Inventions

Literacy

•Here's a video of an invention idea. You could either use this video to get ideas or create your own machine:
https://www.literacyshed.com/uploads/1/2/5/7/12572836/the_shirt_machine_-_download_and_stream_it_on_pocketmovies.net_856_936.mp4

•Draw plans of the shirt machine. Label the parts that the children use and where they find them. OR you could draw and label a plan of your own shirt machine.

•Using commas in lists - Make a list of all the components of the shirt machine.

•Write instructions for the Shirt Machine using time connectives, next, then and imperative verbs, stamp, push, pull etc.

•Discuss onomatopoeia (sound words) to describe the sound the machine makes as it works, e.g. whoosh. Can you describe the sounds of other machines?

•What special qualities will the shirts made by your machine have? Maybe they're waterproof, invisible, etc. Write an advert to advertise your shirt and its benefits.

•Imagine you have invented a time machine - write a story about your adventures in time - what eras would you like to visit? Who would you meet? Would your time machine work well or would it often send you to times you didn't ask to visit?

•Consider what you feel are the top 5 most useful inventions? Why are they important? Did they lead to any other break through or inventions? Can you discuss this with someone in your family/or write a piece explaining why you think your choice is the best invention? Can you draw them being used or write about them?

•You could conduct an interview with a family member or friend (this could be someone you live with or on the phone to someone else). You need to find out what they think has been the most useful invention in their lifetime. Think about what you would like to find out before starting your interview and write down the questions that you're going to ask. Make notes while you're interviewing them and write up your findings.

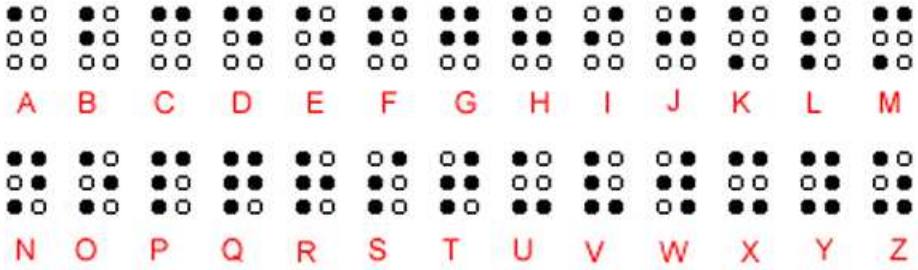
•Did you know that some of the world's great inventions were in fact invented by children? Braille, Christmas lights, toy trucks, ice lollies, snow mobiles, swimming flippers, ear muff. Check the facts out here: https://www.mentalfloss.com/article/93162/11-inventions-made-kids Perhaps you could write a report about the invention you like the most and why?

•Using the letters of the alphabet, think of different inventions- one for each letter of the alphabet. Try scavenging around your house for ideas!

Science

•Create a table of items around your home and garden to show objects that are natural and objects that have been invented (man-made).

•Medicines were all invented by people, to help others overcome their illnesses - find out who discovered penicillin; who invented the stethoscope; who gave x-rays their name; who created the first smallpox vaccine. Some inventions were invented by disabled people to help overcome their disabilities, such as braille (invented by Louis Braille) which is a system of raised dots used so that blind people can read quickly. Have a go at writing your name, a joke or a message in braille. How could you make the dots raised on the paper so that a blind person could read it?



•Transport - look at how vehicles across the world have changed over the centuries/decades. Make a list of different types of vehicles for moving on land, on the water, under water, in the air and underground - who invented them and when? Using whatever resources you have at home, Lego, meccano, recycled materials, paper, etc., invent a moving vehicle. Will it have wheels? Will it fly? Or perhaps it could move through water?

•The marble roller coaster is an open-ended challenge: create the longest track possible without letting the marble fall off. It is ideal for rapid redesigning and exploring the conversion of potential energy to kinetic energy!

Tips and Troubleshooting:

If the marbles are flying off the hills or bumps in the track, then...

Try making the hill larger so the marble expends more momentum before reaching the top, thus preventing it from flying off.

Remove the bump/hill, or transform it into a loop.

If the marbles are flying off curves in the track, then...

Turn the curved section of track on its side.

If the marbles are falling out of loops, then...
Make sure it has enough energy to move through the loop.
Make sure the loop is free of excess tape or small obstacles that might collide with the marble.
The loop may be too big. Even if the marble appears to have sufficient energy, very large loops (10"+ in diameter) are not sturdy enough. The marble's energy will be expended by pushing the loop around. Try making the loop smaller.
Find this experiment and more here: https://www.stem-inventions.com/

- Building on from our theme of Being Green, can you invent a form of transport that uses Green Energy? You could build a model car, plane or boat! Think of a way to make it move that does not use batteries or electricity. Have a look at these sites for some ideas:

Balloon car https://www.youtube.com/watch?v=dR2C1GGJ-9o

Rubber band plane https://www.youtube.com/watch?v=FB2g_q0n8mI

A Balloon Powered Car
With a piece of cardboard, a balloon and a few other household items, your child can make a new toy. Set some goals for the car before creating it. For example, the car must go at least 10 feet when it is released. Let your child experiment with different shapes for the car and other additions, such as fins and weights, to see how they improve or hurt the car's performance.

You will need:
- A deflated balloon
- Two wooden skewers
- Three drinking straws (one must be a bendy straw)
- A piece of cardboard
- Four plastic bottle caps
- A nail
- A hammer
- Masking tape

How to Make a Balloon Powered Car
1. Cut the cardboard into the desired shape. Make sure it is wide enough that the wooden skewers hang at least 1/4-inch off the edge on each side.
2. Cut two straws to the width of the cardboard and tape them onto the bottom of the cardboard with masking tape. They will serve as the axles.
3. **Ask an adult** to poke a hole in the centre of each bottle cap with the hammer and nail.
4. Place one wooden skewer through each straw.

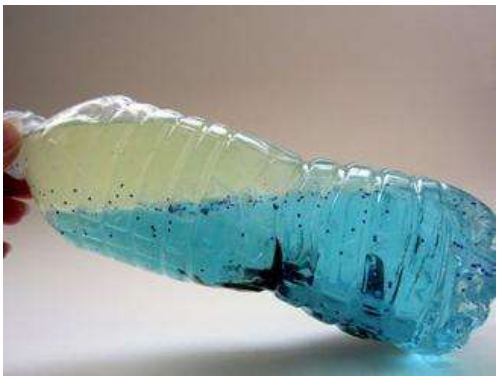
5. Attach the bottle caps to the ends of the wooden skewers to serve as wheels. If the wheels keep falling off, add a bit of glue to the hole.
6. Tape the opening of the balloon to the short end of the bendy straw.
7. Attach the straw to the centre of the top of the car using masking tape. Make sure the balloon hangs off the end so that the short end of the straw sticks up.

Ocean in a Bottle

This is a fun invention that stimulates creativity and introduces kids to ocean habitats. It also opens the door for discussing ways to protect those habitats. It's a great invention any time of year, but especially if you're planning a trip to the beach. It's also one of the easiest inventions kids can make with items you may already have around the house.

What You Need:

- Empty plastic bottle, any size
- Funnel
- Tap water
- Blue food colouring
- Mineral oil or baby oil
- Glitter
- Small seashells
- Small plastic fish or other animals

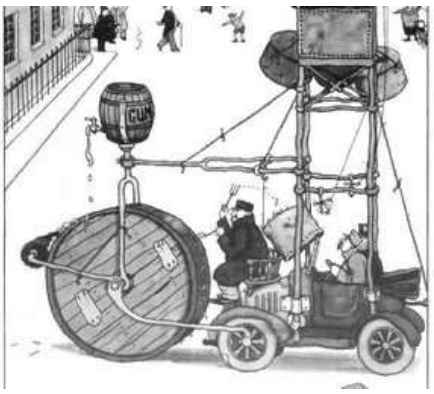


Creating the Ocean

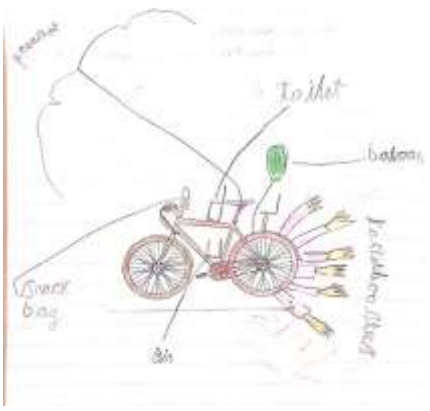
1. Remove all labels and sticky adhesive from the plastic bottle.
2. Using the funnel, fill the bottle about halfway with tap water.
3. Using the funnel, add blue food colouring to the bottle. Be careful not to add too much, or the water will grow very dark. Replace the bottle cap and shake to mix the contents of the bottle thoroughly.
4. Using the funnel, add mineral oil until the bottle is full.
5. Using the funnel, add glitter, seashells and plastic creatures to the bottle.
6. Tightly replace bottle cap.

Art/D.T

•Look at the art of W. Heath Robinson. Invent machines of your own and create illustrations of them.

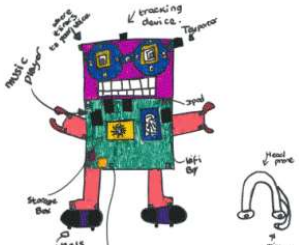


- Year 1 listened to the story of *Mrs Armitage on Wheels* this year. She added lots of strange things to her bicycle! Draw a design of how you could change your own bike in the style of Mrs Armitage. Explain what you have done to improve it.



- Can you use recycling from your house to create a new invention? What does it do? (it can have an imaginary or real function)

- Can you draw a picture of something you'd like to invent? Can you add labels to all the different parts?



Autoomoe 3000
by Lucy Taylor age 9

"A robot that interacts with your voice Headphone set works anywhere in the

Family Scooter
by Wendy Ridley age 9

INVENTORS!

- Create your own lava lamp!

You will need:

- Vegetable oil
- Vinegar
- Food colouring
- Bicarb soda
- A glass or bottle of choice

Instructions:

1. Simply add three spoons of bicarb into the glass or bottle and fill two-thirds of the container with oil, without mixing.
2. In a separate cup, add the food colouring to the vinegar and slowly pour the mixture into the oil and bicarb concoction.
3. Upon doing so, you will start to see bubble appears as it transforms into your very own lava lamp.

- The first telephone was made by Alexander Graham Bell in **1876**. Can you make your own working telephone?

You will need:

- 2 paper cups
- A sharp pencil or sewing needle to help poke holes
- String

Instructions:

1. Cut a long piece of string, you can experiment with different lengths but 4 metres is a good place to start.
2. Poke a small hole in the bottom of each cup.
3. Thread the string through each cup and tie knots at each end to stop it pulling through the cup (alternatively you can use a paper clip, washer or similar small object to hold the string in place).
4. Move into position with you and a friend holding the cups at a distance that makes the string tight (make sure the string isn't touching anything else).
5. One person talks into the cup while the other puts the cup to their ear and listens. Can you hear each other?

What's happening?
Speaking into the cup creates sound waves which are converted into vibrations at the bottom of the cup. The vibrations travel along the string and are converted back into sound waves at the other end so your friend can hear what you said. Sound travels through the air but it travels even better through solids such as your cup and string, allowing you to hear sounds that might be too far away when traveling through the air!

Music

- Can you make (invent) instruments from a range of objects found around your house/garden. Make up a tune using your 'found object' instruments (check with an adult that the objects you find are safe and you're allowed to use them). This video has a few ideas, but don't use knives or other sharp objects:
https://www.youtube.com/watch?v=9GqEkxEcL6s

Geography

- Think about an item that you use every day – do you know who invented it or which country it came from?

- Can you find famous inventions from each of the continents? Or how about trying to discover inventions that come from your favourite country?

P.E

- Invent a sport - write the rules for your new sport. It could be a mixture of rules and ideas from sports that already exist. What will you call your new sport? What equipment will be used? How will it be played?

Cooking

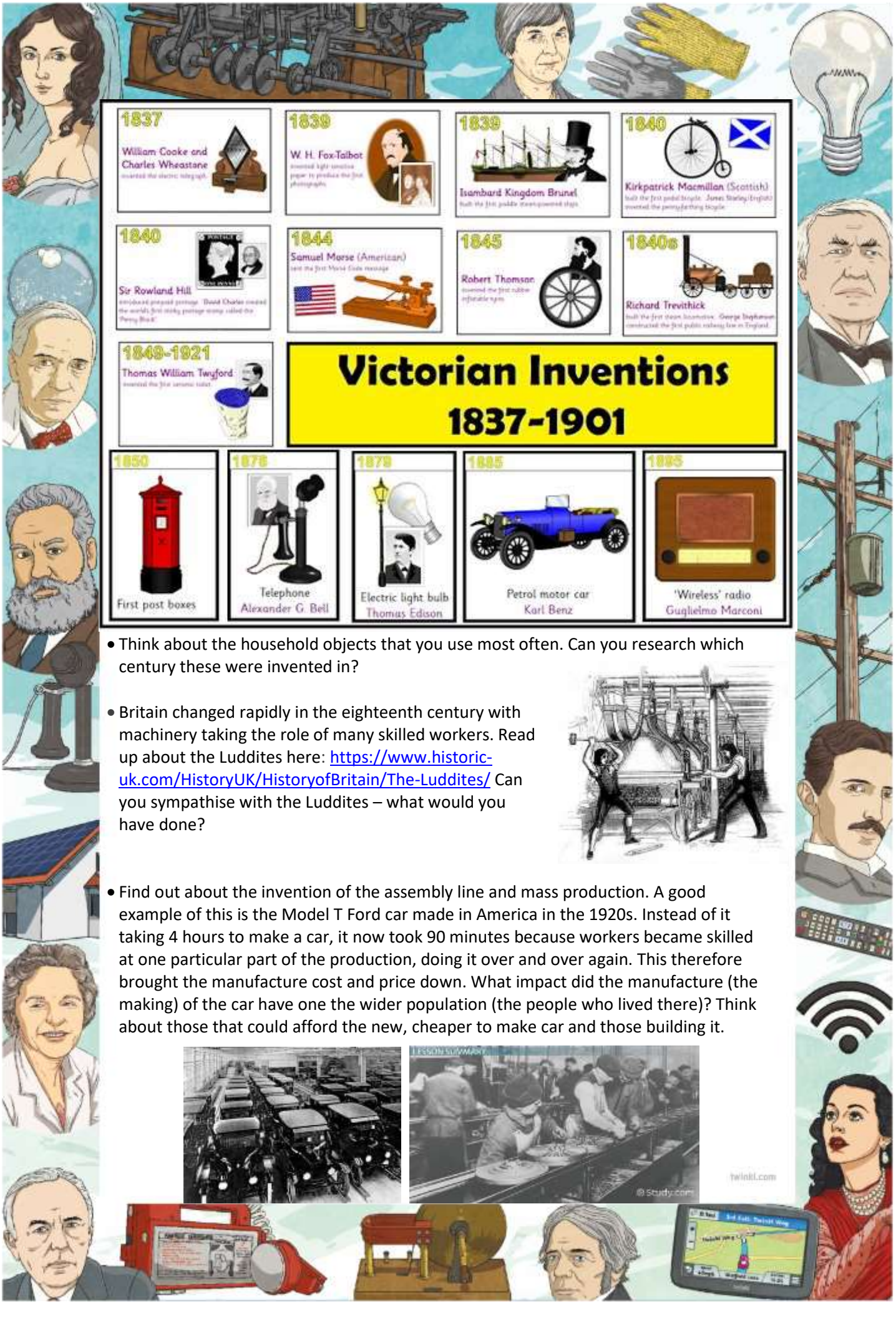
- Invent your own favourite toast topper! Make a slice of toast and experiment with what's in your kitchen cupboards. You might want to cut the toast into narrow strips for maximum experimentation time. Have you tried peanut butter and marmite? Cream cheese and sliced grapes? Mushy peas and mint?

History:

- Look around your house. Can you find out who invented things that you have in your house, such as your TV, camera, etc.? When were they invented? Make a timeline to show when each was invented- some might surprise you!

- Pick an inventor and find out about their life. What do you think life was like before their invention? What was used instead?

- The Victorians invented lots of things that we still use today (have a look at the timeline below).
  Which is your favourite invention? Why?
  Which do you think is the most useful? Why?
  Which do you think is the least useful? Why?



- Think about the household objects that you use most often. Can you research which century these were invented in?

- Britain changed rapidly in the eighteenth century with machinery taking the role of many skilled workers. Read up about the Luddites here: https://www.historic-uk.com/HistoryUK/HistoryofBritain/The-Luddites/ Can you sympathise with the Luddites – what would you have done?

- Find out about the invention of the assembly line and mass production. A good example of this is the Model T Ford car made in America in the 1920s. Instead of it taking 4 hours to make a car, it now took 90 minutes because workers became skilled at one particular part of the production, doing it over and over again. This therefore brought the manufacture cost and price down. What impact did the manufacture (the making) of the car have one the wider population (the people who lived there)? Think about those that could afford the new, cheaper to make car and those building it.

- Imagine you work for a newspaper in the Victorian era. Pick an invention to write about and tell people what it is and what it does. Remember, your readers will have never heard of this new invention before so make sure you tell them its name, what it does and why it is a good thing that it has been invented.

- Can you research one of these inventors, or their inventions and create a fact file about them?
  Thomas Edison – Lightbulb
  Benjamin Franklin - Electricity
  Florence Parpart – Electric Refridgerator
  Penny Spence – Microwave
  Alice Parker – Central Heating
  Steve Jobs – iPad, iPhone, iPod
  Alexander Graham Bell - Telephone

Maths

Eureka!
Have you ever heard anyone use this word before? It's actually Greek (meaning "I've found it!") and many people would associate it with a man called **Archimedes**.

In 322 BC, Alexander the Great built the city of Alexandria and soon afterwards, under the reign of Ptolemy, it became the capital of Egypt. To attract clever people to this city, Ptolemy set up a university in Alexandria, which was the first of its kind. It was at the University of Alexandria that nearly all the famous mathematicians of the time studied or taught. Archimedes was one of these. He was born in about 287 BC in the city of Syracuse on the island of Sicily. We think that Archimedes visited Alexandria and studied there, as he seems to have had many friends who were also great mathematicians.

There are many stories about Archimedes' discoveries and inventions. When the Romans were attacking Syracuse, the King (who was also a good friend) asked Archimedes to help defend the city. He invented huge cranes, which could lift ships out of water; movable poles which dropped weights on enemy ships and powerful catapults. Archimedes also developed complicated pulley systems to drag ships along. These war-time inventions gained Archimedes a lot of recognition and respect from the local people.

It was when Archimedes was in his bath that he jumped up shouting the famous "Eureka!" He had been trying to solve a problem for the King - how to find out whether the King's crown was pure gold or if some silver had been added. As he got into the bath, some water sloshed over the sides and this inspired Archimedes to try an experiment. He discovered that when the crown was put in a bowl of water, more water over-flowed than when the same weight of pure gold was put in. This meant that the crown could not be entirely pure gold. This led to the first law of hydrostatics. It is said that Archimedes used to get very absorbed in his work and would draw diagrams in sand, ashes from the fire and even on himself using bathing oils!

One story tells that it was due to this total absorption in maths that Archimedes was killed. Apparently, he asked a Roman soldier to stand out of the way of a diagram he had sketched in the sand. The soldier ran a spear through his chest.

- Why don't you have a go at recreating Archimedes' experiment (you don't need a bath, you could do it carefully in a jug or bowl of water). With parent's permission, why don't you test different objects to see how much the water rises?

- What inventions can you think of that help you with your maths?

- Can you invent an item that will help someone who is struggling with an area of their maths?

- Do you have the brains for cybersecurity?

If you want to stop people reading your secret messages, use a code to conceal the meaning.

From ancient times to the present day, security, codes and puzzles have been intertwined, as have the people who have tried to crack those codes to read messages they were never meant to see.

<u>Years 5 + 6:</u> Use the code below to decipher the questions and then choose the right answer. When you're done, why don't you have a go at inventing your own code?

A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	2	@	4	☺	6	7	8	☠	10	11	12	✈	14

O	P	Q	R	S	T	U	V	W	X	Y	Z
🡅	16	17	18	🖫	∞	21	22	23	24	25	26

Question	Multiple choice		
Where was the centre of @-🡅-4-☺-2-18-☺-1-11-☠-14-7 during 23-23-B?	HMGCC	MI5	Bletchley
The man who designed the machine that @-18-1-@-11-☺-4 the ☺-14-☠-7-✈-1 @-🡅-4-☺ was...	Turing	Moore	Lorenz
The fundamental 2-21-☠-12-4-☠-14-7 block of ☺-12-☺-@-∞-18-🡅-14-☠-@ devices is the...	Algorithm	Transistor	Firmware

Years 3+ 4:

MATH NINJA

Ninja Aki sends his secret messages through math problems.

Decode his message to you! First complete these math problems. Then match the answers up with the letters using the chart below.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

ex.)

5 6 + 9 3	3 4 - 2 0	8 5 + 1 6	N I N J A
1 4 9	1 4	1 0 1	

4 3 + 4 2	9 6 - 8 4	7 3 - 6 1	8 5 + 7 3	9 2 - 7 7
1 2 5 + 1 0 6	6 8 + 1 1 7	5 1 - 2 6	5 9 - 4 4	4 9 - 2 8

_____ _____ _____ _____ _____ !

1 2 3 4 5

_____ _____ _____ _____ _____ _____ _____ _____ ?

6 7 8 9 10 11 12 13 14

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Key Stage 1

Breaking The Elf Code

Name: _____ Date: _____

Complete the math problems and then see what letter the number stands for to see what the elves have to say.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

1+1 =___ 4+1=___ 6+6=___ 5+4=___ 10+12=___ 2+3=___

_____ _____ _____ _____ _____ _____

5+4=___ 7+7=___

_____ _____

10+10=___ 4+4=___ 4+1=___

_____ _____ _____

6+7=___ 1+0=___ 6+1=___ 6+3=___ 2+1=___

_____ _____ _____ _____ _____

7+8=___ 2+4=___

_____ _____

1+2 =___ 5+3=___ 9+9=___ 4+5=___ 10+9=___ 15+5=___ 6+7=___ 1+0=___ 10+9=___

____ _____ _____ _____ _____ _____ _____ _____ _____

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