

Science Challenge



Ice Sculptures

We can use the properties of water and ice to make sculptures and interesting ice models. You will need to make some blocks of ice by freezing water in different containers. You could use balloons or rubber gloves as well as tubs and boxes to get some interesting shapes. Because saltwater melts at a lower temperature than plain water we can get some interesting effects.

Ice and Salt Rainbow

You will need:

- Plastic containers and bowls
- Water
- Salt
- Tray
- Food colouring/liquid watercolours
- Pipette/spoon/paintbrush



1. Fill different sizes and shapes of container or bowl with water and freeze overnight.
2. Remove the ice from the containers and place in a tray. Mix food colouring/paint with water and put aside for now.
3. Sprinkle salt over the ice or leave small piles of salt and watch the ice begin to crack.
4. Using a pipette, spoon or a paintbrush, dot the surface with food colouring/paint. This won't colour the ice – but will highlight the ravines, crevasses and tunnels that form in the ice as the salt melts it.
5. You can add more salt and colouring - or not - explore however you like!

THE SCIENCE

Water turns to ice at 0°C. Ice without salt melts due to the difference in temperature of the ice and the air round it. When you add salt, it dissolves into the water on the surface of the ice. Salt water has a lower freezing point than water so there is a bigger difference between the air temperature and ice. This is why ice with salt melts quicker.



Technology Challenge



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Smarten Up Your Life

We all use technologies to make our lives easier and some tasks less of a chore. In this activity you will explore how advances in the kitchen might affect the future and design your own product that has all the smart features you can think of. Then try to sell their product to the CEO of an important 'smart' company by creating a PowerPoint presentation.

Can you think of anything about your kitchen at home that could be easier? For example, in the future, do you think going to the supermarket will be necessary? How could this chore be eliminated? Start by noting the biggest chores (in terms of time or nuisance) and your ideas of how these could be eliminated.

Choose one of the problems and design a 'smart' product that will help ease or eliminate the chore.

Phase 1 – research and mind map

Think about all the tasks that happen in the kitchen at home. Who does them? How often? How long does it take? Where could a smart device or new feature be useful to make one of these easier or more pleasant? Create a mind map with your ideas.

Phase 2 – decide on your two big ideas

What are the two features that have come out of your mind map that you are the most enthusiastic about? Name and describe each feature briefly. In your description, explain what the feature is for and how it would work.

Phase 3 – sketch it up

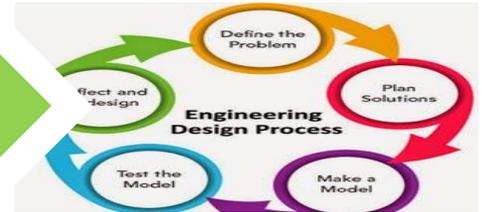
On plain paper, sketch up some different versions of what your final design for the two features should look like. Make notes.

Phase 4 – create a presentation

Next, produce a presentation to convince the CEO of the smart company 'Smart Creations' to start making and selling your product. Consider the following points as you work on this:

- What makes your product appealing or sets it apart from others
- How does this feature make the buyer's life easier?
- What materials and technology would they need in order for it to have this function?
- What is your target audience? (Everyone, people who cannot go to the shop by themselves, young people, older people, very wealthy people, or maybe very technological people?)
- Is this a very expensive feature to build?

Engineering Challenge



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Wicked Water Slides!

Have you ever been on a water slide or seen one in action? Read [this article on How Stuff Works](#) about the science and engineering principles behind water slides. **Create a mind-map or make notes** about the **key science concepts** which enable water slides to work and also some of the steps designers and engineers put in place to ensure the **safety of the riders** as well as **water hygiene**.

Challenge: Use what you have learnt above to design and construct your own model water slide. You are aiming to **get 6 riders to travel as fast as possible to the bottom without colliding or flying off the ride!** For riders you could use beads, marbles or LEGO mini-figures. You might want to use a mixture so you can explore the impact that riders with different weights might have on the design.



Rules:

1. Your water slide should have a **collecting pool** to catch riders at the bottom of the slide
2. You need to **make a way for riders to get from the ground to the top** of the slide (e.g. a ladder or stairs)
3. It should include **at least 3 twists or turns**
4. When you release riders, you need to make sure they **don't collide** with each other (unless they are in the collection pool)
5. Sides should be adapted to make sure **riders do not fly off the ride!**
6. **Maximum height of the ride is 45cm**

Possible resources: cardboard tubes, straws, tin-foil, cellotape, empty boxes, paper cups, plastic bottles, cling-film and a bottle or jug of water with blue food colouring (for your water flow.)

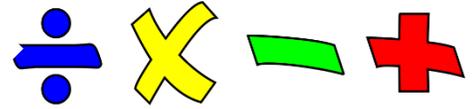


Testing: Create a table to record the following data: the **time** it took for 6 riders to get to the bottom of the slide; the **number of rider collisions** (if any); and **how many riders successfully stayed on** the slide from top to bottom. Repeat your test **at least 3 times** and **calculate the average** for each set of data. *Make sure you test your design outside or in a bath tub!

Adapt and improve: Look at your results, is there anything you could change to **improve** your timing or safety? Make your changes, **re-test and compare** your results.

Water Slide Engineer: Watch [this video clip by Elliot Harvey](#) who is a water slide engineer. Make a list of the skills you think you would need to have to complete this job successfully.

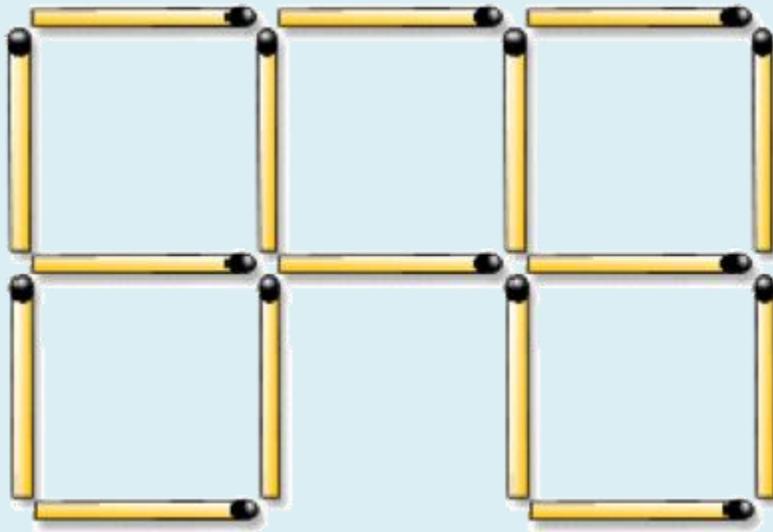
Maths & Numeracy Challenge



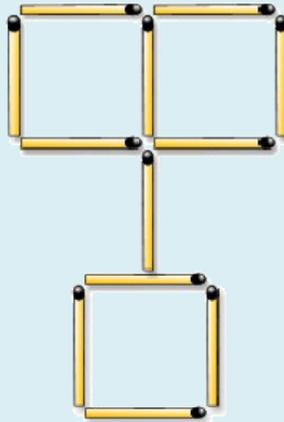
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Matchstick Puzzles

Move 3 matches to new positions to get only 4 squares, no overlapping or loose ends.



Move 6 matches so that 5 squares are formed.



More ideas can be found at:

http://www.learning-tree.org.uk/stickpuzzles/stick_puzzles.htm

Literacy Challenge



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Cartoon Strips

Design a cartoon for a joke or funny scenario....

There are lots of funny stories and videos available on the internet. Things like animals doing silly things or people trying to do something which you just know is going to go wrong. TV programmes such as You've Been Framed are perfect examples.

Choose or make up a funny story and create a cartoon strip.

There is a step by step guide to creating a cartoon strip available here- <https://www.imagineforest.com/blog/how-to-create-a-comic-strip/>

It also includes advice on drawing characters.

Cartoons can be an effective way of recording facts and information in a way that makes it easy to remember.

Choose a topic you would like to know more about. Research and find 5 facts.

Create a cartoon strip which includes these facts. Show someone else your cartoon and see if they can remember the information from your drawing.

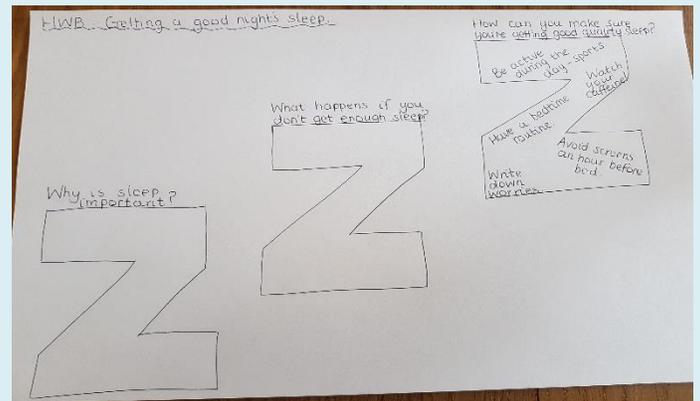


Health & Wellbeing Challenge

Sleep is important!

Did you know that teenagers need about 9 hours of sleep each night? It sounds like a lot but it is important for many different reasons! **How do you feel when you have a bad night's sleep?**

[Read this Newsround article](#) about sleep. Draw an **outline of three zzz's** and give each one a **sub-heading question** from the article (1. Why is sleep important? 2. What happens if you don't get enough sleep? 3. How can you make sure you're getting good quality sleep?) **Inside each Z record key words or phrases from the article which answer the question above it.** You could also draw images and add colour to help you visualise what you read.



[Listen to this podcast](#) which summarises the interesting story of **17-year old Randy Gardner**, who in 1964, **broke the world record for staying awake the longest** amount of time (**11 days and 25 minutes.**) He was monitored round the clock to **explore the effects of sleeplessness** on the body and mind. **Write or give someone a summary** of: how the experiment started and what they wanted to find out; the results they gathered after 11 days of not sleeping; the challenges they faced during the experiment; and what useful information scientists have learnt from the experiment. **What questions do you have after listening to the podcast?**



Many studies have explored the effect music has on our body and mind. Some research has found that participants who listened to music for 30-45 minutes before bed every night fell asleep more quickly, slept more deeply and felt better the next morning. However, the music they listened to has to be set at a tempo of about 60 beats per minute – which is our approximate heart rate when falling asleep! **The tempo of a piece of music is the speed of the underlying beat.** You can calculate a song's BPM by closing your eyes while listening to the song and counting the number of beats for 60 seconds or trying websites like songbpm.com for a quick estimate.

Challenge: Create a 'wind-down' music playlist you can listen to before bed. You will want to include music which will help you relax so try to use songs which have a lower tempo, are calming or do not include many lyrics.

Social Studies Challenge



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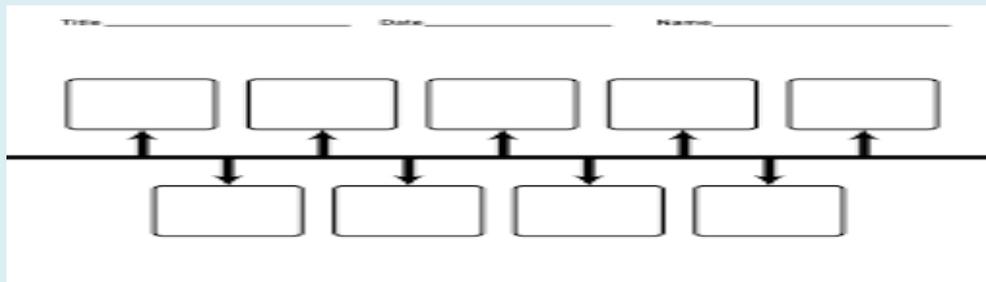
Timeline of Events

A helpful way to learn facts and important information about people and historical events is to create a timeline.

On May the 8th we will celebrate and remember VE day but how much do you know about this important event?

Your challenge is to research the important events that occurred during World War 2 from D-Day up to VE Day.

- Keep a record of key dates, events, people involved, countries involved and the locations.
- Place the dates and events in a timeline to show your understanding of important facts in chronological order.



Remember that your timeline will be read from left to right if it is horizontal like the one in the picture above. If you produce your timeline with a vertical line, then your timeline will be read top to bottom.

A suggested site would be <https://www.dkfindout.com/uk/history/world-war-ii/> but there all lots of sources of information. Make sure the website is reliable and keep a note of all websites used to reference them properly.

Expressive Arts Challenge



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Rhythm Sticks

This rhythm game uses two sticks- you can use drumsticks, pencils, chop sticks, wooden spoons or two table knives.

<https://youtu.be/GK5RBDYBIM4>

The words are very simple- now can you add the tapping rhythm-

Let's put the rooster in the stew

Let's put the rooster in the stew

Let's put the rooster in the stew

Then he cannot say "Cocka-doodle-doodle-doo"

Then he cannot say "Cocka-doodle-doodle -doo"

If you can't access the internet link you can still make up your own rhythms with your sticks.

Count steadily to 4 and as you count tap first left then right stick, now change the pattern to tapping twice with left then once with right as you count.

Keep experimenting with different patterns and you will begin to find some fun rhythms. Put on some music and play along!