February 2021 – Spring Term

#SolveItWithSTEM@Home Secondary Activity Pack
Friday 12th February 2021

Welcome everybody...

Hello everyone – we hope you've had a good week and enjoyed the snow...if you had any?!
We didn't have too much snow at the Fawley site but it was still very cold!

Did you know on Thursday 11th February it was the **International Day of Women and Girls in Science**? So many different women around the world are involved in STEM. Why not check out the **Curiosity Camp at GoldieBlox on Youtube**?!
You will get to learn about the cool parts of STEM led by very talented guides!

This week the theme is **Colour!**

Do you know how many colours one person can register? A healthy human has three types of cone cells, each register about 100 different colour shades. Researches suggest the number of colours we can distinguish at around **a million**!...how cool is that?!

We hope you enjoy this week's pack. Please remember to share the packs with your family and friends online via **www.fawleyonline.org.uk**
See you soon, Alice and Eddie

Activity: Understanding colour
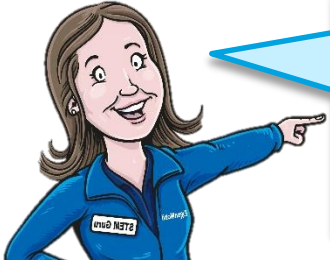
Using the words in the grey box, fill in the blanks below...answers will be provided next week!

If you get stuck, use the following link –
What is colour? – BBC Bitesize

white light
violet
absorb
separated
three
colours
disperse
higher
green
green
yellow
reflect
frequency
orange
eyes

What are light and colour?

White light from the Sun is a mixture of colours, each with a different ……………… You can use a prism to split (or ……………) white light into a spectrum of colours: red, …………, yellow, green, blue, indigo and …………
Dispersed means that the colours are ……………… out.
We see ……………… frequencies of light as blue or violet, lower frequencies of light are seen as red and orange. …………… light is in the middle.

Eyes and colour

Our eyes only detect …………… colours: red, ………… and blue. By combining these, however, we can perceive many different colours.
By mixing red light and green light, for example, we can see ………… If all three are mixed together we see ………………
Objects …………… and ……………… light differently. A lemon reflects yellow light, all the other ……………… are absorbed and so are not seen by our ……….

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Experiment: Rainbow coloured naked eggs
(Make sure you have an adult help you with this activity)

Items Required:
- 7 small glass jars
- Food colouring in the primary colours (red, yellow, blue)
- Vinegar
- 7 eggs

As you can see they have used six colours here rather than the seven we have used!

Instructions:
- Firstly line up the seven glass jars and work out how to create the **rainbow** colours using the primary colours. You will need to create some of the secondary colours by mixing the food colouring together…Eddie has given a clue below on how to make indigo and violet.
- In each jar, add 10 drops of the food colouring(s) you are wanting to include. E.g. in the first jar, you will include **10 drops of red**, in the second jar you will include **5 drops of red** and **5 drops of yellow** to make **orange** and so on…
- Once you have added the colours, fill each container with vinegar – about ½ full.
- Carefully place a raw egg inside each jar.
- Let the eggs sit for about 48-72 hours in the vinegar.
- Over time, the vinegar will break down the calcium on the egg's shell, leaving the egg completely whole but soft.
- When the surface of the water has a weird film, the eggs are ready to come out.
- Remove the eggs from the jars (carefully) and rinse them in water.
- They are completely coloured. Gently roll and bounce the eggs to see what happens…
- Once you have finished playing with the eggs, please dispose of them.

This experiment was inspired by the following link:
Rainbow Rubber Eggs Naked Egg Experiment (steamsational.com)…check it out!

Indigo and violet are similar as they use the same primary colours (red and blue) as a base however you need to alter the ratios. For indigo, use two parts blue and one part red. For violet, use two parts red and one part blue.

Maths: Secret Code

0	1	2	3	4	5	6	7	8	9
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Example:

🟨 🟥 🟪 🟩

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works out as

$$\begin{array}{r} 2\,0\,7\,3 \\ +\ 5\,4\,4\,7 \\ \hline =\ \mathbf{7\,5\,2\,0} \end{array}$$

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Decode the numbers using the colour chart and solve the equations.
Answers will be given in next week's pack.

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Answers: w/e 5th February 2021 STEM Pack

Maths (Page 5): How much water do we really have and how much do we use?

1. You have used 175L of water already today. You have washed your laundry once and have brushed your teeth an unknown number of times. How many times have you brushed your teeth today?

Answer: one time

2. You have used 255L of water already today. You have washed a load of laundry, had a shower and washed the dishes in the dishwasher. How long did you shower?

Answer: 5 minutes

3. You are making apple sauce and you have brought in 3 kg of apples from your backyard. How much water (in kg) is contained in the apples?

Answer: 2.55 kg

4. You are making a large salad with 1 kg of tomatoes, 1 kg of potatoes and 2 kg of spinach. How much water (in kg) will be contained in your salad?

Answer: 3.65 kg

5. In the whole world there is 1.4 x 10^{21} L of water. However, only 0.26% of that water is available for human and plant use. How many litres are available for human and plant use?

Answer: $3.64 * 10^{(18)}$ Litres

6. Out of the water available for humans and plants (answer to question #7), only 0.014% is available to be used as safe drinking water. How many litres of safe drinking water does the world have?

Answer: $5.096 * 10(14)$ Litres

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We hope you enjoyed this week's activities.

Another pack will be on its way to you next week...

Best wishes
The ExxonMobil Fawley #SolveItWithSTEM Team!

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