1. The reaction of iodide ion with hypochlorite ion, OCl^- (found in liquid bleach), is shown:

$$OCl^- + I^- \text{---->} OI^- + Cl^-$$

	Initial Concentrations		Initial Rate of Formation
Reactants	$[OCl^-]$	$[I^-]$	(mol L^{-1} s^{-1}) of Cl^-
Trial 1	1.7×10^{-3}	1.7×10^{-3}	1.75×10^{4}
Trial 2	3.4×10^{-3}	1.7×10^{-3}	3.50×10^{4}
Trial 3	1.7×10^{-3}	3.4×10^{-3}	3.50×10^{4}

i. Determine the general rate law for the reaction above.

ii. If the concentration of the **OCl^-** is tripled, how will the initial rate change?

iii. If the concentration of the **OCl^-** is tripled, how will the reaction time change?

2. In each of the following pairs of reaction, choose the one that will be slower. Justify your choice.

i. (a) The burning of a strip of magnesium, $Mg_{(s)}$, in air.
(b) The burning of finely powdered magnesium, $Mg_{(s)}$, in air.

ii. (a) The oxidation of hydrogen peroxide, H_2O_2, in air.
(b) The oxidation of hydrogen peroxide, H_2O_2, in air with catalyst.

iii. (a) The reaction of 5.0 g of powdered zinc metal, $Zn_{(s)}$, with 1.0 M $HCl_{(aq)}$ at 50.0°C.
(b) The reaction of 5.0 g of powdered zinc metal, $Zn_{(s)}$, with 1.0 M $HCl_{(aq)}$ at 20.0°C.

iv. (a) The reaction of hydrogen gas, $H_{2(g)}$, with the oxygen in the air, $O_{2(g)}$, to produce water vapour, $H_2O_{(g)}$.
(b) The reaction of hydrogen gas, $H_{2(g)}$, with pure oxygen, $O_{2(g)}$, to produce water vapour, $H_2O_{(g)}$.

v. (a) $Pb^{2+}_{(aq)} + 2\ I^{-}_{(aq)} \rightarrow PbI_{2(s)}$
(b) $C_{11}H_{22}O_{11(s)} + 11\ O_{2(g)} \rightarrow 11\ CO_{2(g)} + 11\ H_2O_{(g)}$

i. ____

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ii. ____

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iii. ____

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iv.____

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v. ____

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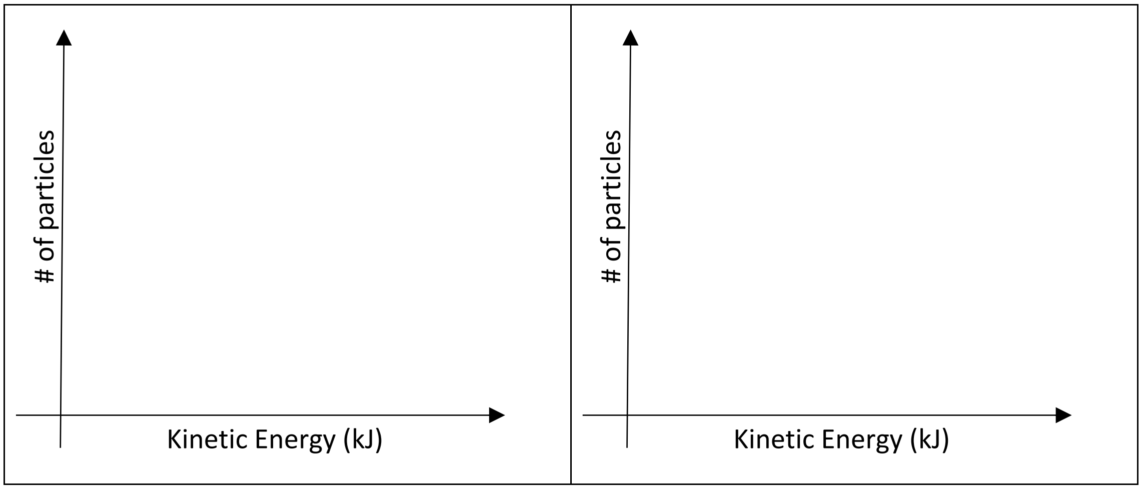
3. Draw two ways you can alter a Maxwell Boltzmann graph to INCREASE the reaction rate and explain your reasoning for your modifications.



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4. When a candle ($C_{20}H_{42}$) burns, the following reaction occurs:

$$C_{20}H_{42\,(s)} + 61\ O_{2\,(g)} \rightarrow 40\ CO_{2\,(g)} + 42\ H_2O_{\,(g)} + \text{heat}$$

If the rate of production of $CO_{2(g)}$ is 0.98 g/min, what mass of $C_{20}H_{42(s)}$ is consumed in 30.0 seconds?

5. Consider the following reaction:

$$2\ Al_{(s)} + 3\ CuCl_{2\ (aq)} \rightarrow 2\ AlCl_{3\ (aq)} + 3\ Cu_{(s)}$$

If the rate of consumption of Al is 0.46 g/min, how many minutes will it take to produce 0.89 g of Cu?

6. When magnesium is reacted with dilute hydrochloric acid (HCl), a reaction occurs in which hydrogen gas and magnesium chloride is formed.

a) Write a ***balanced formula equation*** for this reaction.

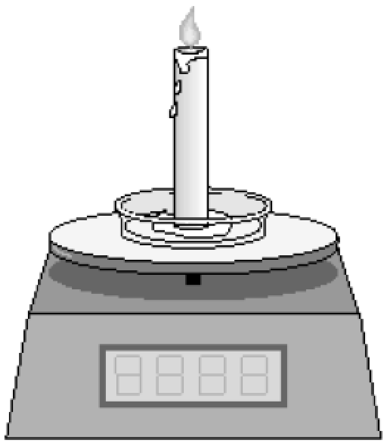
b) If the rate of consumption of magnesium is 5.0×10^{-9} mol/s, find the *rate of consumption of HCl* in moles/s.

c) If the rate of consumption of magnesium is 5.0×10^{-9} mol/s, find the *rate of production of* H_2 in g/s.

d) If the rate of consumption of magnesium is 5.0×10^{-9} mol/s, find the *mass of Mg consumed in 5.0 minutes.*

7) The mass of a burning candle is monitored to determine the rate of combustion of paraffin. An accepted reaction for the combustion of paraffin is:

$$2\ C_{28}H_{58\ (s)} + 85\ O_{2\ (g)} \rightarrow 56\ CO_{2\ (g)} + 58\ H_2O_{\ (g)}$$



The following data is observed:

Time (min)	Mass of Candle (g)
0.0	25.6
6.0	25.1
12.0	24.5
18.0	23.9
24.0	23.4
30.0	22.8

a) Calculate the average rate of consumption of paraffin in g/min for the time interval 12.0 to 24.0 minutes.

b) Calculate the rate of CO_2 production in mol/min for the time interval 12.0 to 24.0 minutes.