

Year 10 C Pathway

Mr. D. Patterson

# INTRODUCTORY CHEMISTRY

# Outcome

- Define the terms: soluble, insoluble, solvent, solute and solution
- Draw diagrams to show how ionic compounds dissolve
- Use a table of solubilities to predict which ionic compounds are soluble
- Use a table of solubilities to predict the formation of a precipitate when two ionic solutions are mixed

# Looking further at ionic compounds...

- Elements – Carbon, oxygen, calcium

Solutions are a type of mixture. (We will look at solutions with ionic compounds in them)

- Mixtures – Iron filings in sand, salty water

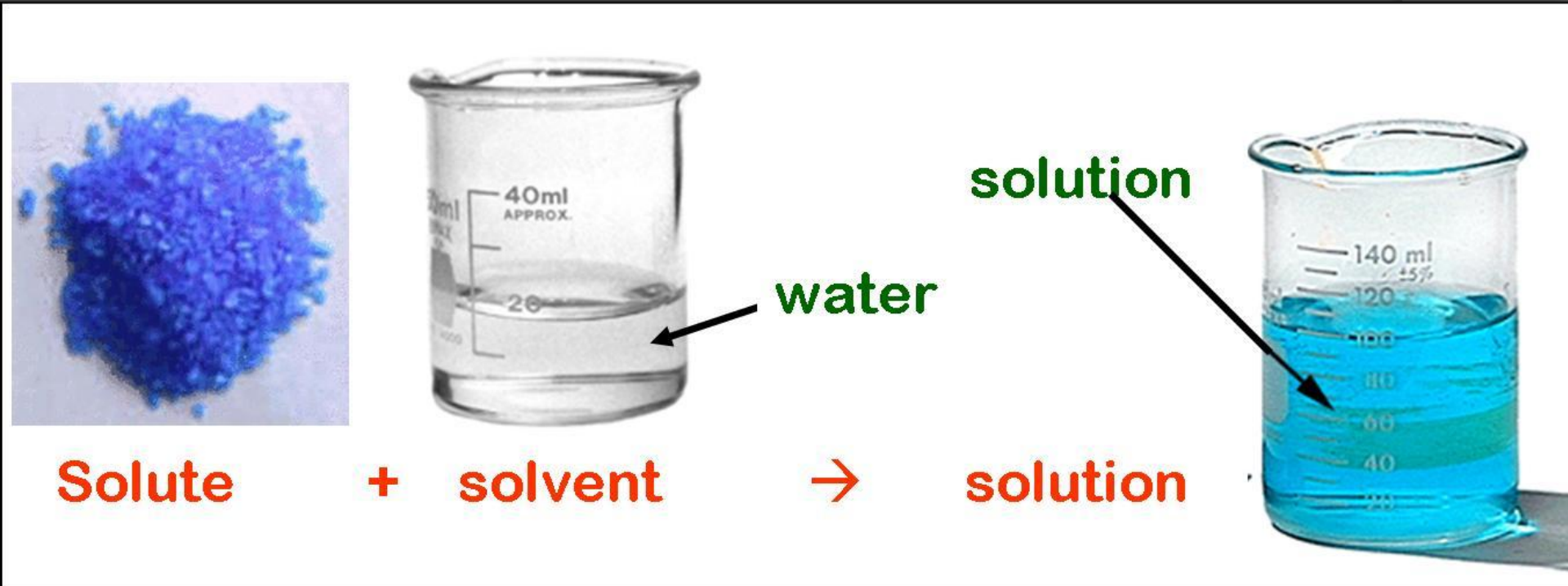
Ionic Compounds

- Compounds

Covalent Compounds



# Solutions

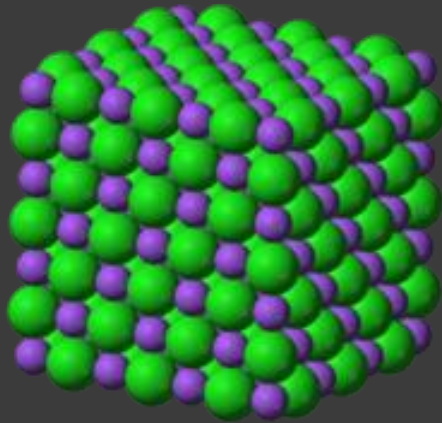


# Solutions

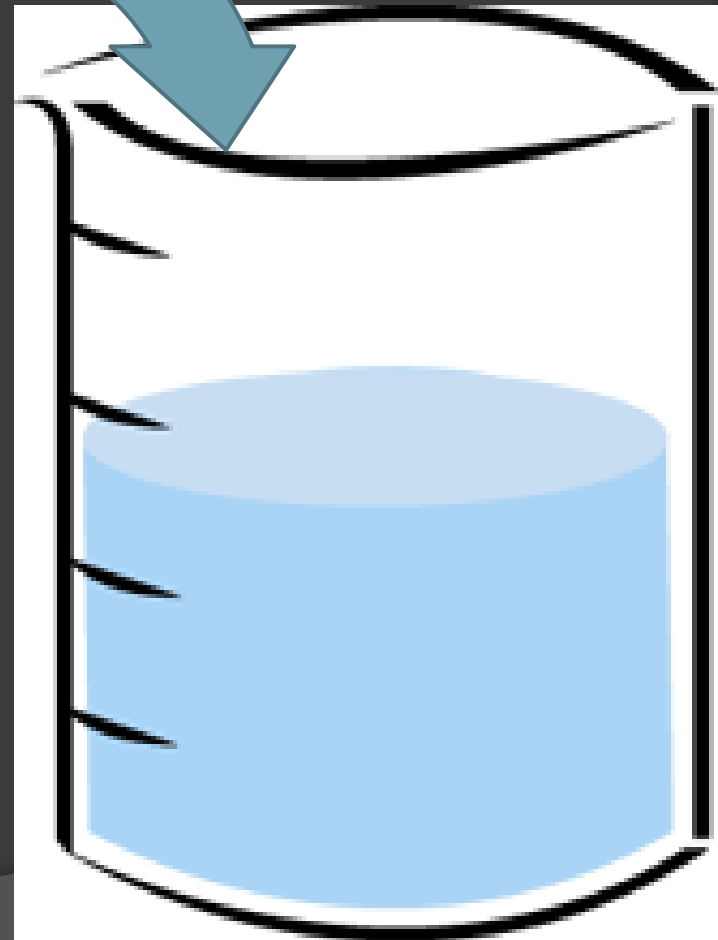
## ⦿ Definitions:

- **Solution** – a mixture composed of two (or more) substances
- **Solvent** – the substance that does the dissolving (eg: water)
- **Solute** – the substance that has been dissolved (eg: salt)
  
- Both solvents and solutes can be solids, liquids or gases! (but we will focus on ionic solids dissolving in liquids)

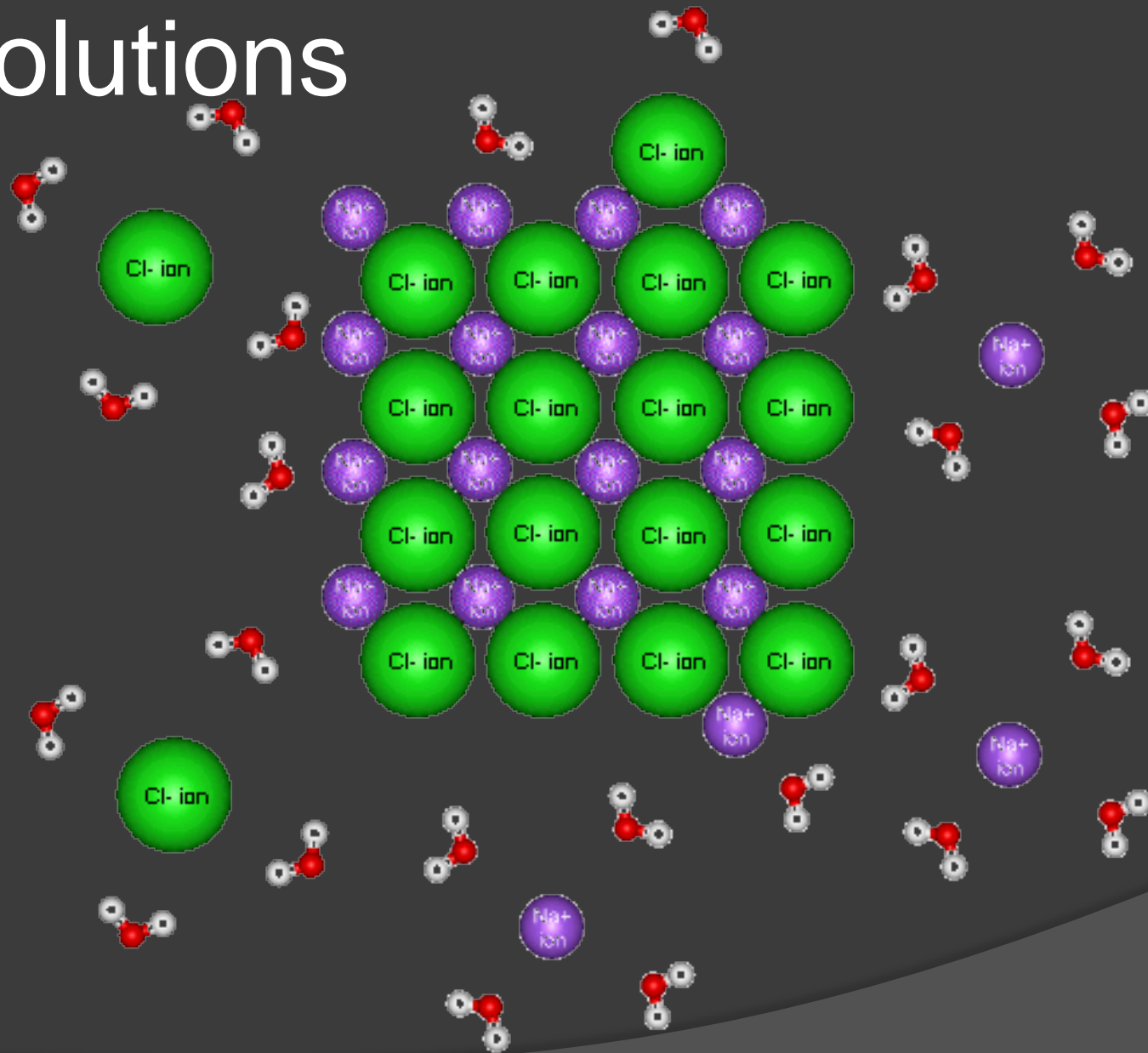
# Ionic compounds dissolving



NaCl



# Solutions



# Solutions

- ⦿ A solute that will dissolve into a solvent is said to be **soluble**
- ⦿ Eg: salt is soluble in water
  
- ⦿ A solute that will **not** dissolve in a particular solvent is said to be **insoluble**
- ⦿ Eg: oil is insoluble in water



# Solutions

- Use solubility table on page 44 of study guide
- $\text{NaNO}_3$  (a nitrate) is soluble.
- $\text{CaS}$  (a sulfide) is insoluble.

● What about:  $\text{NaCl}$ ,  $\text{AgCl}$ ,  $\text{CaCO}_3$ ,  
 $\text{Na}_2\text{CO}_3$ ?

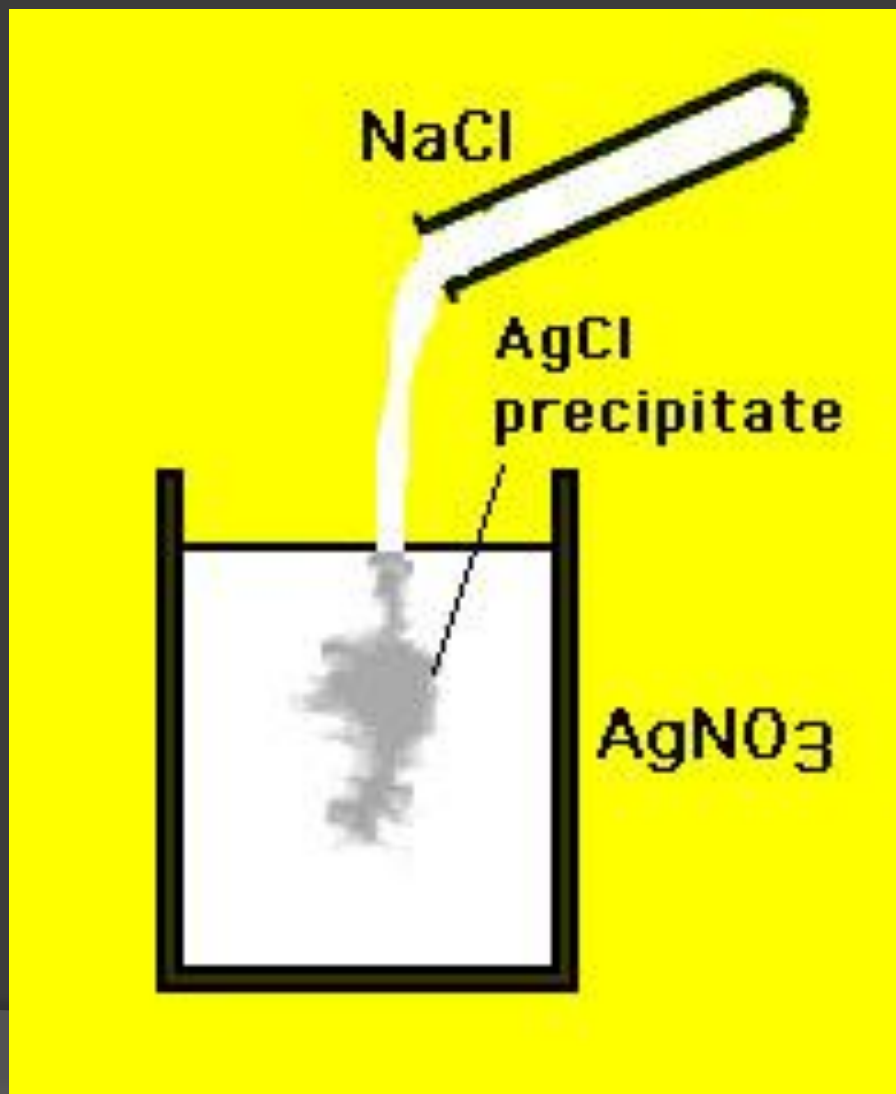
SOLUBLE

INSOLUBLE

# Solutions

- ⦿ What if we have more than one solute?
- ⦿ Use the solubility table to check for combinations of insoluble ions
- ⦿ If any exist, a precipitate (solid in solution) will form

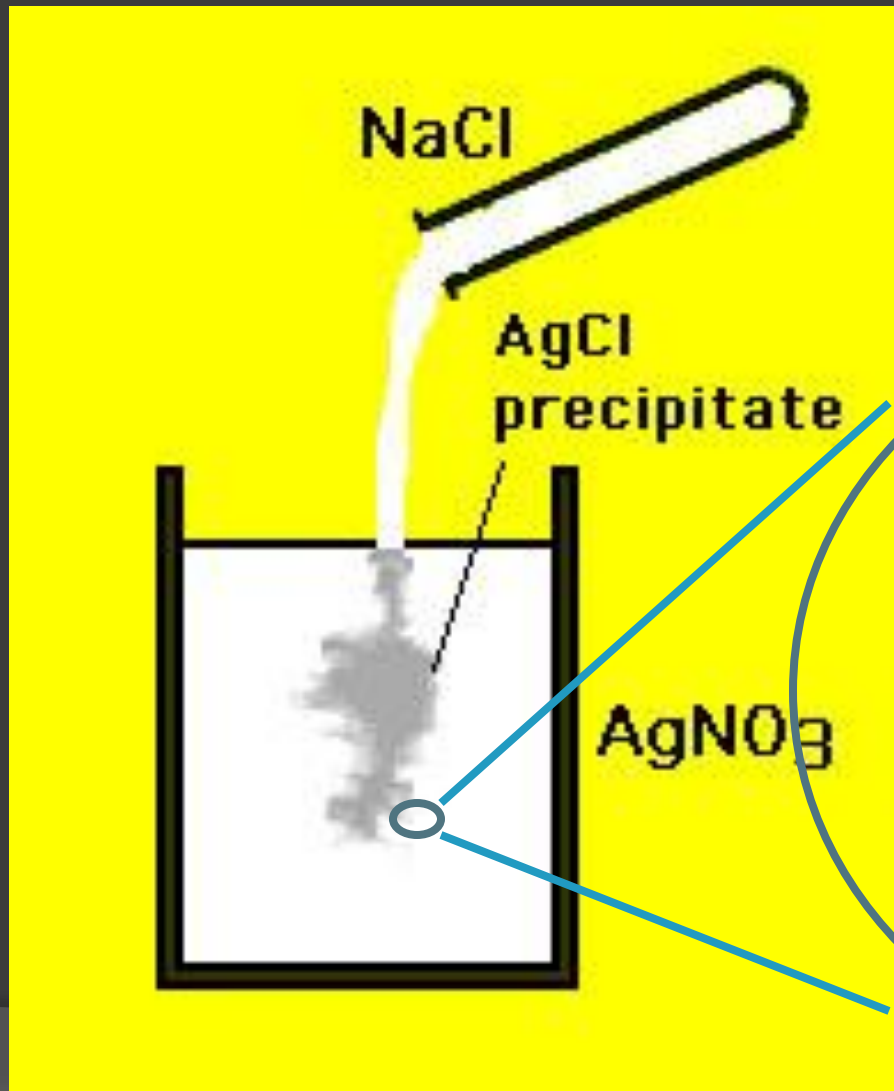
# Solutions – combinations of ionic compounds



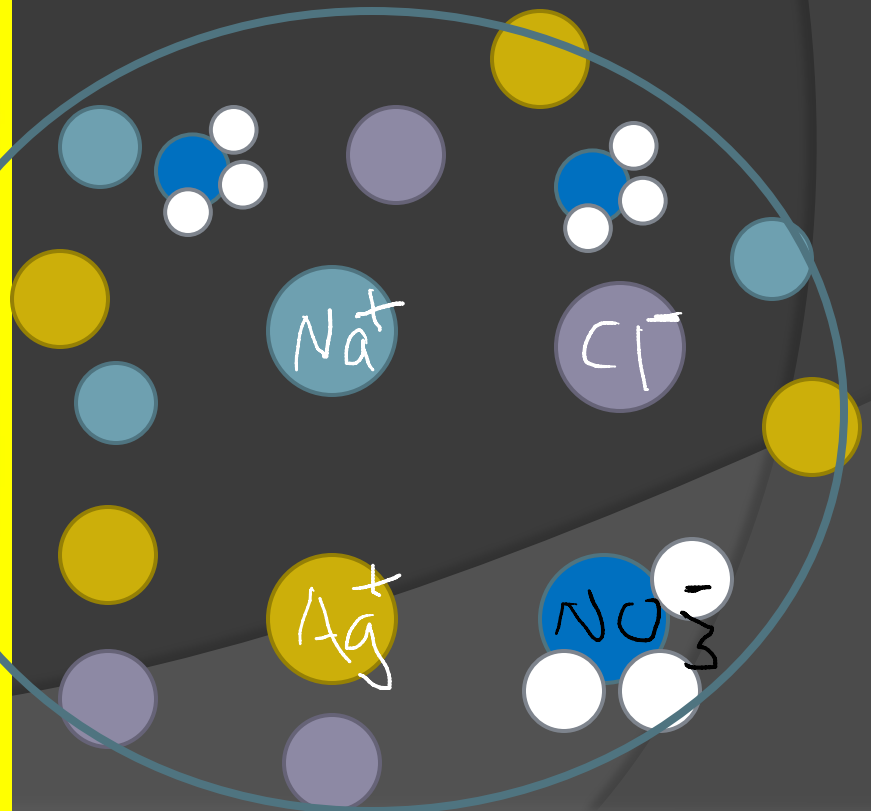
A  $\text{NaCl}$  solute is added to a solution of  $\text{AgNO}_3$

Check the solubility table to see if these are soluble or not.

# Solutions – combinations of ionic compounds



As both **NaCl** and **AgNO<sub>3</sub>** are soluble, their ions will mix together

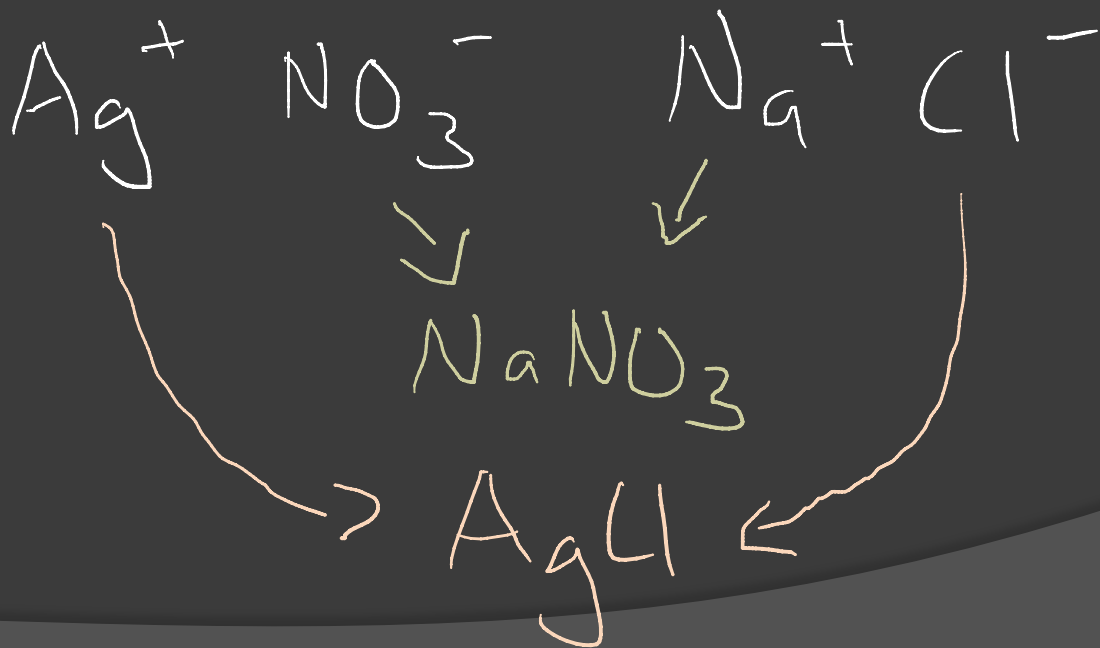


# Solutions – combinations of ionic compounds

A NaCl solute is added to a solution of AgNO<sub>3</sub>

↑  
SOLUBLE

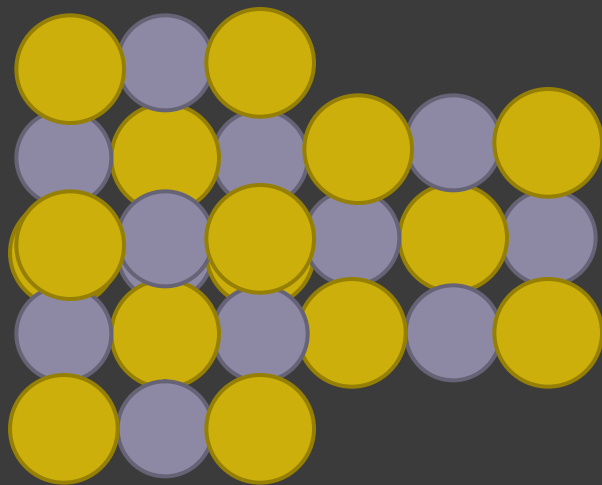
↑  
SOLUBLE



AgCl  
is  
INSOLUBLE

# A precipitate forms!

- AgCl is insoluble (as per the solubilities table)



A solid  
will form!  
AgCl

- AgCl will be a precipitate
- A precipitate is a solid that forms when two solutions are mixed.

# Examples

- ⦿ Will the following form a precipitate?
- ⦿ Sodium chloride solution mixed with silver nitrate
  
- ⦿ Potassium carbonate solution mixed with lithium bromide

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- Checkpoint 7.4, Set 11 (Q3)