



Meet My Molecules

Chem 20 Unit A Project

This project is a summary project in which students choose two molecules that adhere to the following descriptions.

IONIC MOLECULE:

- Contains 2 or more different atoms
- Using the number of valence electrons, demonstrate how the IONIC bond is formed, and discuss why (based on electronegativity, shielding, ionization energy and attraction of oppositely charged ions)
- Explain the idea of ionic lattice (crystalline structure) and relate it to the physical properties of your specific molecule (BP, MP, solubility, reactivity, rigidity)
- Identify a specific use of your molecule in every day life, describe its use and explain why this molecule is good for this specific purpose

COVALENT MOLECULE

- Contains 12 or more atoms total (i.e. Benzene)
- Demonstrate how the molecular bond is formed, and discuss why, using Lewis dot theory (based on electronegativity, and multiple bonds)
- Apply VSEPR theory and discuss all possible VSEPR shapes present within your molecule (explain why this molecule becomes this specific shape)
- Explain and discuss the forces present within this molecule. Using these forces, discuss physical properties of your molecule (BP, MP, solubility, reactivity). This section should contain a full explanation of London forces, Van der Waals, dipole dipole, polarity and hydrogen bonding within your molecule
- Identify a specific use of your molecule in every day life, describe its use and explain why this molecule is good for this specific purpose

Your job is to create a PHYSICAL PROJECT that Demonstrates the structure of your molecules. Using these models, completely discuss the required information.

This project is a summary of understanding of unit A.

- Groups should be NO MORE than 2 people total
- Your project should include
 - 1 ionic lattice (physical demonstration)
 - 1 molecular compound (physical demonstration)
 - 1 information package explaining your understanding of all required concepts (information to follow)
 - This information package could be a poster, a flyer, a mind map, just something that can explain your information well

This package should not be a simple word document, or powerpoint! THIS IS A PROJECT!

Your project will be marked using the rubric on the back of the page. This checklist should help you with your planning and creation of your project.

IONIC MOLECULE TO DO LIST:

- ◇ Molecule chosen has more than 2 different atoms
- ◇ Draw Lewis Dot Diagram of individual atoms involved
- ◇ Demonstrate Bonding (using arrows to show electron movement)
- ◇ Determine how many shells (orbitals) each atom contains and how many protons nucleus contains
- ◇ Relate this fact to electronegativity, shielding, ionization energy and attraction of charged ions
- ◇ Research lattice structure of your molecule and determine how it is "put together"
- ◇ Relate the lattice information to BP, MP, Solubility, Reactivity and Rigidity
- ◇ Research the specific use of the molecule in every day life and apply knowledge of your molecule to why it suits this purpose
- ◇ Build model of singular molecule (including valence electrons and bonding electrons)
- ◇ Build multiple models of the molecule and create a lattice structure

**YOU ARE NOT ALLOWED
choosing Sodium Chloride
or Potassium Chloride as
your ionic structure!**

MOLECULAR (COVALENT) MOLECULE TO DO LIST:

- ◇ Molecule chosen has more than 12 atoms total
- ◇ Draw Lewis Dot Diagram of the molecule (based on the steps developed in class)
- ◇ Analyze and discuss why your molecule bonds the way it does
- ◇ Identify all central atoms, determine VSEPR shape of each central atom, and determine the bond angle between each bond around the central atom
- ◇ Determine all forces present in the molecule and describe each (how they are formed and how they effect the molecule)
 - LONDON?
 - VAN DER WAALS?
 - DIPOLE
 - POLARITY
 - HYDROGEN BONDING
- ◇ Research the specific use of the molecule in every day life and apply knowledge of your molecule to why it suits this purpose
- ◇ Build model of the molecule (including valence electrons, bonds, relative bond angles and polarity arrows)

**A good tip. BE ORIGINAL...
you really think you are
the first student to think
of building "crystal
meth"?? Really...**

Ionic Compound Brainstorming Page

Lets get started on the Ionic Compound Portion of the Project!

First things first, define the words below:

- IONIC LATTICE
- CRYSTALLINE STRUCTURE
- IONIC BOND

YOU ARE NOT ALLOWED
choosing Sodium Chloride
or Potassium Chloride as
your ionic structure!

Now research how scientists find the crystalline lattice structure of an ionic compound. (scientific process)

There are 7 specific types of crystalline structure. You should include a description of all 9 in your project, and how they influence the chemical properties of matter. It would be easiest to look up all 9, with specific examples for each and choose your **favorite** from there!

BRAINSTORMING:

Lattice Structure	Description	Examples (3)
Triclinic		
Monoclinic (simple or base centered)		
Orthorhombic (simple, base centered, body centered, face centered)		
Rhombohedral		
Tetragonal (simple or body centered)		
Hexagonal		
Cubic (simple, body centered, face centered)		

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From here, you should be completely describing the theory involved in how the bond is actually formed! Remember this is a major project, so if it takes only 1 hour, its not done right.

Molecular Compound Brainstorming Page

A good place to start for the molecular compound would be to google molecular formulas of commonly used things humans can eat, drink or use. (i.e. caffeine, hormones, drugs, etc).

You may **not** have the same molecule as anyone else in the class, so make a list of 10-20 possible molecules you may be interested in:

From there, determine the molecular formula and atomic structure of your chosen compound. Now you are able to draw, design and analyze the bonding angles present. Remember you are to analyze every central atom present in your molecule, including shape and bond angles!

It may be a good idea to draw your atomic structure of your molecule below, and analyze from there!

Meet my Molecule MARKING RUBRIC

	4	3	2	1
IONIC MOLECULE				
Physical Project	Project is well done, neatly created and contains 2 or more labeled atoms, and completely demonstrates how the bond is created and stays together	Project contains 2 or more labeled atoms, and completely demonstrates how the bond is created and stays together	Project is well done, neatly created and contains 2 or more atoms, and completely demonstrates how the bond is created, however does not show how the bond stays together	Project is well done, neatly created and contains 2 or more atoms, however there are issues in the demonstration of the bonding
Discussion of Bonding Using the number of valence electrons, demonstrate how the IONIC bond is formed, and discuss why (based on electronegativity, shielding, ionization energy and attraction of oppositely charged ions) (worth 2x)	All required information is included, obviously present and detailed to at or above chemistry 20 level.	All required information is included however slightly less than a chemistry 20 level.	Information is missing 1-2 relevant points OR The information is well below a chemistry 20 level	Information is missing 3-4 relevant points OR The information is well below a science 10 level
Ionic Lattice Explain the idea of ionic lattice (crystalline structure) and relate it to the physical properties of your specific molecule (BP, MP, solubility, reactivity, rigidity)	All required information is included, obviously present and detailed to at or above a chemistry 20 level.	All required information is included however slightly less than a chemistry 20 level.	Information is missing 1-2 relevant points OR The information is well below a chemistry 20 level	Information is missing 3-4 relevant points OR The information is well below a science 10 level
Specific Uses Identify a specific use of your molecule in every day life, describe its use and explain why this molecule is good for this specific purpose	Description completely explains 2-3 common uses for the molecule in every day life. An in depth description of properties associated with the purpose is included.	Description completely explains 1 common use for the molecule in every day life. An in depth description of properties associated with the purpose is included.	Description completely explains 2-3 common uses for the molecule in every day life. A limited description of properties associated with the purpose is included.	Description completely explains 1 common use for the molecule in every day life. A limited description of properties associated with the purpose is included. OR No properties are discussed within 2-3 common uses.

Ionic Molecule:

/20

	4	3	2	1
MOLECULAR MOLECULE				
Physical Project	Project is well done, neatly created and contains 2 or more labeled atoms, and completely demonstrates how the bond is created and stays together	Project contains 12 or more labeled atoms, and completely demonstrates how the bond is created and stays together	Project is well done, neatly created and contains 12 or more atoms, and completely demonstrates how the bond is created, however does not show how the bond stays together	Project is well done, neatly created and contains 12 or more atoms, however there are issues in the demonstration of the bonding
Discussion of Bonding Demonstrate how the molecular bond is formed, and discuss why, using Lewis dot theory (based on electronegativity, and multiple bonds)	All required information is included, obviously present and detailed to at or above chemistry 20 level.	All required information is included however slightly less than chemistry 20 level.	Information is missing 1-2 relevant points OR The information is well below a chemistry 20 level	Information is missing 3-4 relevant points OR The information is well below a science 10 level
VSEPR Apply VSEPR theory and discuss all possible VSEPR shapes present within your molecule (explain why this molecule becomes this specific shape, including bond angles of each bond)	All required information is included, obviously present and detailed to at or above chemistry 20 level.	All required information is included however slightly less than chemistry 20 level.	Information is missing 1-2 relevant points OR The information is well below a chemistry 20 level	Information is missing 3-4 relevant points OR The information is well below a science 10 level
FORCES Explain and discuss the forces present within this molecule. Using these forces, discuss physical properties of your molecule (BP, MP, solubility, reactivity). This section should contain a full explanation of London forces, Van der Waals, dipole dipole, polarity and hydrogen bonding within your molecule	All required information is included, obviously present and detailed to at or above a chemistry 20 level.	All required information is included however slightly less than a chemistry 20 level.	Information is missing 1-2 relevant points OR The information is well below a chemistry 20 level	Information is missing 3-4 relevant points OR The information is well below a science 10 level
Specific Uses Identify a specific use of your molecule in every day life, describe its use and explain why this molecule is good for this specific purpose	Description completely explains 2-3 common uses for the molecule in every day life. An in depth description of properties associated with the purpose is included.	Description completely explains 1 common use for the molecule in every day life. An in depth description of properties associated with the purpose is included.	Description completely explains 2-3 common uses for the molecule in every day life. A limited description of properties associated with the purpose is included.	Description completely explains 1 common use for the molecule in every day life. A limited description of properties associated with the purpose is included. OR No properties are discussed within 2-3 common uses.

Covalent Molecule: