HIGHAM LANE
NORTH ACADEMY

SUMMER OF SCIENCE

A Summer of Science

Remember that although you don't have to do any of these activities you will receive merits based on the quality of your work. It may even be put on display around the science department as well.

In this booklet you will find some examples of science experiments that you can do at home but remember, there are plenty of other examples out there so you can chose to do any you wish. Here are some ideas of what you could include to help you write like a scientist and achieve a great piece of work.

Introduction—Make sure that your teacher knows what you are going to do in your experiment.

Prediction—Try to predict what you think will happen in your experiment.

Method—What are you going to do? Think of this as a set of instructions that somebody else in your family could follow.

Safety—It is extremely important that all science experiments are carried out safely. How are you going to make sure you can do this? If you are unsure ask an adult to help you with this part.

Results—What happened in your science experiment? Think carefully about how these are presented. Would they look better in a results table or maybe even a chart or graph?

Conclusion—Present a round up of your results giving the general trend. Was your prediction correct?

Evaluation—If you were to do your experiment again, what would you improve about it and why?

Remember to compile all of your work together into a folder, create a front page and present it to your new science teacher in September.

Biology—Transport Systems in a Flowering Plant

This nice experiment is a classic! We can observe how flowering plants can transport water from their roots to their petals.

Equipment

- White Chrysanthemum or carnation (daffodils also work).
- Measuring jug
- Sharp knife and chopping board
- 2 cups or beakers
- Plastic tray
- Sticky tape

Health and Safety

1. Ask a responsible adult to cut the flower as described in the first step using the sharp knife and chopping board.
2. Plant sap may be an irritant for some people.
3. Food dyes are low hazard.

Method

1. Take a white flower with a long stalk and ask a responsible person to cut the stalk carefully lengthwise (either all the way along the stalk to the base of the flower or just part way up the stalk).
2. Put each half of the stalk into a beaker containing either plain water or water to which food dye has been added.
3. Wedges of paper underneath the beaker will tilt them towards one another and may make it easier to insert the stalks and these can be taped to a plastic tray so that they don't fall over.
4. Leave the flower for a few hours (or overnight) and see where the dye ends up in the flower head.

Biology—Transport Systems in a Flowering Plant

Extension questions

1. Water and dye are passing through certain structures as they travel up the plant. Can you name these structures?
2. When they reach the flower petals, what happens to the water?
3. When they reach the flower petals, what happens to the dye?
4. What is the consequence of the difference in the behaviour of water and dye?
5. Why might this technique be used by a business?
6. What would happen if you used different coloured dyes in the two different beakers? Could you try this?
7. Use suitable methods of research to find the names of plants with blue flowers. How many can you find?

Chemistry—Separating the Colours of an M&M shell

This relatively simple practical allows us to look at what an M&M® coating contains. Read the notes before collecting all of your equipment together and having a go yourself. In total this experiment should take less than 2hrs.

Notes

1. Whatman chromatography paper works best for this experiment, but, if unavailable, large sheets of ordinary filter paper can be cut up instead.
2. Ensure that the hairdyer has had an electrical safety check.
3. M&M'S® with a variety of about 6 or 7 different colours are required for each group.
4. If M&M'S® are unavailable this experiment can be carried out with liquid food colouring which is readily available from supermarkets. Chromatography of Smarties® is less successful as they use natural food colourings. Peanut M&M'S® should not be used if there is anybody with a peanut allergy.

Health and Safety

If the above notes have been followed then this is a perfectly safe experiment to carry out carefully under the supervision of an adult.

Equipment

- Beaker
- Small soft paint brush
- 2 Paper clips (preferably plastic coated)
- Chromatography paper, approximately 20cm x 10cm (Note 1)
- Pencil and Ruler
- A hairdryer (optional) (Note 2)
- A supply of M&M'S® of various colours (Note 3 and 4)

Chemistry—Separating the Colours of an M&M shell

Method

1. Place the piece of chromatography paper on a clean flat surface, with the longer side horizontal and draw a horizontal line in pencil (not biro) about 1.5 cm from the base of the paper.
2. Use the dampened paint brush to remove the colour from one of the M&M'S® and paint this colour on the line about 2 cm from one end. Small spots are best.
3. Clean the brush in fresh running water and paint the colour of another M&M® on the line about 2 cm from the first spot.
4. Repeat this until all the colours are on the paper or until you have reached the other end.
5. Use a pencil (not a biro) to write the name of the colour next to the corresponding spot.
6. Roll the paper into a cylinder and hold this in place with the paper clips. Try to avoid any overlapping of the paper when you make the cylinder.
7. Put water into the beaker up to depth of about 1 cm.
8. Lower the paper cylinder into the beaker of water thus allowing the water to rise up the paper. Ensure that the water is below the level of the spots. Try to avoid moving the paper cylinder about once it is in position.
9. When the water approaches the top of the paper cylinder remove it from the water. Mark with a pencil the level of the water at the top of the filter paper.
10. Allow the paper cylinder to dry, perhaps by using a hairdryer if available or by clamping it and leaving it to dry overnight.
11. Unravel the paper cylinder and examine it carefully.

Extension questions

1. Why do you think some dyes separate out into different colours whilst others do not?
2. Why do you think some colours move further up the paper than others?
3. Can you think of any way of improving the separation between the different spots?
4. Look on the side of a M&M'S® packet for a list of the coloured dyes used. Try to identify which dyes correspond to the spots on the chromatogram.

Physics—Straw Oboes

This practical is extremely simple but a lot of fun. It allows us to see the link between the size of an instrument and the pitch of the sound produce. Beware though, you may need a large supply of straws as this can become highly addictive!

Equipment

- Straws (need to be straight – cut off the bendy bits if there are any)
- Scissors

Health and Safety

This practical is extremely safe to carry out as long as there is a responsible person nearby who can help or supervise the cutting of the straw.

Method

1. Flatten one end of the straw ~2cm from the end to the tip.
2. Make two cuts in the now flattened end of the straw, to form a triangular tip.
3. Insert the triangular tip of the straw into your mouth and blow hard. You should hear a loud 'buzzing' sound.
4. While blowing on the straw oboe, get a volunteer to cut the straw shorter, ~1cm at a time. With each cut you will hear the pitch of the oboe sound go up.

Extension questions

1. What is happening to make a sound?
2. What is the link between the length of the straw and the sound that you hear?
3. Does the diameter of the straw affect the sound that is made?
4. Can you get more than one straw and recreate your favourite piece of music?