Classroom Based Assessment

Introduction

For my classroom based assessment, I decided to do a UV bead experiment. Previously, I had researched the health effects of UV light and I found the topic quite interesting. I wanted to further research the effects of UV light on UV beads.

Statement of task

For my experiment, I wanted to see how fast UV beads change colour with the influence of UV light. I am going to use a UV torch to recreate the effects of natural UV light.

Hypothesis

I predict that the UV beads will turn a darker colour for the longer the torch is shined on it because the longer the torch is shined on it, the longer the beads will have to develop. I also predict the UV beads will change colour faster when the torch is closer to the beads as the light will be more concentrated the closer it is to the beads. The more concentrated light would dye the beads faster.

Background

UV light is ultraviolet light that comes from the sun. The ozone layer protects us from the harmful health effects of ultra violet light. Small amounts id UV light can be good for the production of vitamin D but large amounts can have serious consequences such as rickets, psoriasis, eczema, sunburn and skin cancer.

Tanning can also be caused by UV light which is why UV light is commonly used in the creation of tanning beds. Tanning beds are box shaped beds that have sunlamps in them. Sunlamps use UV lights to tan the skin. Continued use of tanning beds can cause serious health issues.

Considerations

For my experiment I had to consider the time I had to complete it. I had to make sure my experiment would be efficient enough to complete my

1. The student proposes two hypotheses that are testable

2. Testable hypothesis is justified

experiment and write up in the time given. I had to consider the materials that were available to me for my experiment. Luckily my science teacher had the materials needed to complete this experiment. I had to consider what variables I was going to use as i didn't want to put in too many variables that would complicate the experiment and make the results unclear. I had to consider what height I should put the torch at as I wanted the results to show the different effects of how the height can affect the concentration of the light.

Equipment

- I used a retort stand to hold the UV torch as the stand would hold it still while still allowing the height to be changed for the different experiments.
- I used the UV torch to recreate the effects of UV light on the beads.
- I used UV beads to test the effects of UV light
- I used a Petri dish to hold the UV bead still while we were performing the experiment
- I used a ruler to measure the height of my torch to make sure it was accurate.
- I used an iPad to measure the time and to take pictures of the bead every 5 seconds.
- I put a piece of tissue paper under my Petri dish to make sure there was nothing affecting the colour of the bead.
- I used a UV colour chart to measure the shade of the beads.

3. Displays evidence that considerations have been made related to reliability and fairness.

CBA1 Extended Experimental Investigation
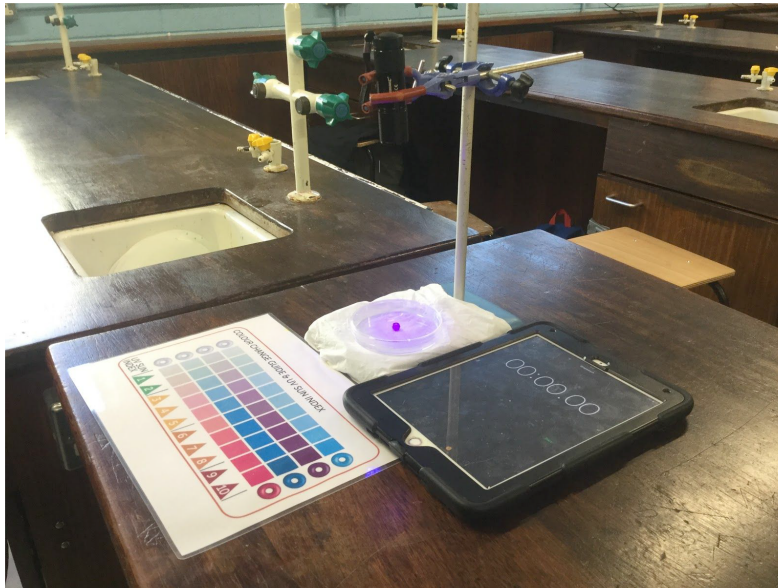

4. Method and equipment are identified.
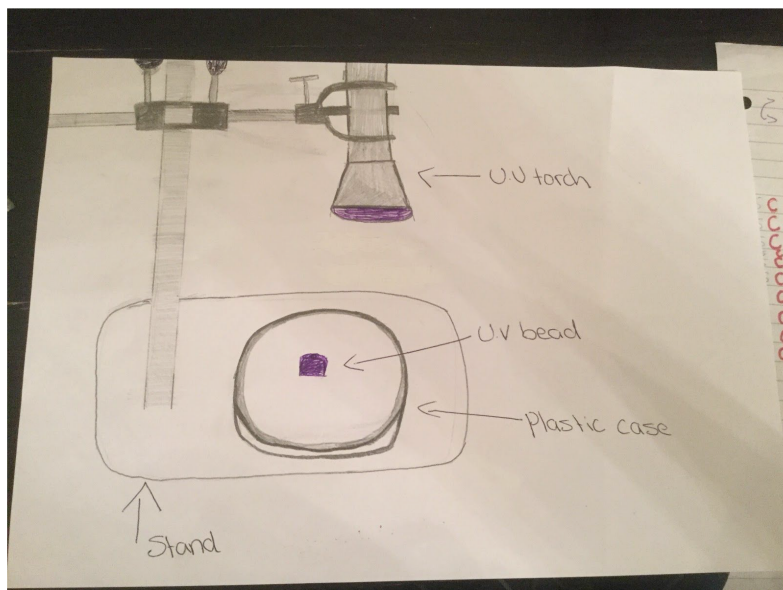
Procedure

I first set up my retort stand at 10cm and placed my torch into the clamp. I placed a tissue on the base of the retort stand so the colour of the bead would be clear. I placed one bead into the Petri dish and placed it on the base of the retort stand. My friend place her iPad beside the retort stand so I could have a timer to measure the amount to seconds it took for the bead to change colour. At every time I was measuring the colour of the bead, my friend paused the time and the torch for a brief second. I took a picture of the bead. I took the picture while the torch was paused so I could have an accurate picture of the shade of the bead. Once I had taken all of the pictures and the time I was measuring was measured, I looked at the pictures and compared them to the UV colour chart. I wrote the results I found into my copy.

CBA1 Extended Experimental Investigation

This was the set up of my experiment as it was being performed. You can see the colour chart and the timer clearly in the picture.

Variables
The variable I used was the height of he UV torch. I made sure I only used one variable to ensure that the results were easy to understand. I had the heights 15cm, 20cm and 25cm. I wanted to see the different results that would come from different heights that were close in measurement.

Measurements
I measured the colour of the beads at 5, 10 and 15 seconds. I used the UV colour chart to compare the beads and find out what shade they were. I used a purple bead for my experiment as I found it was the easiest to decipher the different colours on the chart.

5. Set-up and procedure allows for collection of good quality data.

6. Variables to be changed and controlled are identified by the student and the method is outlined although it may not be easily repeated by others.

CBA1 Extended Experimental Investigation
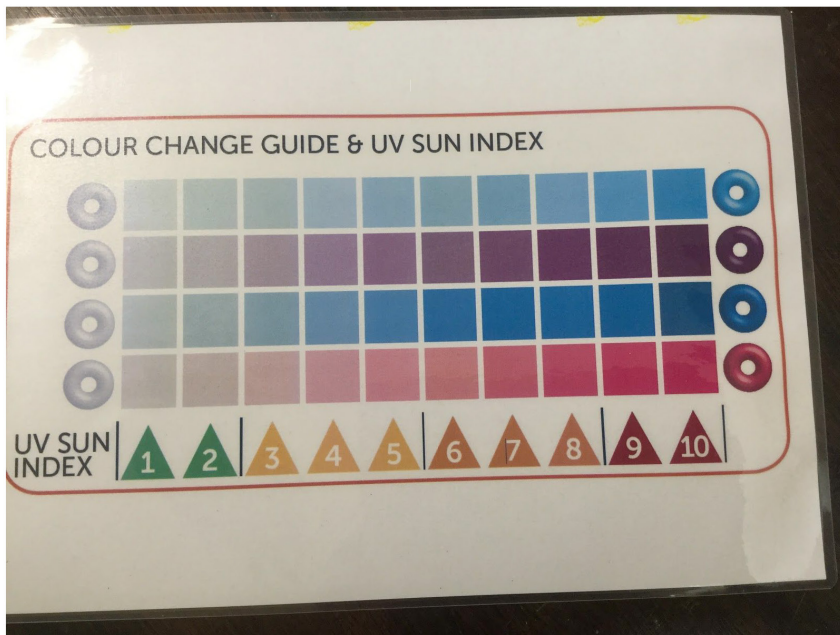
This is the UV colour chart I used to compare my beads. I used the second row of colour as I used a purple bead to complete my experiment.

Results

CBA1 Extended Experimental Investigation

I used the UV colour chart to measure the colour of my beads. The UV colour chart measures the colours from 1 to ten 1 being the lightest and 10 being the darkest. The results varied with the different heights and seconds. The averages show how the shade varied with the height of the torch.

7. The first set of data, sufficient to test hypothesis. Table includes time in seconds and distance in centimetres in addition to the shade intensity of the bead
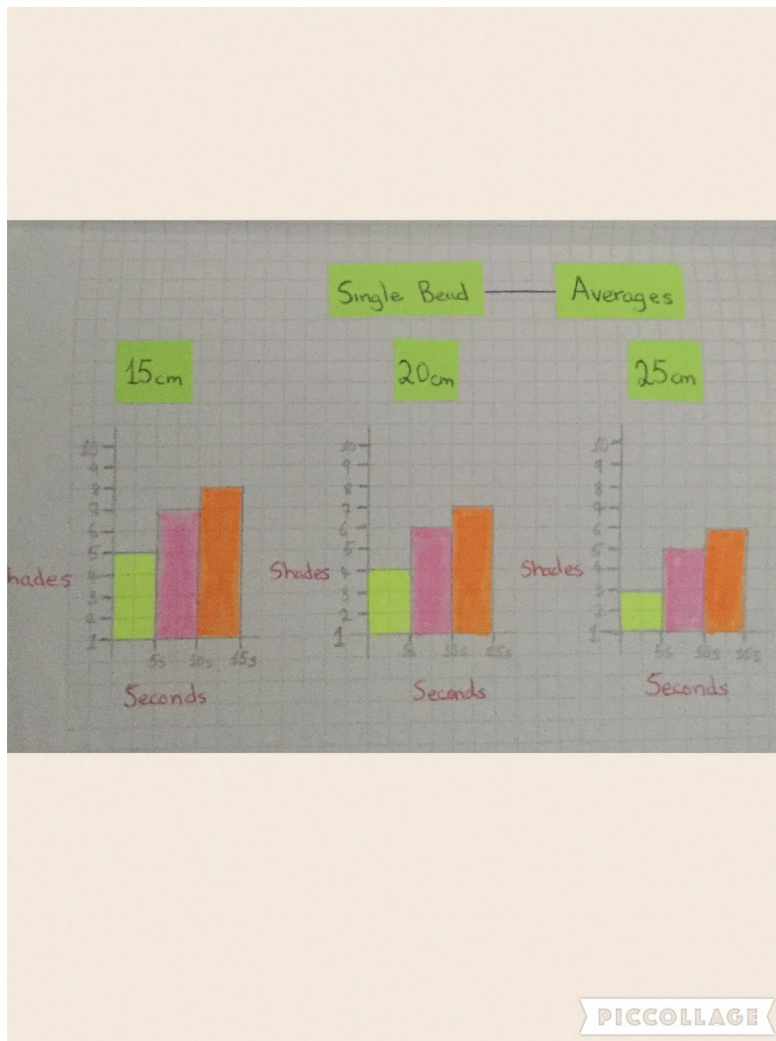
From the bar charts you can see how the numbers decrease with the height of the torch. The bar charts were created using 1-10 as the scale on the side.

8. States a simple relationship between the variables.

CBA1 Extended Experimental Investigation

Safety

- I made sure the clamp on the rotary stand was clamped tight to make sure that the clamp wouldn't loosen and drop the torch.
- I was careful to seal the bag of UV beads correctly so the UV beads wouldn't fall into the floor making them a slipping hazard. This would be especially dangerous in a room full experiments and chemicals.
- Although the health effects of UV light are only effective after a long period of continuous exposure to UV rays, I tried to keep my skin away from the beams of the UV torch to prevent any skin problems.

Time

I had 3 weeks to complete my experiment and write up of my experiment. I had 3, 40 minute science classes each week. I completed my experiment at the end of my fifth science class. I completed my diagrams and graphs in my sixth science class in the 3 weeks provided for the classroom based assessment. I completed my write up in the remaining 3 classes.

What went wrong

Initially, I did my experiment using several beads. I realised after completing the experiment that the results were inaccurate as I wasn't measuring the colour of the same bead each time, this made my experiment unfair.

9. Outlines safety considerations.

Results

Multiple Beads Experiment

Try 1	Try 2	Try 3
Shade 5	Shade 5	Shade 3
Shade 8	Shade 7	Shade 6
Shade 10	Shade 9	Shade 7

Try 1	Try 2	Try 3
Shade 5	Shade 5	Shade 6
Shade 9	Shade 7	Shade 8
Shade 9	Shade 8	Shade 9

Try 1	Try 2	Try 3
Shade 4	Shade 5	Shade 6
Shade 5	Shade 7	Shade 8
Shade 7	Shade 8	Shade 9

Averages

15cm	20cm	25cm
Shade 4	Shade 5	Shade 5
Shade 7	Shade 8	Shade 7
Shade 9	Shade 9	Shade 8

You can tell from the results that the results are inaccurate and that it wouldn't be a fair experiment if I had not redone the experiment using one single bead.
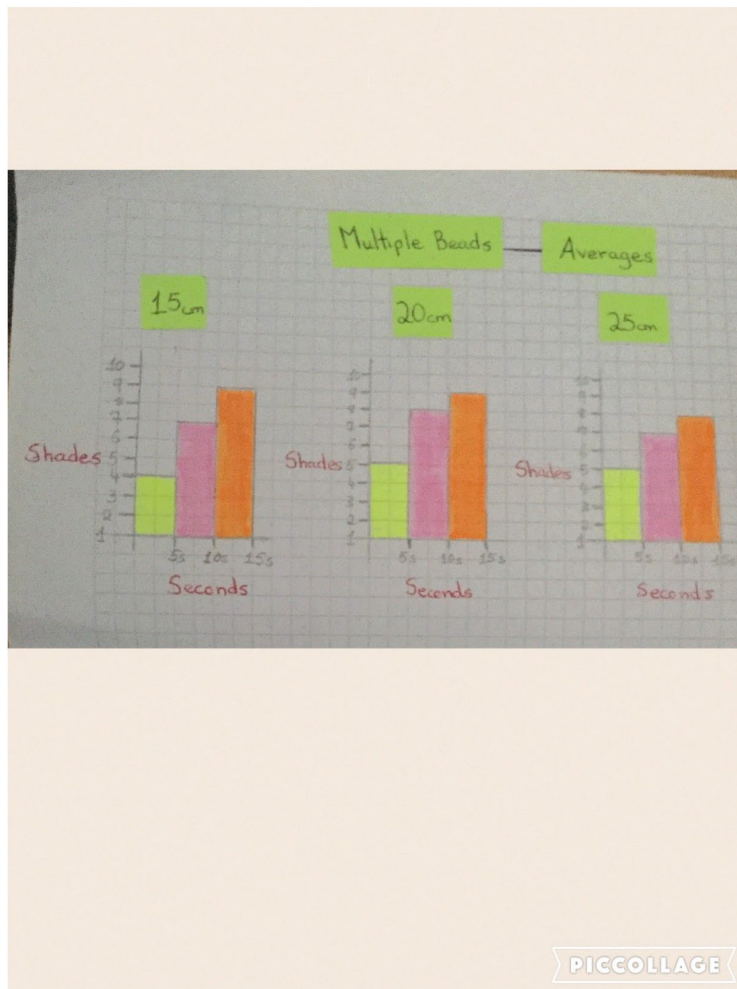
These bar charts show the averages of the the inaccurate experiment. They were also measured using the UV colour chart.

CBA1 Extended Experimental Investigation

Conclusion

The results of my experiment prove my hypothesis that the colour of the bead gets darker the closer the torch is to the bead. When I held the torch for 15s the colour was the darkest it has been throughout the experiment. I stopped measuring the colour after 15s as the colour would have just gotten to shade 10 and the results would stay the same if I held the torch for any longer. I feel my experiment shows the effects of UV light correctly as I used a fair experiment with clear results. If I had left my results at the multiple bead experiment I feel the results would not represent the experiment well and the results were not clear.

10.Draws a conclusion consistent with data and comments on whether it supports the hypothesis although there is some confusion in how this is expressed.

Overall judgement: Above expectations

Exceptional | Above expectations | In line with expectations | Yet to meet expectations