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## Required Background Knowledge and Skills

The types of compounds you will be using to collect data throughout the experiments are salts.

In order to perform satisfactorily in the lab you need to be familiar with certain knowledge, terminology, and background skills. For example, you will be working with salts throughout this experiment and thus you need to know what a salt is.

Below are action items you need to be able to do before starting the experiment:

- Describe what it means for a compound to be a salt
- Identify and correctly write formulas for salt compounds
  - Describe the composition of salts
  - Use the periodic table to determine the charge of ions in salt and write the formulas of salts given the ion charges
- Describe the terms solute, solvent, and solution
- Explain the terms polar and nonpolar solvent
  - Describe why salts are soluble and dissociate in polar solvents such as water
  - Describe why salts are *not* soluble in nonpolar solvents

## What is a salt?

Salts contain cations (positively charged ions) and anions (negatively charged ions).

[[http://www.youtube.com/watch?feature=player\\_embedded&v=Xz-2p0-xcik](http://www.youtube.com/watch?feature=player_embedded&v=Xz-2p0-xcik)]

- Metals lose one or more electrons to become cations.
- Non-metals gain one or more electrons to become anions.

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Do you know what the difference is between an atom and an ion? The video below provides the answer to that question.

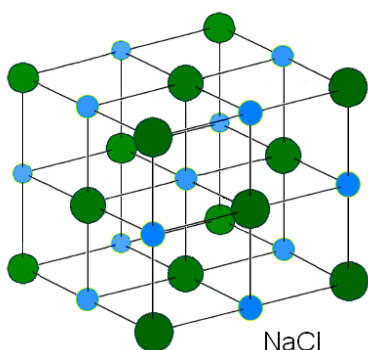
[[http://www.youtube.com/watch?feature=player\\_embedded&v=1ohQgpKVi0M](http://www.youtube.com/watch?feature=player_embedded&v=1ohQgpKVi0M)]

- As depicted in the video, copper (II) cation is formed from a copper atom when it loses its electrons to result an ion being positively charged.

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## Creation of a Salt

Salts may be created by the reaction of metals with nonmetals. Upon losing electrons the metal that is neutral in charge, converts to a positive ion (cation) and the nonmetal that is neutral in charge converts to a negative ion (anion). The video below depicts the reaction of sodium (Na) metal with the nonmetal chlorine ( $\text{Cl}_2$ ) to produce the salt NaCl containing sodium ions ( $\text{Na}^+$ ) and chlorine ions ( $\text{Cl}^-$ ). Note that during the process heat is released.



[[http://www.youtube.com/watch?feature=player\\_embedded&v=Ws6r8Jg7ME0](http://www.youtube.com/watch?feature=player_embedded&v=Ws6r8Jg7ME0)]

Once the ions,  $\text{Na}^+$  and  $\text{Cl}^-$  are formed, they are stable and will not react with one another. The ions are arranged in a lattice structure where ions are surrounded by ions of the opposite charge (as depicted in the diagram on the left).

 Sodium Chloride Crystal Structure

[http://commons.wikimedia.org/wiki/File:Sodium\\_chloride\\_crystal.png](http://commons.wikimedia.org/wiki/File:Sodium_chloride_crystal.png)