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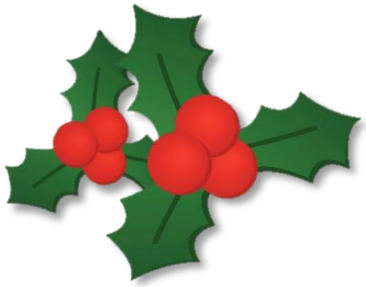
December 2020

Christmas and New Year #SolveItWithSTEM@Home Activity Pack

featuring Alice and Eddie, the STEM Gurus!



Hey everyone!
We hope you missed us...but we also hope you have had a great time getting back into a routine at school over the last few weeks.

We have decided to put together a **Christmas and New Year edition of #SolveItWithSTEM@Home** so you can enjoy activities at home over the holidays.

We have included all sorts: from creating Christmas cards, to solving a Christmas maths puzzle, to helping Eddie!

Have a lovely Christmas and a Happy New Year.
Stay connected with friends and family and most of all, stay safe.

Happy Holidays, Alice and Eddie

Safety at Home

Eddie forgot to turn the plug off before connecting his Christmas lights!

Can you remind him what else he needs to be careful with this Christmas?
Colour in the item(s) below which could be unsafe for Eddie...

Organising his teddy bears

Using a sharp knife to cut up the Christmas dinner

Leaving the heated blanket on

Climbing up ladders

Counting how many presents he has

Overloading plug sockets

Lighting candles

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Activity #1: Fingerprint Christmas Lights Card

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

Now Eddie knows how to be safe this Christmas, why not help him decorate the Christmas lights!

Items Required:

- Christmas card cut-out (this is available on page 5)
- White card or paper
- Printer
- Scissors
- Washable paint (various colours)
- Tray or bowl
- Pen
- Your hands!

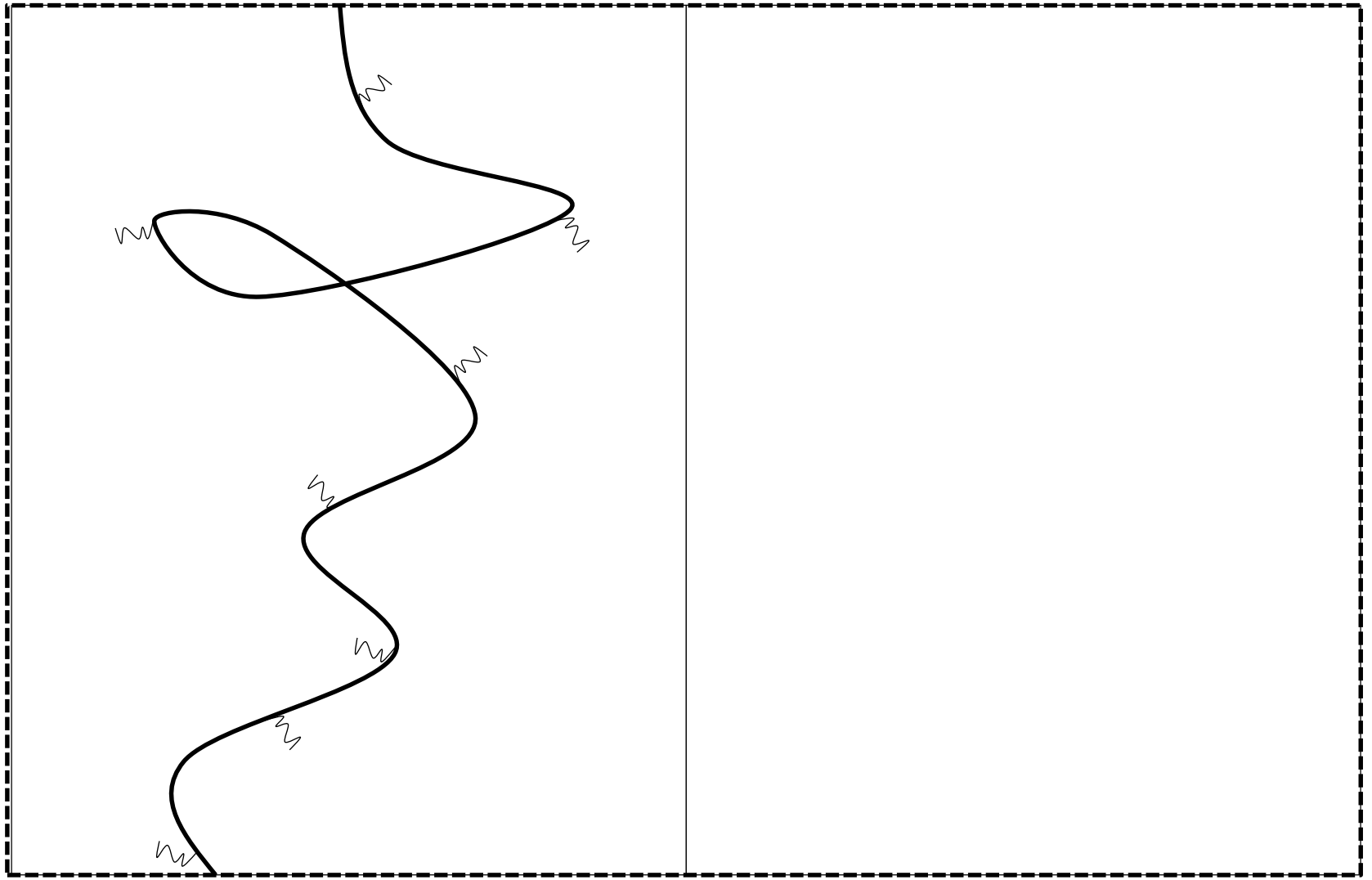
Instructions:

1. Print and cut out the Christmas card cut-out (which can be found on page 5). Please use thin card if available as it will be a stronger material when using paint. If you are unable to print, you can simply copy the measurements on a piece of card and draw your own Christmas lights line.
2. Select what washable paint colours you would like to use and pour some paint on a tray or bowl ensuring they do not mix.
3. Decide which colour you would like to use first and dip your finger in the paint.
4. Print the paint on Side 1 next to the light bulb hanger.
5. Repeat this exercise with different fingers and different colours, slowly filling up the Christmas lights! Once this is complete, let the paint dry.
6. Once the paint has dried, fold the Christmas card on the centre line.
7. Your Christmas card is now ready – write your personal Christmas message inside your card send to your friends or relatives! With situations being a little different this year, you may wish to repeat the activity and send to many relatives wishing them a happy Christmas.

This activity was inspired by several websites, including:
https://www.muminthemadhouse.com/fingerprint-christmas-cards/
https://www.sitters.co.uk/blog/the-top-15-christmas-card-ideas-kids-can-make.aspx

Activity #1: Fingerprint Christmas Lights Card cut-out

Side 1



Side 2

Wintery wildlife: Hedgehogs

Alice loves the area she lives in because she is surrounded by wintery wildlife! One of her favourite animals to watch this time of year is...the hedgehog. Find out from Alice how you can help hedgehogs this winter...

Currently hedgehogs are preparing for hibernation. They usually hibernate between November and mid-March – animals must have enough fat reserves to survive **hibernation**.

What does *hibernation* mean?

Hibernation is a way that some animals deal with the harshness of winter. They curl up in a safe place and stay there until winter ends.

Please follow this link for more on hibernation

Food and fresh water will encourage hedgehogs to return

- Leave out foods like tinned dog or cat food (not fish-based) and crushed dog or cat biscuits. Specialist hedgehog food is also recommended and can be bought from wildlife food suppliers.
- Never feed hedgehogs milk as it can cause diarrhoea; instead provide plain, fresh water in a shallow bowl.

What are *invertebrates*?

An **invertebrate** is an animal without a backbone. Invertebrates live in every part of the world. In fact, most of the animals on Earth are invertebrates.

Please follow this link for more on invertebrates

Making hedgehog homes in the garden and providing food will help hedgehogs

- Leave areas of the garden 'wild', with piles of leaf litter and logs. These are an attractive nest as well as a home for the **invertebrates** (slugs, beetles) that hedgehogs like to eat.
- Making an artificial home can be as simple as placing a piece of board against a wall.

Did you know?...

The west European hedgehog (scientific name *Erinaceus europaeus)* is Britain's only spiny mammal. They have around **6000 spines!**

Check out a video of "Snufflespoons" on Fawley Online, our local spikey friends!

Video courtesy of E. Roberts

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Activity #2: Making snowflake pretzels

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

Ingredients/Items Required:

- White chocolate chips (200g for cooking, 50g extra to make lollies *optional*)
- 32 mini pretzels (approx. 45g)
- White or silver sprinkles
- Baking tray
- Baking parchment or foil
- Microwave (or the hob)
- Eight paper lolly sticks (optional)

Instructions:

1. Put a sheet of baking parchment or foil on a baking tray.
2. Place the 200g of white chocolate into a bowl and melt. You can either melt carefully in the microwave or in a bowl set over a pan of simmering water – **please ask the adult present to simmer the water in a pan as this will get hot**. If you do choose to simmer the water – don't let any water get into the bowl or allow the base of it to touch the water.
3. Once the chocolate has melted, add the pretzels and stir well. If you have melted the chocolate in a bowl over a pan – turn off the heat but leave the bowl on the pan and stir the pretzels in.
4. Lift the pretzels out of the chocolate with a fork, shaking them a little so the excess chocolate drips off, then put them on the baking tray and in the freezer for 5 mins to set.
5. Once out of the freezer, dip the pretzels in the chocolate again, then lay four at a time together on the tray and push them together, with the pointy ends in the centre, to make a snowflake shape. Add a blob more chocolate with the end of a teaspoon in the middle of each snowflake so they hold together when set.
6. Before they set, decorate with sprinkles. Leave somewhere cold to set completely – you can use the freezer if you want to speed up the process.
7. If you want to make the pretzel snowflakes into lollipops, melt the extra 50g chocolate as before and make eight well-spaced blobs, the size of a 1p coin, on a piece of baking parchment or foil. Put a paper lolly stick on each blob so one end is in the chocolate, then press a pretzel snowflake gently on top and leave somewhere cold to set. *Will keep for one to two days in a cool place*.

This activity was taken from the following website:
https://www.bbcgoodfood.com/recipes/snowflake-pretzels

12 Days of Christmas maths question

According to the traditional song, on the first day of Christmas (25th December), my true love sent to me:

- **A partridge in a pear tree**

On the second day of Christmas (26th December), my true love sent to me **THREE** presents:

- **Two turtle doves**
- **A partridge in a pear tree**

On the third day of Christmas (27th December and so on) my true love sent to me **SIX** presents:

- **Three French hens**
- **Two turtle doves**
- **A partridge in a pear tree**

This carries on until the twelfth day of Christmas, when my true love sends me:

- **Twelve drummers drumming**
- **Eleven pipers piping**
- **Ten lords a-leaping**
- **Nine ladies dancing**
- **Eight maids a-milking**
- **Seven swans a-swimming**
- **Six geese a-laying**
- **Five gold rings**
- **Four calling birds**
- **Three French hens**
- **Two turtle doves**
- **A partridge in a pear tree**

After the twelve days of Christmas are over, how many presents has my true love sent me altogether?

Use the space below to work out your answer...

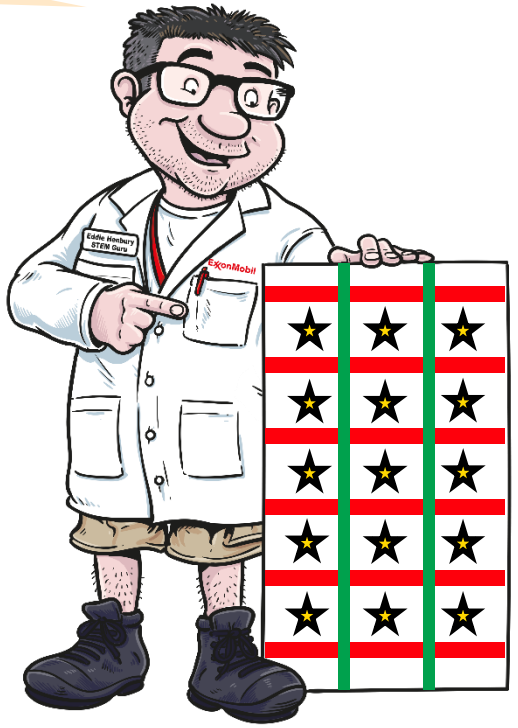
Paper folding when it comes to wrapping presents!

Number of times you can fold a piece of paper in half...

The commonly accepted wisdom is that you **can't fold a single sheet of paper in half more than seven times**. The problem with folding paper in half multiple times is that the paper's surface area decreases by half with each fold. A single sheet of paper may be easy to cut, rip, or tear, but a paper that has been folded in half multiple times becomes very strong because of the increase in density.

Shall I try and fold this piece of wrapping paper?!...

The sevenfold limit holds true if you are using a standard size sheet of A4 printer paper. However, if you alter the size or thickness of the paper, you can increase the number of folds that are possible.



MythBusters, a popular science programme on the Discovery Channel, once featured the paper folding myth. They determined that using a larger sheet of paper would make it possible to fold the paper in half more than seven times. *MythBusters* used a sheet of paper the size of a football field! By fold seven, everyone involved in the project finds it very difficult. However, the team eventually manages to fold the paper eight times with no tools. With the assistance of a forklift and steamroller, they get the paper to fold 11 times.
Why not watch them in action...https://www.youtube.com/watch?v=FPHs8uk1h7s

In 2001, high school student Britney Gallivan of Pomona, California, successfully managed to fold a piece of paper in half 12 times by using a roll of long, thin specialty toilet paper that was 1.2 kilometers in length. Her efforts were part of an extra credit project for a math class, in which she was challenged to fold anything in half 12 times. She first succeeded using thin gold foil and alternate directions of folding. Later, her teacher asked her to try the folding experiment with paper and unfortunately failed!

Activity #3: Christmas Lava Lamp Experiment

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

Items Required:

- Vegetable oil
- Water
- Food colouring (red and green for Christmas!)
- 2 teaspoons of salt

Instructions:

- Pour water into a glass (approx. ¾ full)
- Add a few drops of food colouring (whichever colour you prefer!)
- Add vegetable oil to the rest of the water (approx. ¼). The water and oil should separate into two layers, water at the bottom and oil sitting on top.
- Pour the salt into the glass, watch it sink to the bottom and the Christmas lava will begin!

This activity was inspired from both the following websites:
https://funlearningforkids.com/christmas-lava-lamp-science-experiment/
https://www.science-sparks.com/christmas-lava-lamps/

Answers Page

Safety at Home (page 3)

Leaving the heated blanket on, overloading plug sockets, climbing ladders, lighting candles, using a sharp knife to cut up the Christmas dinner

12 Days of Christmas maths question (page 8)

Day by day:

1 + 3 + 6 + 10 + 15 + 21 + 28 + 36 + 45 + 55 + 66 + 78 = 364 presents

https://www.mathsisfun.com/puzzles/12-days-of-christmas-solution.html

We hope you have a lovely Christmas and
a Happy New Year!

Best wishes
The ExxonMobil Fawley #SolveItWithSTEM Team!

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