

SUPPLEMENTARY MATERIAL

INQUIRY-BASED LEARNING IN STEREOCHEMISTRY: STRENGTHENING 3D VISUALIZATION AND CONCEPTUAL UNDERSTANDING

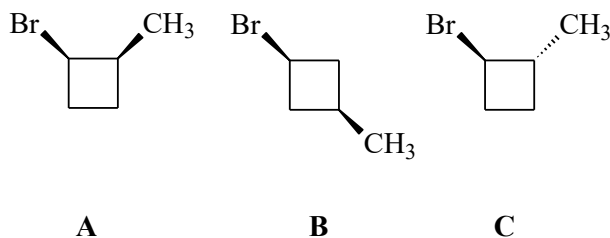
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RESEARCH-BASED LEARNING USING MOLECULAR MODELS

Number of students in the group _____

1. Construct 3D models of the following three structures (omit the hydrogen atoms).



- The molecular formulas of these compounds are:

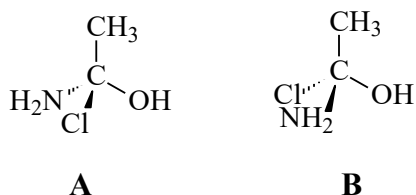
A: _____ **B:** _____ **C:** _____

- Differences between structures A and B _____

- Differences between structures A and C _____

- Constitutional isomers are _____.
- Stereoisomers (geometric or *cis/trans* isomers) are _____.
- Based on the previously formulated definition, provide an example of geometric isomers with the molecular formula **C₂H₂Br₂**:
- Based on the definition of constitutional isomers, provide an example of a constitutional isomer of structure **B** that is different from the option already given under **A**.
- Using the example from the board, refine the previously formulated definition.

2. Construct 3D models of the following two structures.



- The molecular formulas of these two compounds are:
A: _____ **B:** _____
 - Stereoisomers with chiral (stereogenic) center are _____.
 - Using the previously formulated definition, give an example of an optical isomer with the molecular formula C₃H₅O₂Br (containing a carboxylic group, COOH).
3. Construct a 3D model of ethane (CH₃CH₃).
- Construct and draw both Newman projection formulas of ethane.

- Which of the two is more stable, and why?

- Construct a 3D model of butane. Carry out conformational analysis by rotating C2-C3 bond! Which of these projections is the most stable?
