

# **Lesson 4- The effect of concentration**

Chemistry- Key Stage 3

Energetics

Miss Charlton



## Increasing the number of particles...

A

Increases the speed of the particles so they collide more.

C

Decreases the volume of products.

B

Increases the frequency of collisions as they collide more.

D

Increases the energy of the particles so they collide more.



## Decreasing the frequency of collisions...

A

Decreases the speed of the particles.

C

Slows down the rate of reaction.

B

Speeds up the rate of reaction.

D

Increases the speed of the particles



# Increasing the concentration...

A

Decreases the size of the particles.

C

Slows down the particles.

B

Gives the particles more energy.

D

Increases the number of particles per given volume.



# Decreasing the concentration...

A

Increases the frequency of collisions..

B

Slows down the particles.

C

Decreases the frequency of collisions.

D

Increases the rate of reaction.



# What sort of graph/chart will we use?

**A**

A bar chart

**B**

A line graph

**C**

A scatter graph

**D**

A pie chart

Concentration of HCl (M)	Time taken for 'X' to disappear (s)
0.25	148
0.5	123
0.75	105
1	79
2	39



# Complete the task

**Design a line graph using the variables you worked out before.**

**Don't plot the points.**



## 1) Describe the effect of concentration on the rate of reaction

- Mention how the concentration of acid affected the time it took for the X to disappear.
- Use data from the table to support your answer.

## 2) Explain why the reaction time was affected in this way

- Use the science you have learned this topic and the keywords below for both questions:

Collisions, time, concentration, acid, sulfur, opaque, particles, frequency.



# Answers



## Increasing the number of particles...

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C

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## Decreasing the frequency of collisions...

A

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Slows down the rate of reaction.

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# Increasing the concentration...

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# Decreasing the concentration...

A

Increases the frequency of collisions..

C

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Slows down the particles.

D

Increases the rate of reaction.



# What sort of graph/chart will we use?

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A bar chart

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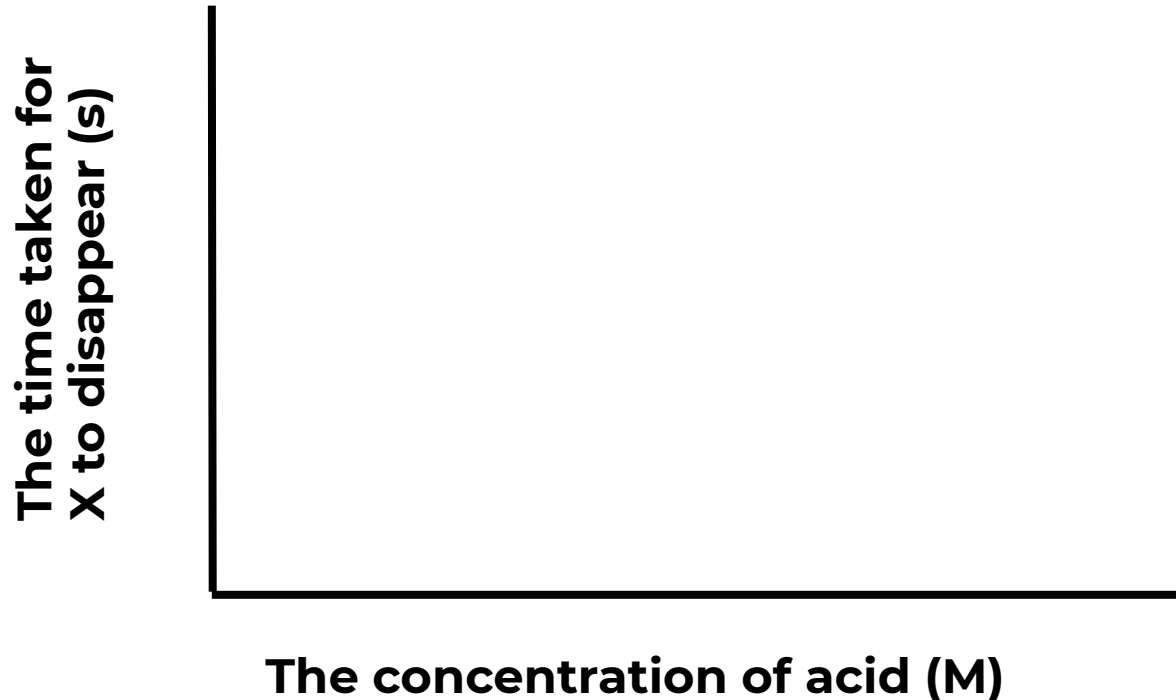
Concentration of HCl (M)	Time taken for 'X' to disappear (s)
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# Sodium Thiosulphate and Hydrochloric acid

IV: The concentration of acid

DV: The time taken for the X to disappear.



## Describe the effect of concentration on the rate of reaction

As the concentration of HCl increases, the rate of reaction also increases.

For example, at 0.25M HCl it took an average of 148 seconds for the 'cross' to disappear, but with 1M it only took an average of 79 seconds.

## Explain why the reaction time was affected in this way

This is because, the higher the concentration, the more acid particles there are in every cm<sup>3</sup>. This means that there will be more frequent collisions between acid particles and the sodium thiosulfate particles, so the reaction will be faster.

