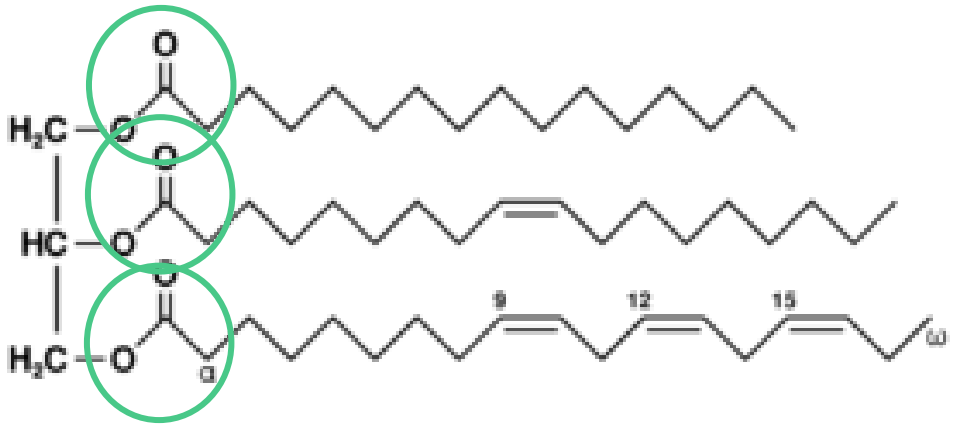
Naproxen (Brand name Aleve)



nitroglycerin

Q3: Circle and name the functional groups in these molecules. Specify primary, unsubstituted, etc.

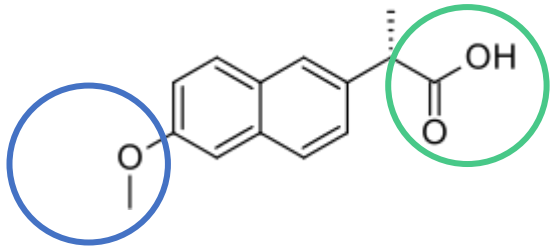
esters



triglyceride

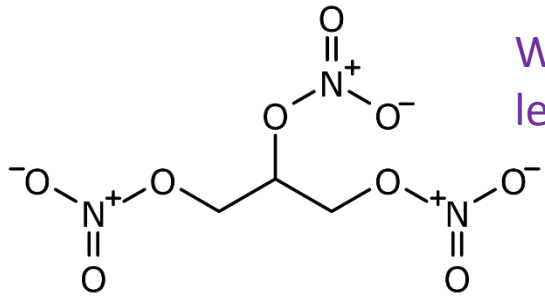
asymmetric ether

carboxylic acid



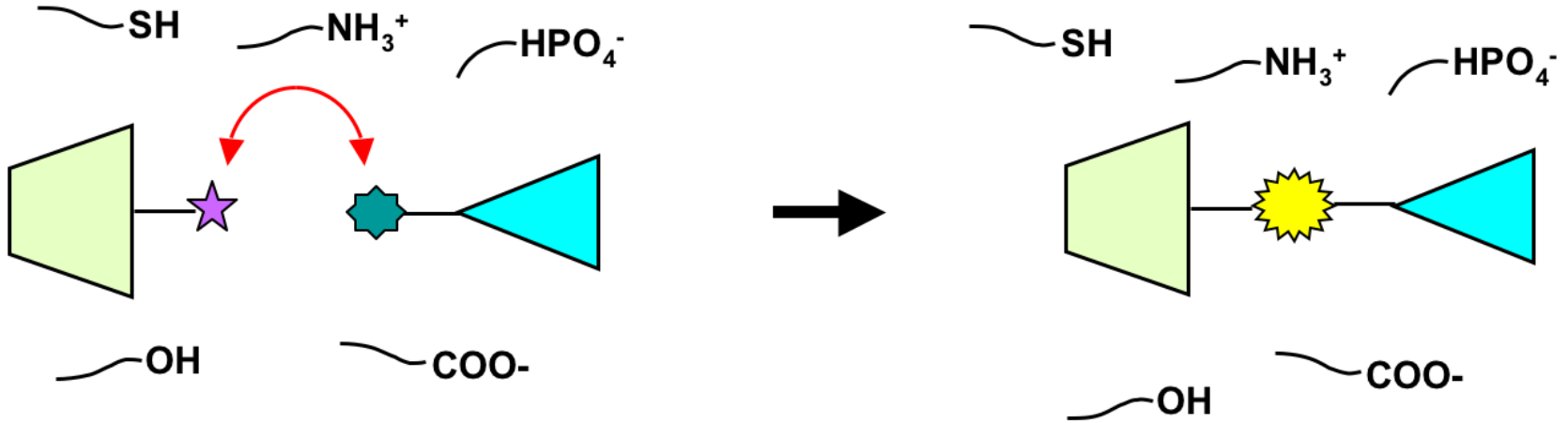
Naproxen (Brand name Aleve)

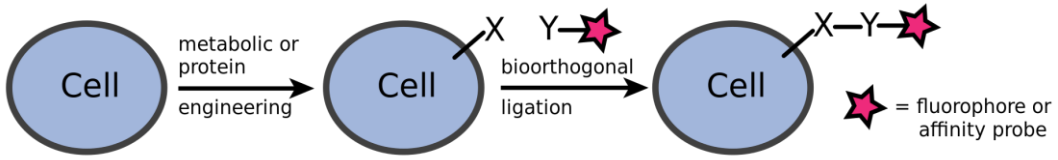
We haven't learned these!

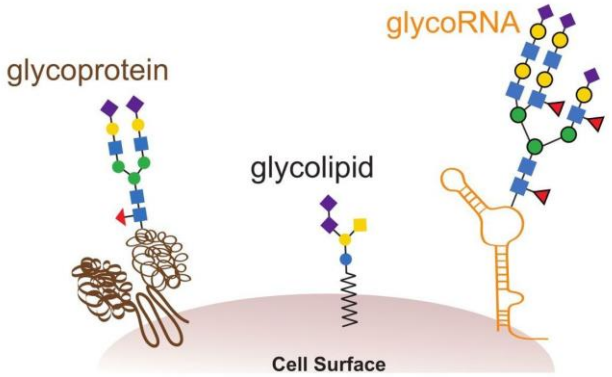


nitroglycerin

Prof. Carolyn Bertozzi: Coined the term “bioorthogonal chemistry”







She is scientifically brilliant and soo cool

- Frequently voted (on twitter) for Nobel Prize and NOW is!!!!
- 2SLGBTQIA+
- Baker Family Director of Stanford ChEM-H
- Anne T. and Robert M. Bass Professor in the School of Humanities & Sciences
- Professor (by courtesy): Chemical and Systems Biology and of Radiology

Stanford was smart and “stole” her on time ☺

COMPANY	YEAR FOUNDED	FOCUS	BACKGROUND
Redwood Bioscience	2008	Antibody-drug conjugates	Sold in 2014 to Catalent Pharma Solutions
Enable Biosciences	2014	Rapid diagnostics	National Institutes of Health–funded biotech developing at-home diagnostics for diabetes and other diseases
Palleon Pharmaceuticals	2015	Immuno-oncology	Raised nearly $48 million to develop glycoimmune checkpoint inhibitors
InterVenn Biosciences	2017	Glycoproteomic analysis	Raised $9.4 million to use artificial intelligence for mass spectrometry for glycoproteomic analysis
Grace Science	2018	Rare-disease therapeutics	Drug development spin-off of a nonprofit devoted to researching NGLY1 deficiency
OliLux Biosciences	2019	Tuberculosis diagnostics	Developing trehalose-based rapid tuberculosis detection
Lycia Therapeutics	2019	Extracellular protein degradation	Backed by Versant Ventures to develop LYTACs technology

Editor-In-Chief (EIC)

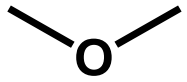
ACS central science

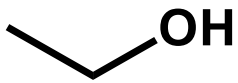
Cal

BROAD INSTITUTE

Q4: Fill in the following for the pair of molecules. What kind of isomers are they?

Skeleton:





Molecular formula:

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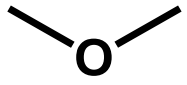
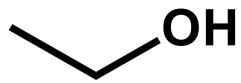




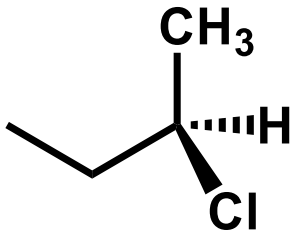
Molecular formula: C_2H_6O C_2H_6O

Functional isomers!

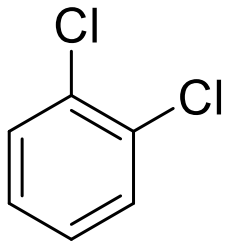
Q5: Draw a corresponding isomer (as indicated) for each molecule below.

Skeletal:

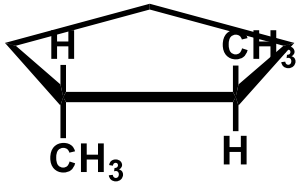
Enantiomer:



Positional:

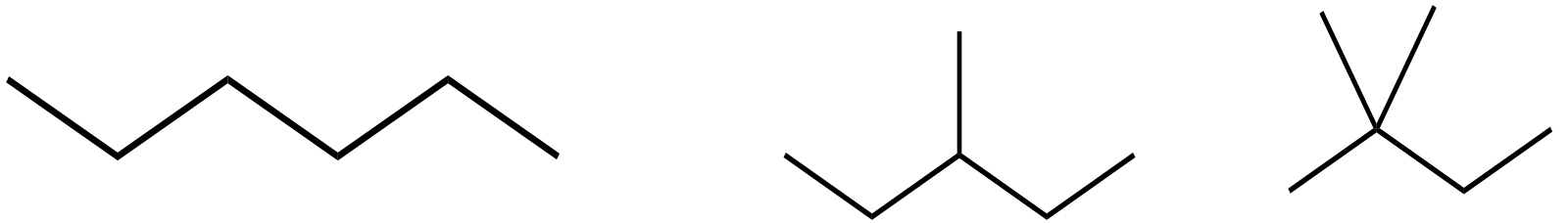


Geometric:



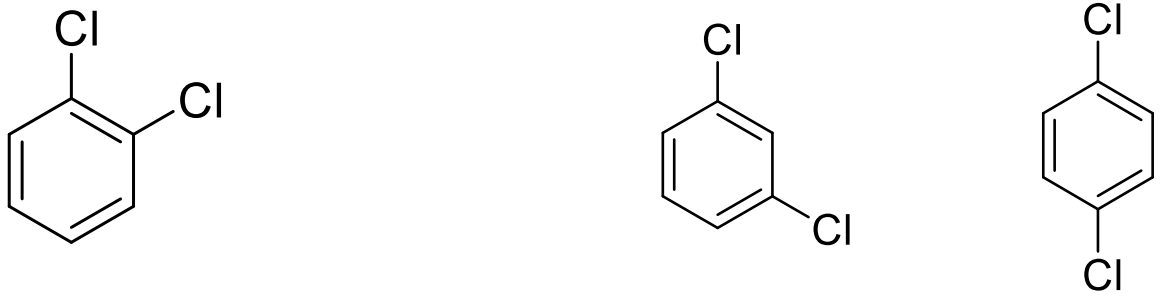
Q5: Draw a corresponding isomer (as indicated) for each molecule below.

Skeletal:

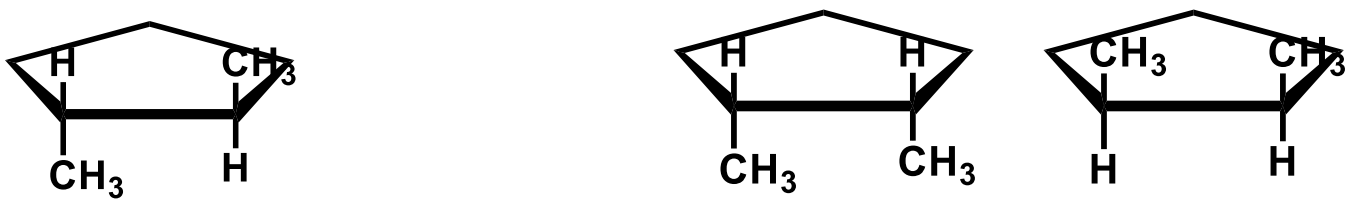


Enantiomer:

Positional:



Geometric:



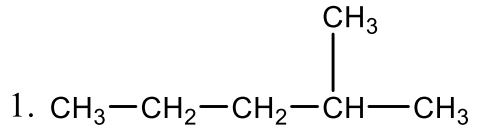
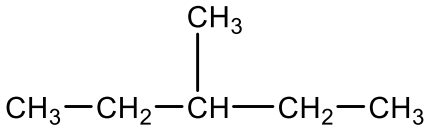
slido

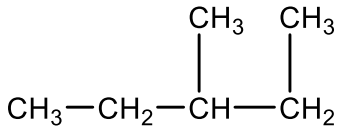
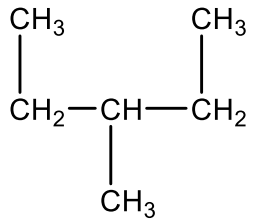
Which of the following pairs are structural isomers?

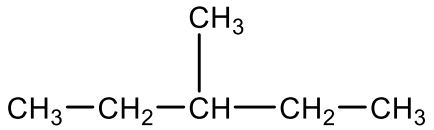
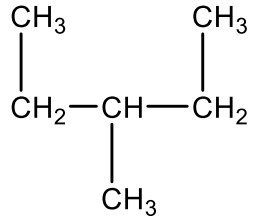
ⓘ Start presenting to display the poll results on this slide.

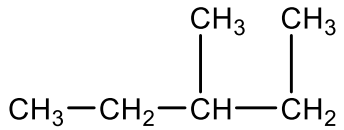
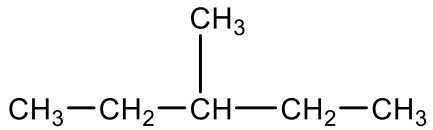
Which of the following pairs are structural isomers?

A. 1
B. 2
C. 3
D. 4
E. All

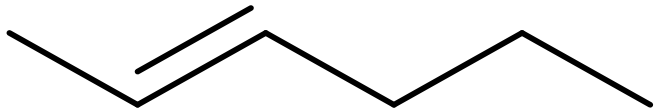
1. 


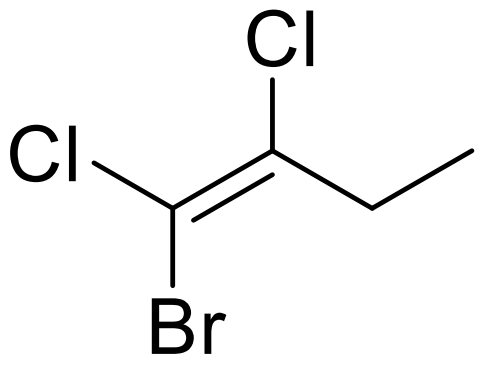
2 


3 


4 


Q6: Name the following molecules using cis/trans or E/Z.





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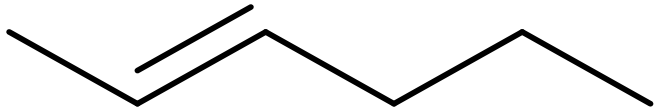
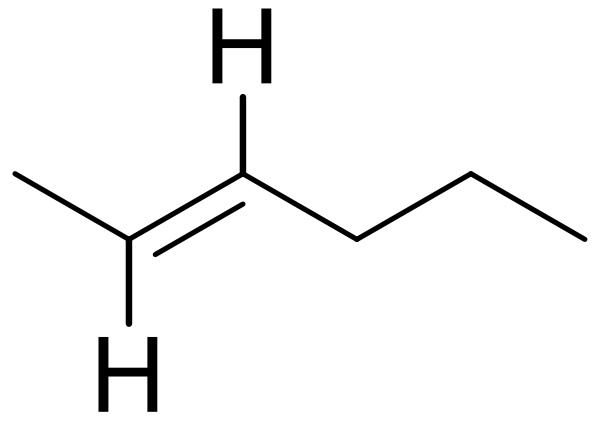
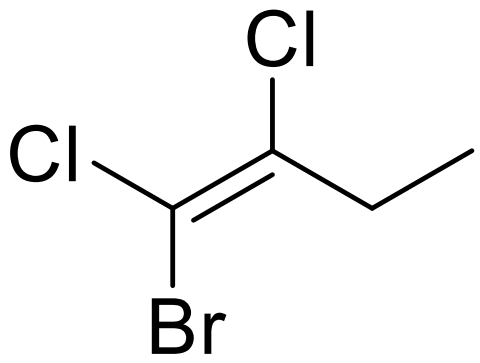


trans- hex-2-ene

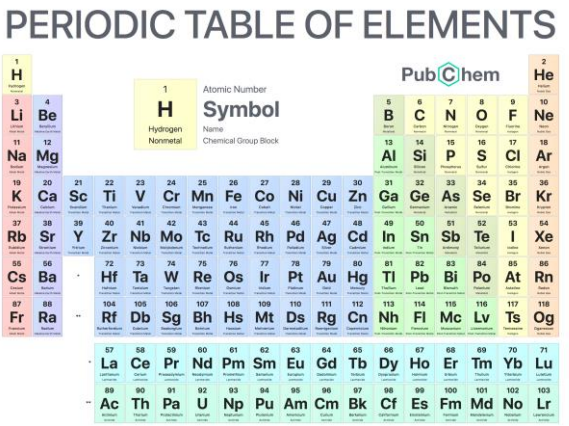
(*E*)-hex-2-ene





(*E*)-1-bromo-1,2-dichloro-but-1-ene

trans/cis not possible here because the double bond is at the end of the carbon chain



Q7: Decide whether the bromoalkanes (a) $CH_3CH_2CH(Br)CH_3$ and (b) $CH_3CH(Br)CH_3$ are chiral.

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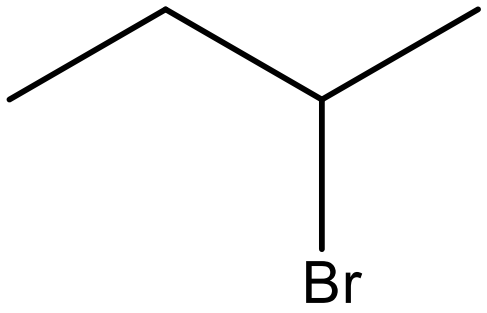
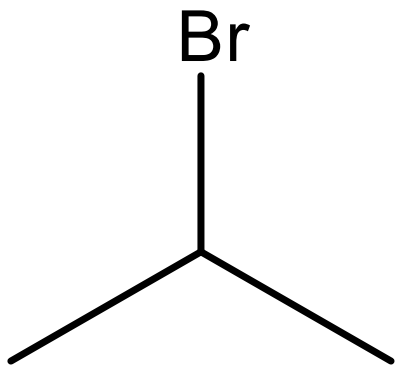
$CH_3CH_2CHBrCH_3$



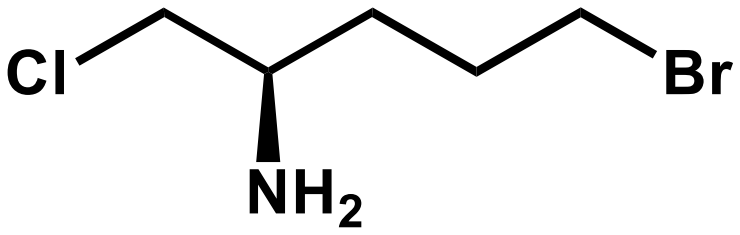
4 different groups, so chiral!

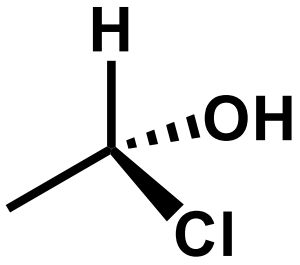
$CH_3CHBrCH_3$

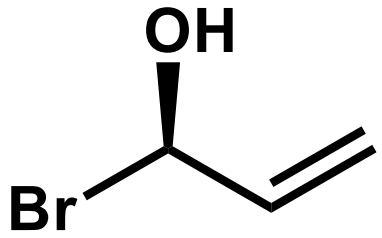


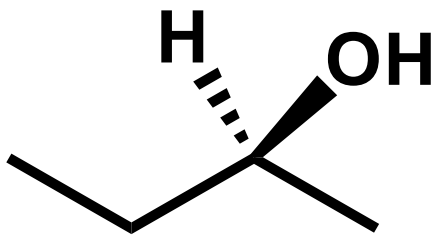
Two methyl groups, so only 3 different groups, this is “achiral” (not chiral)

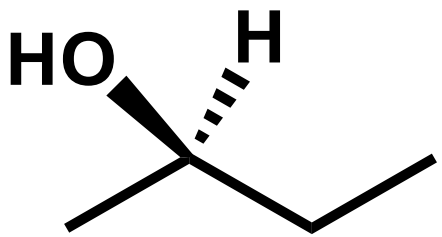
Q8: Indicate if the following molecules are R or S. Show your work!

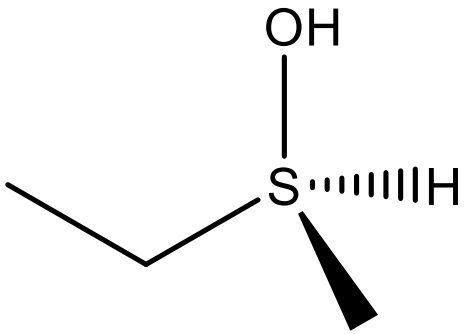


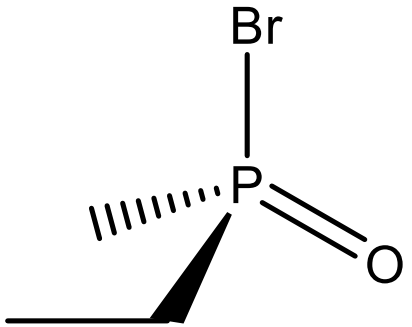




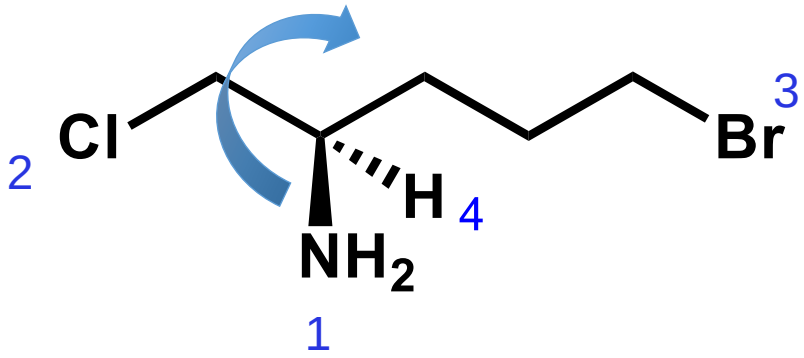




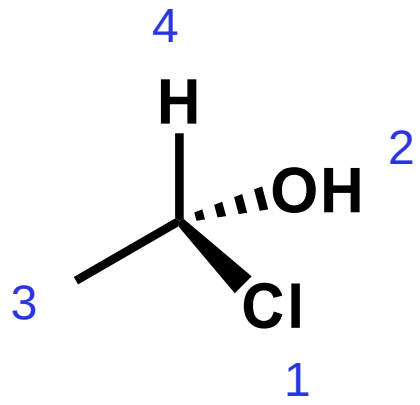


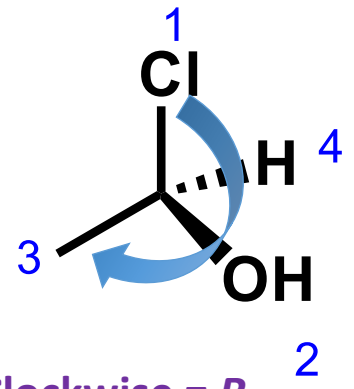


Q8: Indicate if the following molecules are R or S. Show your work! NEW

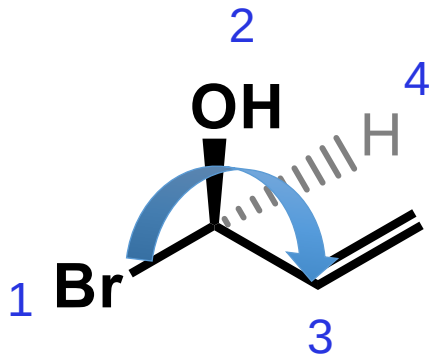


Clockwise = *R*

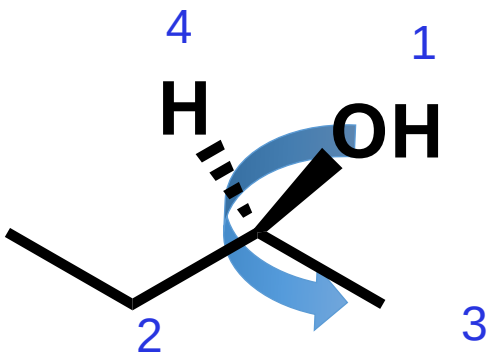




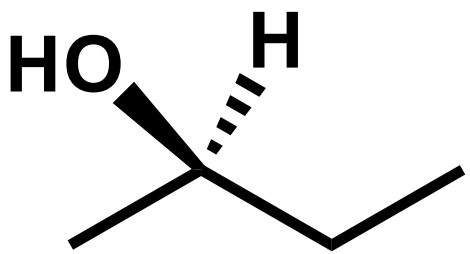
Clockwise = *R*



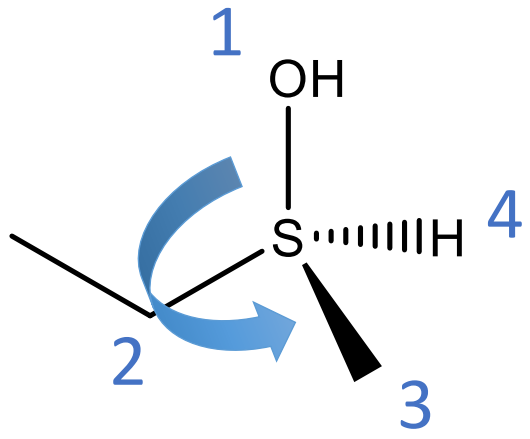
Clockwise = *R*



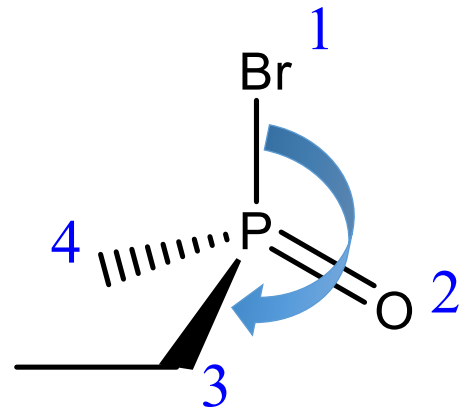
Counterclockwise = *S*



Clockwise = *R*



Counterclockwise = *S*



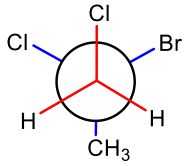
Clockwise = *R*

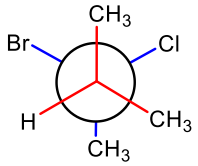
slido

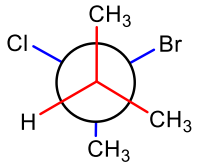
Which of the following is the Newman structure of the molecule below?

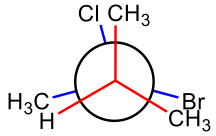
ⓘ Start presenting to display the poll results on this slide.

Answer: Which of the following is the Newman structure of the molecule below?

A. A 

B. B 

C. C 

D. D 

E. E