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SUPPLEMENTARY MATERIAL

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

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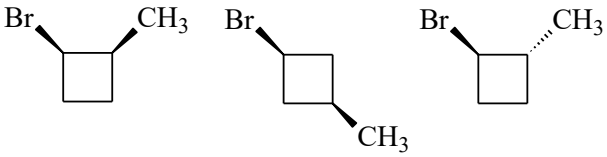
RESEARCH-BASED LEARNING USING MOLECULAR MODELS

Number of students in the group _____

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



A **B** **C**

- 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 **$C_2H_2Br_2$**:

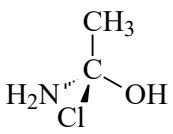
- Based on the definition of constitutional isomers, provide an example of a constitutional isomer of structure **B** that is different from the option already given under **A**.

- Using the example from the board, refine the previously formulated definition.

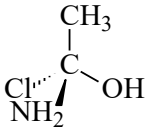
  _____

  _____

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



A



B

- 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 $C_3H_5O_2Br$ (containing a carboxylic group, COOH).

3. Construct a 3D model of ethane (CH_3CH_3).
- 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?

_____