# Chemistry Unit 1

# Extended response #1

**Bonding in Household Products**

A wide range of chemicals and materials are used in and around the home. Materials used in the home have one of four types of bonding between particles: metallic, ionic, covalent molecular, or covalent network. Examples of some compounds is given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Metallic | Ionic | Covalent molecular | Covalent network |
| Steel  Aluminium  Copper | Sodium chloride  Sodium hydrogen carbonate  Calcium carbonate | Water  Acetic acid  Ammonia | Graphite  Silicon dioxide  Diamond |

**Your Task**

* Research the uses of the compounds listed above. As you have studied the types of bonding and properties of substances in class, you do not need to research these but you will need to know about them to complete the in class component of the task.
* Prepare research notes about each compound. (See example)
* In class, in **Week 12** (= Week 2, Term 2), you will be asked to submit your notes and then complete the following task.

“The properties of many substances make them suitable to use around the home. Discuss the bonding, properties and common household uses of the following four compounds.

|  |
| --- |
| Compounds |
| To be advised |

For each of the substances listed above describe:

* the type of bonding in each substance, including the arrangement of particles and the nature of the attractive forces that exist between particles
* the properties of the substance and an explanation of how these properties are related to the structure and bonding within the substance
* the uses of the substance in the home, and an explanation of how these uses are dependent on the properties of the substance.
* The four substances will be selected from the list above, but you will not know which will be selected prior to the essay.

**Tips for Good Results**

|  |  |
| --- | --- |
| **Notes** | **Essay** |
| * Research the specific uses of each material | * Revise the structure/bonding of each type of substance |
| * Do not reference unreliable sites like Wikipedia, Wiki Answers or Yahoo Answers | * Plan your essay in advance |
| * Include formatted references for the sources of your information in your notes. See <https://www.usq.edu.au/library/referencing/apa-referencing-guide> for details. | * Aim to write at least half a page for each substance |
| * Use headings and subheadings |
| * Include diagrams when appropriate |

**Example Notes**

**Substance: Carbon dioxide**

**Uses**

Fire suppression agent (e.g. fire extinguisher)

* Does not support combustion
* Is denser than air – will sink to ground
* Compressible (can be stored in a small volume container)

Soft drink additive

* Dissolves easily in water (compared to N2 for example)
* Reacts with water to form carbonic acid (H2CO3) which improves taste of drink

**Sources**

Makowka, N. (n.d.) *Why carbon dioxide (CO2) in fire suppression systems?* Retrieved March 3, 2014 from http://www.nafed.org/whyco2

Matson, B. (2006) *Microscale gas chemistry*. Retrieved from http://mattson.creighton.edu/Download\_Folder/MattsonGasBook4thEdCO2.pdf

The Naked Scientists. (2008) Why do they use CO2 in fizzy drinks? Retrieved March 3, 2014 from http://www.thenakedscientists.com/HTML/questions/question/1952/

**MARKING KEY**

**RESEARCH NOTES (to be handed in on the day of essay)**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Depth of research (e.g. detail) | 2 marks |
| Quality of sources (reliability) | 2 marks |
| Formatting of references uses a referencing system e.g. APA | 2 marks |

**IN-CLASS ESSAY (no notes permitted during essay)**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Description of the type of bonding, including arrangement of particles and attraction between them | 12 marks |
| Description of the properties of substances, and explanation of how those properties relate to the type of bonding | 12 marks |
| Description of the uses of substances in the home, and explanation of how these uses is related to the properties of that compound | 12 marks |
| Quality of essay (e.g. well organised, uses headings, minimal spelling errors) | 3 marks |