Project – Building a Molecular Model

Overview

You will create a molecular model of an assigned compound. You will also create a booklet to accompany your model. 10 points of your grade is based on overall presentation (appearance, organization, etc.). You must include a bibliography that contains a minimum of 3 references. Not all 3 references can be from the internet. The remaining points are awarded as follows:

Ball-and-Stick Model (30 points)

♦ Materials. You may use any materials you wish (wood, Styrofoam, etc.). Choose your materials carefully and build it in advance to make sure it is sturdy. If it falls apart on your way to school or when I pick it up to grade it, I will not assume you made it correctly. Craftsmanship is important! Please attach a 3 x 5 card with your name, period, and name of your molecule to your molecule. Be sure it is attached well. I will not try to “find” a molecule to go with a booklet if you forget to label it.

♦ Bond Angles. Your model should display the correct bond angles for your molecular shape. I will not be picky about 4 or 5 degrees, but be as accurate as possible.

♦ Atoms. You should distinguish between different types of atoms in your molecule. The sizes of the balls in your model should correspond to the relative sizes (covalent radii) of the atoms. For example, if you have 3 H atoms and one N atom, the N should be larger than the 3 H’s and the 3 H’s should all be of equal size. You may also want to use different colors for different atoms.

Booklet (45 points)

Your booklet may be any size (pocket-sized, half-sheet, tri-fold, etc.) and format (hand-made, computer, etc.). Whatever you choose to do, make it look professional, not sloppy. The booklet should be turned in with your model and must include the following information about your compound. Make sure I can find this information easily. I recommend adhering to the order as shown.

❖ Cover. Include the formula and name of your molecule, your name, and your class period.

❖ Physical Properties. Give at least three physical properties including the physical state of the compound at room temperature (solid, liquid, gas) and the melting point (°C). The other physical properties you choose will depend on your compound (color, boiling point, solubility, etc.). Use the CRC handbook in the classroom as a reference.

❖ General Information.
  ♦ History. A brief history describing the data and circumstances of the molecule’s discovery, who discovered it, the discovery date and other pertinent information..
  ♦ Manufacturing/Extraction and Purification A complete description of how the molecule is extracted and/or manufactured. Also include a description of the purifications method.
  ♦ Uses Describe the different uses of the molecule. Include products in which the product is found, and the effects the molecule has on humans and other living organisms.

❖ Lewis Structure. Draw the Lewis structure for your molecule.

❖ Molecular Geometry.
  ♦ Molecular Shape (e.g. trigonal planar). State the shape of your molecule. Use the concepts behind VSEPR Theory to briefly explain why your molecule has the specified shape.
  ♦ Bond Angles. State the bond angle(s) according to the VSEPR Theory.
### Molecular Model Project Grading Sheet

**BALL-AND-STICK MODEL** (30 points)
- model portrays the formula 0 10
- bond angles 0 3 7 10
- relative atomic radii 0 5
- sturdy construction 0 3 5

**BOOKLET** (45 points)
- Cover
  - formula and name of compound 0 1 2 3
  - your name and class period 0 1 2
- Physical Properties
  - at least three properties 0 1 2 3
  - physical state at room temp 0 1
  - melting point 0 1
- General Information
  - history 0 2 5
  - mfg/extraction/purification 0 2 5
  - Uses 0 3 5
- Lewis Diagram
  - Lewis diagram 0 3 7 10
- Molecular Structure
  - molecular shape 0 2 4
  - shape explanation 0 2 3
  - bond angles 0 1 3

**OVERALL PRESENTATION** (10 points)
- Appearance of Model 0 2 4
- Appearance of Booklet 0 2 4
- Bibliography 0 1 2

**FINAL GRADE:**

**COMMENTS**
**Ideas:** You may choose from any of the following. Remember the teacher must approve your molecule.

Formaldehyde
Hexane
Dichloromethane
Ethylene
Benzene
Naphthalene
Dimethyl Benzene
Isopropanol
Ethylene Glycol
Glycerol
Benzaldehyde
Vanillin
Cinnamaldehyde
Formic Acid
Ethyl acetate
Octane
Carbon tetrachloride
Alanine
MTBE
Diethyl ether
Acetone
Lactic acid
Novocain
Aspirin
Nicotine
Glucose
Adrenaline
Ozone
Buckyball
Caffeine
Propane
Butane
Ethanol
Methanol
Cyclohexane
Acetaldehyde
Urea