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March 2021 – Spring Term

#SolveItWithSTEM@Home

Secondary Activity Pack

Friday 5th March 2021

Hey everyone and welcome to our last week!...

Hello everybody and welcome to the last week of #SolveItWithSTEM@Home activity packs. Eddie and I hope you have enjoyed the past eight weeks but it is time for us to go so you can get back into school life!

Although we are saying goodbye, this doesn't mean you have to stop exploring STEM...did you know it is British Science Week this week? From 5th March right up to 14th March...they even have their own activity packs – check them out here:

<https://www.britishscienceweek.org/plan-your-activities/activity-packs/>



In this pack we wanted to show you all what ExxonMobil Fawley has been busy doing during the COVID-19 pandemic...as well as a fun experiment and maths questions!

With sunnier and warmer days approaching, we will soon be in Spring and hopefully exploring the outdoors as restrictions change.

Remember to visit www.fawleyonline.org.uk so all your friends and family can take part in the activity packs.

See you soon, Alice and Eddie!

Fawley and the COVID-19 pandemic: What have we been up to?

ExxonMobil has been working to help meet the needs of communities and health care professionals fighting this pandemic on the frontlines while we remain focused on meeting energy demand. Eddie and Alice have provided examples of who ExxonMobil has supported within Europe and what Fawley has contributed within the UK!

What is polyethylene?

A light, versatile resin that is used all around the world. Can be made into products ranging from clear food wrap, shopping bags to detergent bottles and fuel tanks. [polyethylene | Properties, Structures, Uses, & Facts | Britannica](#)

What is isopropyl alcohol?

Is a chemical compound and when mixed with water can be used as a rubbing-alcohol antiseptic. [isopropyl alcohol | Uses, Structure, & Formula | Britannica](#)



France

- Donated enough **polyethylene** for one of our customers to produce 370,000 protective coats, which will be distributed to local hospitals around Lyon.

Belgium

- Donated **isopropyl alcohol** to make hand sanitizer for the Santhea Care Group, to help keep their 56,000 health care workers safe.

The Netherlands

- Made a contribution to the Dutch Red Cross, on top of contributions from our employees.

Spain

- Donated low-density polyethylene to a customer making protective medical gowns to be given to a hospital in Santander.

United Kingdom

- ExxonMobil UK provided fuel cards to charity volunteers delivering COVID-19 response activities in communities local to our key sites.
- Fife Ethylene Plant and Fawley refinery and chemicals plant donated some surplus PPE to support local healthcare workers.

Fawley



Butyl Polymer is a synthetic rubber made at Fawley that can be used to make stoppers for medical purposes. It is currently being used for COVID-19 vaccines.



A product called **Heptene** is produced at Fawley – this product goes into the production of face masks.



A product called **Nonene** is produced at Fawley – this product goes into the production of detergents for industrial and institutional (inc. hospital) cleaning products.



Nonene also goes into the production of vinyl flooring which is being used to convert public halls into temporary hospitals for COVID-19 treatment.



Several different Fawley products go into the production of PPE-grade gloves (used in healthcare and cleaning).

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If you would like to find out more on how ExxonMobil has supported communities during the coronavirus, please visit:

[Supporting the Fight Against Coronavirus In Europe - Energy Factor \(exxonmobil.eu\)](https://www.exxonmobil.eu/Supporting-the-Fight-Against-Coronavirus-In-Europe-Energy-Factor)

Experiment: How to get an egg into a bottle

(Make sure you have an adult help you with this activity)

Items Required:

- Hard boiled egg, peeled (be sure to have a few because you'll want to see this again!)
- 1 glass bottle (similar to a glass milk bottle – ensure the mouth is slightly smaller than the egg)
- Matches or lighter
- Paper strips (A5 length strips)
- Gloves



Instructions:

- **Ensure an adult is present and completes this part of the experiment.** Wearing gloves, use a match or lighter and light a paper strip and place it into the glass bottle.
- Then place the egg at the narrowest point over the bottle opening.
- The paper strip that is alight will burn out and the egg will get sucked into the bottle.

What actually happened?

As the lighted piece of paper burnt inside the bottle it uses up the oxygen creating a vacuum that sucks in the egg into the bottle.



Maths: Fractions

Have a go at the below questions on fractions!...the answers have been provided on slide 7 if you get stuck.

Question:

The first two terms of a sequence are $\frac{2}{3}$ and $\frac{4}{5}$.

Each subsequent term is the mean of the two previous terms.

What is the fifth term in the sequence?

Use the space provided below to work it out.

Question:

List the following fractions in increasing order:

$\frac{11}{6}$ $\frac{5}{3}$ $\frac{7}{4}$ $\frac{9}{5}$ $\frac{3}{2}$

Use the space provided below to work it out.

Answers: w/e 26th February 2021 STEM Pack

Maths: these maths questions are sound!... (Page 5)

Question:

Brian's band is playing at a concert in a hall. The **loudness** of a band **varies inversely as the square of the distance** from the band. Brian measures the normal loudness of his band as **100** decibels at a distance of **5** metres. The band has to stop playing if the loudness is **80 decibels** or more at a distance of **4.8** metres. Does the band have to stop playing?

Use the space provided to work it out.

$$L \propto \frac{1}{d^2}$$

$$L = \frac{k}{d^2}$$

$$100 = \frac{k}{5^2} \rightarrow k = 2500 \rightarrow \text{So } L = \frac{2500}{d^2}$$

$$\text{If } d = 4.8 \rightarrow L = \frac{2500}{4.8^2} \rightarrow = 108.506... \\ = \mathbf{108.5 \text{ decibels}}$$

108.5 is more than 80 decibels, therefore the band would have to stop playing

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Question:

The table gives the sound levels of some sources of sound. Enter the following sources of sound in the correct places.

- Background noise at home
- At a concert – 1 metre from a loudspeaker
- Normal talking
- Whispering

| Source of Sound | Sound level in decibels |
|---|-------------------------|
| Threshold of sound | 0 |
| Whispering | 20 |
| Background noise at home | 40 |
| Normal talking | 60 |
| Noise pollution level | 90 |
| Pneumatic drill – 5 metres away | 100 |
| At a concert – 1m from a loudspeaker | 120 |
| Threshold of pain | 140 |

Answers: w/e 5th March 2021 STEM Pack

Maths: Fractions (Slide 5):

Question:

The first two terms of a sequence are $\frac{2}{3}$ and $\frac{4}{5}$.

Each subsequent term is the mean of the two previous terms.

What is the fifth term in the sequence?

Answer: $\frac{3}{4}$

Numbers (the maths way)...

$\frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15}$, so the average is $\frac{11}{15}$

$\frac{4}{5} + \frac{11}{15} = \frac{12}{15} + \frac{11}{15} = \frac{23}{15}$ so the average is $\frac{23}{30}$

$\frac{11}{15} + \frac{23}{30} = \frac{22}{30} + \frac{23}{30} = \frac{45}{30}$ so the average is $\frac{45}{60} = \frac{3}{4}$

Question:

List the following fractions in increasing order:

$\frac{11}{6}$ $\frac{5}{3}$ $\frac{7}{4}$ $\frac{9}{5}$ $\frac{3}{2}$

Answer:

$\frac{3}{2}$ $\frac{5}{3}$ $\frac{7}{4}$ $\frac{9}{5}$ $\frac{11}{6}$

$\frac{11}{6} = 1\frac{5}{6}$ this is $\frac{1}{6}$ below 2

$\frac{5}{3} = 1\frac{2}{3}$ this is $\frac{1}{3}$ below 2

$\frac{7}{4} = 1\frac{3}{4}$ this is $\frac{1}{4}$ below 2

$\frac{9}{5} = 1\frac{4}{5}$ this is $\frac{1}{5}$ below 2

$\frac{3}{2} = 1\frac{1}{2}$ this is $\frac{1}{2}$ below 2

meaning = $\frac{3}{2} < \frac{5}{3} < \frac{7}{4} < \frac{9}{5} < \frac{11}{6}$

We hope you enjoyed the last week of activities.

Enjoy your time back at school and remember to stay safe. Who knows...you may see Eddie and Alice in the near future!

Best wishes

The ExxonMobil Fawley #SolveItWithSTEM Team!

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