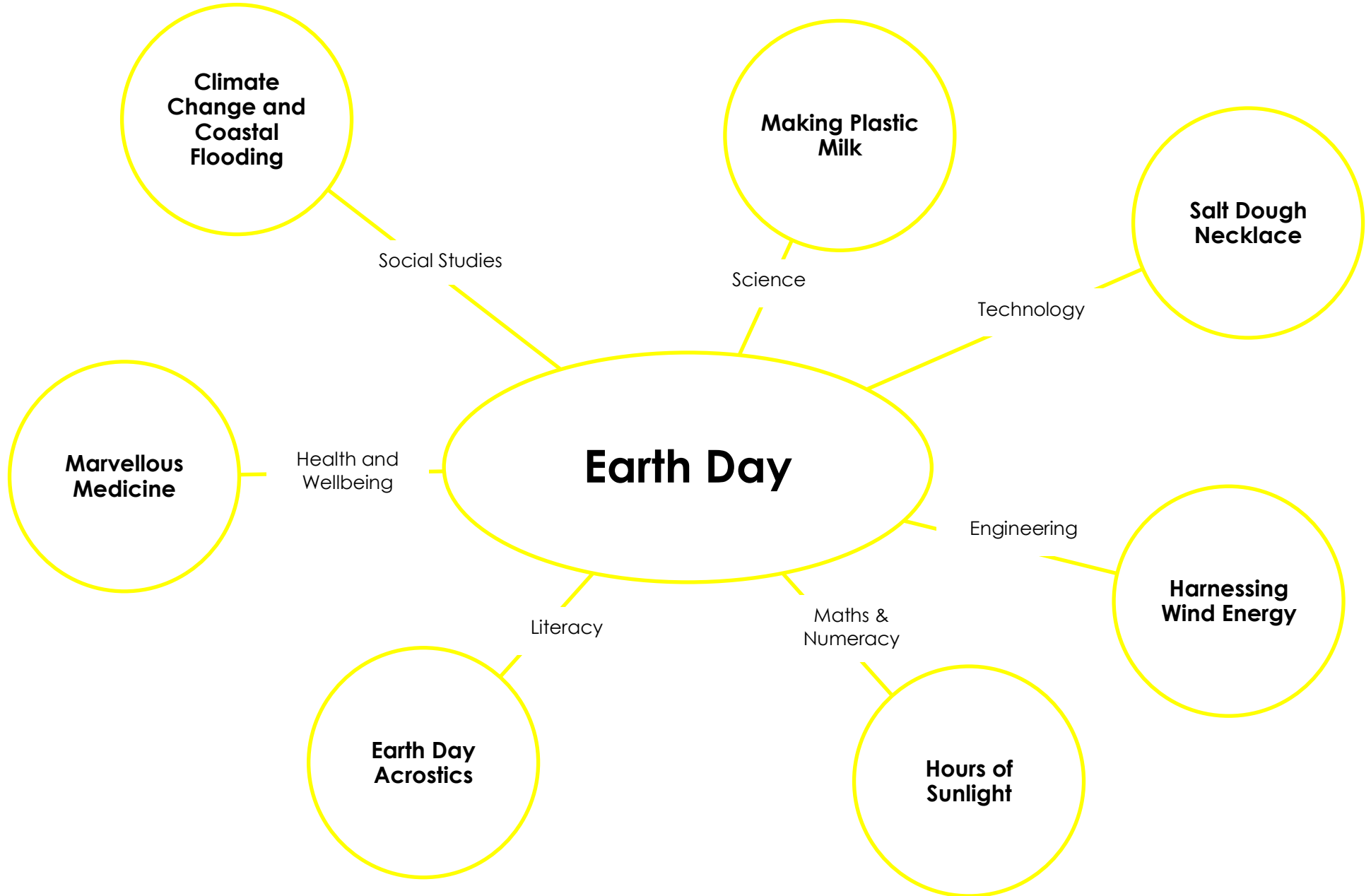




Learning from Home



Science Challenge



Making Plastic Milk

Adult Support and Supervision Required

Watch the transformation of a couple of basic household ingredients into a mouldable, durable piece of a plastic-like substance.

You Will Need: 1 cup milk, 4 tablespoons vinegar, sharpies, cookie cutters, strainer, paper towels

Safety Warning: Milk will be very hot after being in the microwave. Handle with care – risk of scalding!

Instructions:

1. Add 1 cup of milk to a microwave safe bowl and heat for 90 seconds.
2. Mix in 4 tablespoons of vinegar and stir for 60 seconds.
3. Pour into a strainer and press out all the milk.
4. Press paper towel into the strainer to remove any leftover milk
5. Lay out a piece of paper towel, place a cookie cutter onto the paper towel and press your vinegar milk into the cookie cutter and let set for 48 hours.
6. Wait the 48 hours and then decorate with a sharpie.



Note: You need to set aside a couple of days for this science experiment since it will need to dry before it can be decorated!



The Science:

This milk and vinegar experiment does not produce real plastic. The new substance is casein plastic. This plastic-like substance forms from a **chemical reaction** between the milk and vinegar. When the protein in the milk which is called casein, comes in contact with the vinegar, the casein and vinegar do not mix but rather the molecules move around and join forces to make the casein plastic!

The casein becomes these plastic-like blobs that you can strain out and mould into shapes. This is also one way of making a simple cheese from milk.

*Keep in mind the milk might have a strong smell while you are experimenting with it!

Extension: Test different fat percentages of milk such as skimmed and semi-skimmed varieties. Additionally, you could test different ratios of vinegar to milk. Would another acid like lemon juice turn the milk into plastic?

Activity and images from <https://littlebinsforlittlehands.com/>

Technology Challenge



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Salt Dough Necklace

Adult Supervision Required

Try this Earth-friendly salt dough recipe for Earth Day! Transform a couple of simple household ingredients into a salt dough Earth model.

You Will Need: 2 cups all-purpose flour, 1 cup of salt, 1 cup of warm water, bread knife, fork, circle cutters, straw, string, paint, paint brush



Instructions:

1. Combine all the dry ingredients in a bowl and form a well (dip) in the centre.
2. Add the warm water to the well in the dry ingredients and mix together until it forms a dough. **NOTE:** If you notice the salt dough looks a little runny, you might be tempted to add more flour. Before you do this, allow the mixture to rest for a few moments! That will give the salt a chance to absorb the extra moisture.
3. Roll the dough to $\frac{1}{4}$ inch thick or so and cut out large circle shapes for your earth.
4. Use a bread knife or a fork to make an outline on the circle for land and ocean.
5. Use a straw to make a hole in the top of each ornament. Place on a tray and leave for 24 to 48 hours to air dry.
6. Once dry, paint your salt dough Earth.
7. Finish up by threading a piece of string through the hole in the necklace. Now you have a salt dough Earth necklace to hang up or wear.



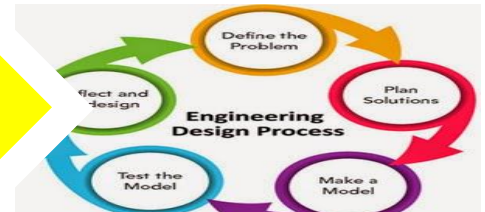
How to Preserve the Salt Dough Necklace:

Your salt dough necklace is made from a mixture of flour and salt that creates a type of modelling clay, that can be baked or air-dried and then saved. Why is there salt in the dough? Salt is a great preservative, and it adds additional texture to your necklace. You'll notice the dough is heavier too! How long will a salt dough ornament last? It should last for many years. Store it in a dry, airtight container, away from heat, light or moisture and you will be able to enjoy this homemade necklace year after year.

What other things could you make with salt dough?

Activity and images from <https://littlebinsforlittlehands.com/>

Engineering Challenge



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Harnessing Wind Energy

Imagine life without mains electricity. How would you power your home? One billion people in the world today live without a supply of mains electricity. In a world experiencing climate change and global warming it is important that we shift from burning fossil fuels like oil, gas and coal, and move towards creating a greater proportion of our energy from renewable resources, like wind, which cause less pollution and therefore contribute less damage to the planet.

Different Types of Wind Turbine



Your Task: Use your engineering skills to design and make a model wind turbine.

Build It: Use recycled materials from home, plus sticky tape, masking tape and whatever other materials you choose

Test it: Does your structure rotate when exposed to wind energy? How could you use this rotation to cause another action? (Cause and Effect)

Reflect: Use books and / or the internet (ask permission first) to look at wind turbines and identify any common themes. Look at any templates you might find and consider whether they may be useful to help your design.

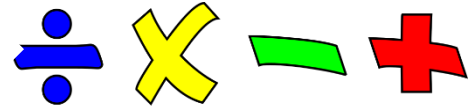
Improve It: Use information from your reflection to make any adjustments to your structure.

practicalaction.org/schools/wind-power-challenge Practical ACTION

Click here for more information:
<https://practicalaction.org/schools/wind-power-challenge/#resources>

Information and images from: <https://practicalaction.org/schools/>

Maths & Numeracy Challenge



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Hours of Sunlight

The table below shows the average number of daylight hours per month for London. Based on the information, complete the following questions and tasks:

UK Daylight Hours

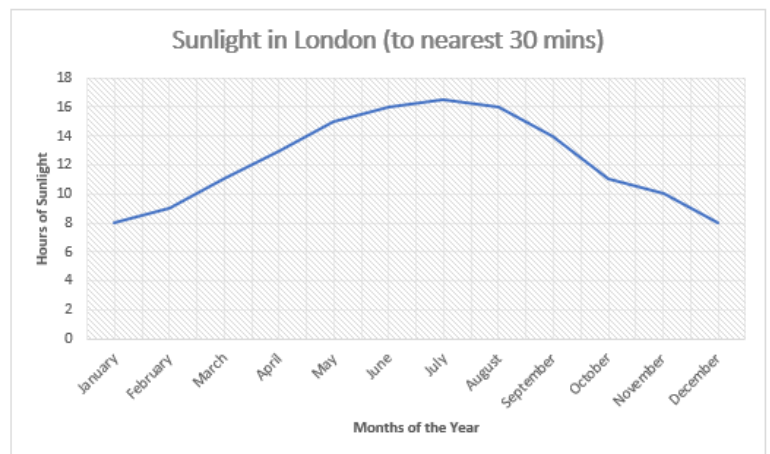


This table shows the average number of daylight hours per month.

Month	Hours (to nearest half hour)		
January	8	08:05	16:00
February	9	07:39	16:47
March	11	06:46	17:38
April	13	06:36	19:31
May	15	05:32	20:21
June	16	04:48	21:06
July	16.5	04:46	21:20
August	16	05:23	20:49
September	14	06:11	19:48
October	11	06:59	18:39
November	10	06:52	16:34
December	8	07:42	15:55

Sunrise and Sunset times based London on the 1st of each month.

1. How many hours of sunlight are there on average in April?
2. Which month has the most sunlight?
3. Which months have the least sunlight?
4. At what time does sunset occur, on average, in December?
5. The biggest change in the average length of daylight occurs between which 2 months?
6. Which month had 16 hours and 34 minutes of daylight from sunrise to sunset?
7. How long was it from sunrise to sunset in January?



8. Draw a line graph like this one, showing the average length of sunlight, to the nearest half hour, for the months of the year based on the information in the table. Place the months of the year along the X axis and the amount of sunlight up the Y axis like in the example. **BUT** space your Y axis out further by making each square represent 1 hour of sunlight.

Extension: Research the daylight hours for a location nearer where you live. Record the data in a table and then transfer it to a line graph like the one you made for London.

Data table and image from www.hamilton-trust.org.uk/



Literacy Challenge



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Earth Day Acrostics

Acrostic poems are very simple and they have only a few easy rules.

To begin with, an acrostic is a poem in which the first letters of each line spell out a word or phrase. Usually, the first letter of each line is given a capital letter. This makes it easier to see the word spelled out vertically down the page.

Acrostics are easy to write because they don't need to rhyme, and each line can be as long or as short as you want it to be. See the example below.

Earth green and blue
 Amazing and wonderful
 Round and large
 Telling stories of life
 Heating up beneath a hot yellow sun.



Your Task: is to create an acrostic poem of your own to go with the Earth Day theme. You could choose the words Earth Day, or just Earth, or you might want to think about some of the things (words and phrases) which are associated with Earth Day like global warming, climate change, conservation, recycling, erosion, carbon footprint etc. The choice is yours. Share your poem with someone at home.

Click here for more information about acrostic poems:

- <https://www.bbc.co.uk/bitesize/topics/z4mmn39/articles/ztdvw6f>



Health & Wellbeing Challenge

Marvellous Medicine

Ever been stung by a nettle? What's the first thing you do? Say OW!!? And the second thing? You'd probably look for a dock leaf to rub on the sting and make it go away. Well rainforests are full of plants which could be used to cure many ailments and illnesses.



Already, one quarter of all medicines are made from ingredients first found in rainforest plants.

A special bark, found on the outside of the chinchona tree in the rainforest in Peru, has been used to make something called "quinine" which is used to treat malaria, a deadly disease which comes from mosquito bites in tropical countries. There's also the "sausage tree" which has been used to treat eczema and the rosy periwinkle of Madagascar which has been successfully used to treat leukaemia.

Did you know?

Only 1% of rainforest plants have been studied. That leaves the other 99% which may hold the cures to many diseases.

Task 1: Choose one of these medicines that are derived from the rainforest. Do some research and find out more about where it comes from and how it is used. Which illness or illnesses is it used to treat? Etc.

quinine	novacaine	turbocuarine	aspirin
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Task 2: Think of a health condition you would like to be able to cure or ease. It might be one that you or a family member or friend suffer from, or it might just be one you have heard of. Your task is to imagine a tree or plant in the rainforest that contains the cure. Draw the tree or plant and give it a name. Which part of it contains the medicine – is it the bark, the petals, the leaves etc.? Give your medicine a name. How would it be used – rubbed on the skin, injected, taken as a tablet? Etc.

Information from www.yptenc.org.uk via TES Images from www.clipart-library.com

Social Studies Challenge



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Climate Change and Coastal Flooding

Climate is 'the general weather in one place over a long period of time'. So, it's not what the weather is like today, it is the average weather conditions over a few years. Meteorologists (scientists who measure the weather) collect detailed information about the weather every day, often using high-tech satellite and computer systems. Hundreds of measurements are calculated and the results compared to previous readings.

From their readings, meteorologists have noticed that the world's climate is getting warmer. But they also know that changes in the climate are nothing new. For example, 50 million years ago there was no ice at the North or south poles, but 18,000 years ago there was ice 2 miles thick in Scotland.

So why does it matter that climate change is happening again? Because it is happening more quickly now than ever. Humans are believed to be speeding up the rate at which the climate is getting warmer, and many plants and animals cannot adapt quickly enough to the changes in order to survive. The effects on our oceans and land masses is also stark.

The ice caps at the North Pole (The Arctic) and the South Pole (The Antarctic) are slowly melting and this is causing the sea levels to rise. One scientist has predicted that the sea level rises will be approximately 49cm over the next 100 years. Another has said the rise could be as much as 8m! This shows that we don't really know what's going to happen, but we are sure that something is and the effects could be devastating: if the sea levels continue to rise, many countries and cities could be flooded by the sea and lost forever. Bangladesh is one example (they already suffer from severe annual flooding); nearer to home, cities like London, Bournemouth, Cardiff, Newcastle, Carlisle and Edinburgh could also be at serious risk.



Even if the ice caps don't melt, the oceans are likely to expand as they warm up and could cause coastal flooding anyway.

Water is also good at absorbing carbon dioxide – but becomes less good at it as it warms up, which means that as the seas warm up

Your Task: is to research what humans could do to slow down the rate of climate change and to find out if there is anything we can do to reduce the rates of coastal floods in order to protect our towns and cities which are located there. You can write up a report on what you find out or you can present it as a poster.

Information and image from www.yptenc.org.uk Via TES