Achieved

NZQA Intended for teacher use only

(a)	**Use the Resource sheet provided to identify the type of reaction occurring here:** ☑ Neutralisation ☐ Combustion ☐ Decomposition ☐ Precipitation ☐ Combination
(b)	**Explain why you chose this reaction type.** *You should use:* *- your own observations of reactants and products* *- generic word equations and any other relevant information on the resource sheet* *- predictable patterns of the reactions you studied in class.* I know it was this type of reaction because...

As seen in the observations, the hydrochloric acid solution was previously red before, as they added the magnesium hydroxide powder, it dissolved then colour changed into green. They only added 5mL of magnesium hydroxide powder. In other words, this tells us that the ~~HCl (acid) +~~ HCl (acid) Combined with the Mg(OH) (base) resulted in the neutralisation of acid. This is because the acid contains H^+ (Hydrogen ions) & the base contains OH^- (Hydroxide ions), when it both releases H^+ & OH^-, the ~~acidity~~ base cancels out the acidity & neutralises it. This is also why the UI colour went from red ~~to green~~ → orange → yellow → green. Additionally, ~~From the combination of H^+ (Hydrogen ions) & OH^- (Hydroxide ions),~~ (acid) (neutral) when the HCl containing H^+ (acids) combined with the Mg(OH) containing OH^- (bases), they released & mixed which is also how ~~the~~ salt would form. The salt in this case was the magnesium chloride.

(c)	**Explain how mass is conserved in this chemical reaction.**

I know that mass was conserved because...

the chemical equation ~~for~~ is ~~Hydrochloric~~ $2HCl + Mg(OH)_2 \rightarrow MgCl + 2H_2O$
And the ~~balanced~~ the generic chemical equation is
acid + base (metal oxide or hydroxide) → ionic salt + water.
~~We can see the~~ $2HCl + Mg(OH)_2 \rightarrow MgCl + 2H_2O$.

4 =H 1=Cl → 1=Mg 4=H

1=Mg 1=O 1=Cl 1=O

Looking at the chemreal equation, I can see that the reactants on the left side have the same amount of atoms on the right side which is the products. Furthermore, the law of conservation of mass states that mass cannot be destroyed or created, it can only be transferred. The chemical equation proves this because we can see that the reactants have the same amount products. Ultimately, mass was conserved.

(d) **To successfully digest protein in your stomach, the pH must be between pH 1 and 3. A friend suggests that you might feel better if you took 3 times the recommended dose of Mylanta.**
What might be the implication (effect) of doing this on successful digestion of any protein in your stomach?

By taking x3 of the recommened amount of Mylanta, it would still go into the process of neutralisation. The hydrochloric acid in the stomach will combined with the base, in this case it is Mylanta. It will neutralise the acidity in the stomach, however, ~~th~~ because of the excess amount of ~~base (hydrochloric~~ magnesium hydroxide (mylanta), the stomach will ~~not be an at~~ now cause ~~br~~ indigestion in the stomach & cause heartburns. 15mL was more than enough because to cancel out the acidity, you would only need 5mL to cancel out the ~~th~~ acidity in the stomach.

(e) **5mL of Mylanta (magnesium hydroxide) needed to be added to 10mL of hydrochloric acid before the green colour appeared.**
Explain how this observation relates to the balanced chemical equation.

This observation relates to the balance chemical equation of:
$2HCl + Mg(OH)_2 \rightarrow MgCl_2 + 2H_2O$
So when 5mL of Mylanta (the magnesium hydroxide) → (base) was dropped into the 10mL of hydrochloric acid, the mixture turned green because of the H^+ ions & the OH^- ions released & combined, resulting in the neutralisation of the hydrochloric acid. The mixture caused salt to be formed which was the $MgCl_2$. ~~and it also forms water~~ The water was also present after the neutralisation.
The generic chemical equation that proves this is:
acid + base (metal oxide or hydroxide) → ionic salt + water.

$$2HCl + Mg(OH)_2 \longrightarrow MgCl_2 + 2H_2O$$

Grade: Achieved
For Achieved, the student needs to demonstrate understanding of chemical reactions in context. This involves describing the reactants and products for a range of chemical reaction types using equations, with reference to conservation of mass. It also involves linking each chemical reaction to a context, using predictable patterns or observations. A range of chemical reactions means at least three different reaction types are required, as outlined in Explanatory Note 2 of the standard. This student has described the reactants and products using equations selected from the Resource Sheet and referred to conservation of mass by stating that matter is not created nor destroyed. The student has also linked the reaction to the context of antacids using the predictable pattern through the evidence. Similar evidence for another two different reaction types is required for an overall grade of Achieved. For Merit, the student could explain the relationship between the reactants and the products in the reaction and use observations from the context of antacids to link the chemical reaction to the context.