Chemistry 2.6 AS 91166 Demonstrate understanding of chemical reactivity

Writing Excellence answers to **Reaction rate Factors – Surface Area** questions

Reaction Rate Factors – Surface Area QUESTION
Question: Compare and contrast the reactions of 0.5 g of **magnesium ribbon**, Mg(s), with 50.0 mL of 0.100 mol L–1 hydrochloric acid, HCl(aq), and 0.5 g of **magnesium powder**, Mg(s), with 50.0 mL of 0.100 mol L–1 hydrochloric acid, HCl(aq). Refer to collision theory and rates of reaction in your answer.

ANSWER	
1. state the **collision theory**	Chemical reactions between particles of substances only occur when the following conditions have been met: Particles must collide with enough energy (called activation energy EA) and with the correct orientation. If these conditions are met the collision will be considered **successful**.
2. Describe the reactants in your reaction and state **which factors are the same**	In the reaction of hydrochloric acid with Mg ribbon and Mg powder, both form the same products, magnesium chloride and hydrogen gas. $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$ The concentration and amount of the hydrochloric acid is the same in both reactions as is the mass of magnesium. (we assume the temperature is also the same)
3. Describe the reactants in your reaction and state **which factor is different** (the factor affecting reaction rate)	However, since Mg powder has a larger surface area than Mg ribbon
4. **link** the factor to the collision theory	the powder will have more Mg particles immediately available to collide than the magnesium ribbon
5. link the reaction to more successful collisions occurring per unit of time	And therefore there will be more effective collisions per second (unit of time)
6. link to more products (name products) being formed per unit of time AND link to a faster reaction rate	and more H_2 gas will be produced initially in the magnesium powder, resulting in a faster rate of reaction.
7. summarize the reaction with the **slower reaction rate**	Mg ribbon will take longer to react because fewer particles are immediately available to collide, so will have a slower rate of reaction.
8. Explain that both reactions will produce the **same amount of product** eventually as they started with the same amount of reactants	Both reactions will eventually produce the same volume of hydrogen gas as the same amounts of each reactant are used.

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.