Chemistry – Quantitative chemistry – Checklist

4.3.1 Conservation of mass and the quantitative interpretation of chemical equations	Taught	Practiced	Mastered
Explain the meaning of the law of conservation. Write simple word equations. Write simple symbol equations. Balance symbol equations. Extended writing: describe the equations given in terms of number of moles, reactants and products. Grade 9: balance complex equations and add state symbols.			
Review the definition of relative atomic mass. Recall how to find the relative atomic mass from the Periodic Table. Define the relative molecular mass. Extended writing: write instructions to another student how to calculate the relative formula mass.			
Extended writing: use measurements of mass before and after an experiment to explain what has happened to the mass during the experiment and why it has happened.			

4.3.2 Use of amount of substance in relation to masses of pure substances	Taught	Practiced	Mastered
Define one mole in terms of M_r and A_r Calculate the number of moles in a substance using the relative formula mass. Extended writing: write instructions to another student how to calculate the number of moles using the relative formula mass			
Balance chemical equations and use these to calculate the masses of substances present.			

4.3.2 Use of amount of substance in relation to masses of pure substances	**Taught**	**Practiced**	**Mastered**
Extended writing: write instructions to another student use balanced chemical equations to calculate the masses of substances present.			
Use the masses of substances present in a reaction to write a balanced equation.			
Define the term limiting reactant. Link the limiting reactant to the number of moles. Link the limiting reactant to the masses in grams.			
Explain the meaning of concentration and the unit grams per dm^3 Be able to convert cm^3 into dm^3. Use the equation: $C = m / v$ to calculate the concentration of a solution. Rearrange the equation: $C = m / v$ to make mass the subject. Extended writing: write instructions to another student on how to calculate the concentration, or how to rearrange the equation to calculate mass. Discuss the differences of the word 'concentration' and 'strength' in science and everyday language.			

4.3.3 Yield and atom economy of chemical reactions	Taught	Practiced	Mastered
Describe how atoms are lost or gained in a chemical reaction. Explain why atoms can be lost or gained in a chemical reaction. Calculate the theoretical yield for simple examples. Extended writing: write instructions to another student how to calculate the theoretical yield giving explained examples.			
Calculate the atom economy for simple examples. Extended writing: write instructions to another student how to calculate the atom economy giving explained examples.			

4.3.4 Using concentrations of solutions in mol/dm^3	**Taught**	**Practiced**	**Mastered**
Explain the meaning of concentration and the unit mol per dm^3. Be able to convert cm^3 into dm^3. Use the equation $C = n / v$ to calculate the concentration of a solution. Rearrange the equation $C = m / v$ to make number of moles the subject. Extended writing: write instructions to another student on how to calculate the concentration, or how to rearrange the equation to calculate number of moles Extended writing: write instructions to another student on how to carry out a titration. Include reasons for using a burette instead of other measuring equipment. Grade 9: explain why indicators eg methyl orange and phenolphthalein are used instead of Universal indicator.			

4.3.5 Use amount of substance in relation to volume of gases	Taught	Practiced	Mastered
Recall the equation: $$number\ of\ moles = \frac{mass}{relative\ formula\ mass}$$ Use the equation: volume of gas at rtp = number of moles x molar gas volume (24 dm^3) for simple examples. Extended writing: write instructions to another student on how to calculate the volume of a gas. Use balanced equations and known volume of reactant/product to calculate the volumes of gaseous reactants/ products.			