Year 11 Chemistry Practical
Water of Hydration

The formula for hydrated barium chloride is $BaCl_2.xH_2O$ where x molecules of water are incorporated into the crystal lattice for every unit of $BaCl_2$. This water can be driven off by heat.

Purpose: To find the ratio of water molecules in hydrated barium chloride

Equipment:
- hydrated barium chloride
- crucible and holder
- bunsen burner
- tripod
- tongs
- spatula

Method:
1. Weigh and record the mass of the crucible
2. Accurately add approximately 1g hydrated barium chloride, weigh and record mass
3. Heat crucible for approximately 10 mins to evaporate water of hydration
   WARNING: The crucible is **very hot**. Hold it securely with **tongs**.
4. Allow crucible to cool enough to touch, weigh and record mass
5. Heat crucible for approximately 5 mins, stirring with a spatula.
   WARNING: This will make one end of spatula **very hot**. Use care.
6. Repeat steps 4 and 5 until the mass is no longer being reduced.
7. Calculate the number of water molecules per unit of barium chloride.
   WARNING: The tripod may be **too hot** to touch. Only pack it away when it is safe to do so.

Results and Conclusion:
Use the steps below to calculate the number of water molecules per unit of barium chloride.
- Use the results obtained to calculate the mass in grams of anhydrous (without water) barium chloride
- Calculate the molar mass of $BaCl_2$ from a periodic table
- Calculate the number of moles of anhydrous barium chloride
- Use the results obtained in the experiment to calculate the mass in grams of water lost during heating
- Calculate the molar mass of water (H_2O)
- Hence calculate the number of moles of water lost during heating
- Calculate the mole ratio of $BaCl_2$: H_2O
- Round the ratio to whole numbers and conclude the formula for hydrated barium chloride.

Discuss possible sources of error in the experiment and ways the experiment could be improved.