

Investigation to show the effect of temperature on glow sticks



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Methodology:

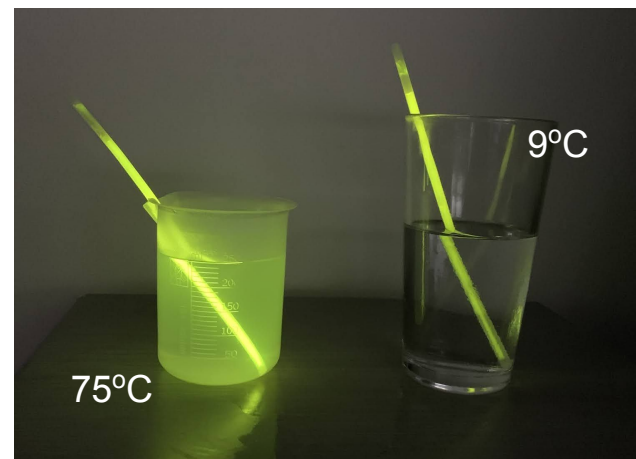
- Fill a beaker with very cold water, and another with hot water from the kettle
- Place a thermometer in each beaker and record the temperature
- Crack 2 glow sticks and place one in each beaker
- Record which glow stick is brightest and dimmest

Results:

- The results of our experiment concluded that the hotter the temperature, the brighter the reaction
- This is because the hot water speeds up the rate of the reaction
- However, in the colder beaker the reaction lasted much longer than the hot water
- This is because the cold water slowed down the reaction which causes it to last longer as the particles were used much slower

Further work:

- We extended the experiment by doing a second test with similar hot/cold environments, one in the fridge and the other at room temperature and left them for 24 hours
- We did this because it was important to show the effects that both hot and cold environment in a quantitative format
- Although we were definitely sure that the glow stick in the fridge lasted longer, it was difficult to record the exact time that each lasted for, so we did not manage to collect any quantitative data.



Theoretical Basis:

Temperature affects the rate of a reaction because the heat increases the amount of energy the particles have. The more energy the particles have, the faster they will move, meaning they will collide with other particles more frequently, increasing the speed of the reaction. We have proved that the hotter the particles the quicker and more vigorous the reaction is. The glow stick that was hottest, was glowing the brightest and it finished reacting quicker.

During the reaction the particles are used up, as they are turned into new particles. Eventually all the particles will be used up so the reaction will stop. The glow stick that is the hottest will stop reacting first because the hotter the glow stick, the faster the reaction so the amount of particles left decreases faster.

Evaluation of our experiments:

- We can improve by leaving the glow sticks in the water for 5 minutes before activating them. This is because we are trying to make them react in a set environment so it's important that the reaction starts in that exact environment.
- We could improve it if we had a photometer to measure the brightness of light which would provide a much higher accuracy.
- If we had a photometer we would be able to leave the glow sticks in their environments and the photometer observing them which would improve accuracy of our quantitative experiment.