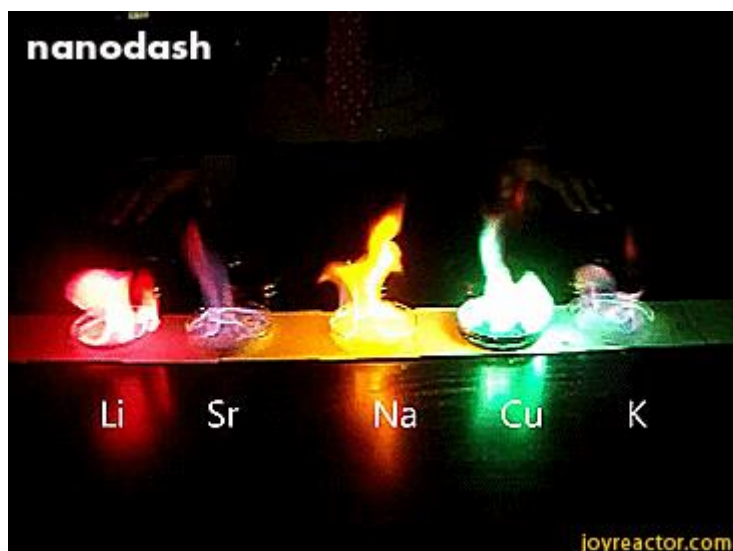


Remember, Remember

Activity Pack Two



Remember, Remember!

Remember, remember the fifth of November.

Gunpowder, treason and plot.

We see no reason

Why gunpowder treason

Should ever be forgot.....

Remember, Remember

Lily, Rosa and Frank are Healthcare Scientists working in the laboratories at Great Ormond Street Hospital. They work to help patients understand what is making them unwell, or to help with making them better.

It's November and there is fog hanging in the air, the leaves have begun to fall and the street lights have started to come on by the time they leave work.

Scientists often work late into the night and Lily is waiting for Rosa and Frank to finish for the day.

Whilst waiting for them she decides to run one more test using her favourite piece of lab equipment, a MALDI-ToF she's called Bonnie. Bonnie is a pretty cool piece of equipment as it has a laser and can get a result for Lily in less than 5 minutes for something she used to have to wait 2 days for.

Just as she presses the big red button, Rosa and Frank walk through the door to the laboratory. Suddenly a message appears on the screen, where no message should be saying 'HELPE...'

Then the message changes and gives an address at the top of Lamb's Conduit Street and what looks like a map.

Lily is so surprised she jumps back and tries to turn Bonnie off, but the machine doesn't respond and the message just stays on the screen.

Not knowing what to do Lily, Rosa and Frank decide to leave the lab and find somewhere to sit and chat to work out what might have happened, after all this is a piece of scientific equipment not a computer game.

As they leave the lab they are suddenly surrounded by the fog they had seen outside the window until they can barely see what's in front of them.

As they walk towards where they believe the tube to be they suddenly realise they are on Lamb's Conduit Street and the fog begins to clear

A child is waiting, she has a Scottish accent and demands they call her Princess Elizabeth! They must all bow to her!

She tells them there is a plot to get rid of her father by blowing up the Houses of Parliament. The scientists are amazed – do you mean the Gunpowder Plot of 1605?

She says she will tell them later how she managed that.

Even then, they don't believe she is a princess....

But she is

Remember, Remember

What can you do to help the scientists in 1605?

The scientists must find a way to help Princess Elizabeth find the Gunpowder Plotters. Then maybe they'll be able to find out how to get back to 2021!

The scientists have asked you to complete a number of activities in order to help them find the plotters. You are the detectives, guiding the scientists so that they can get home.

Complete the following activities and we'll find a way to get the results back in time to the scientists in 1605.

Remember, Remember

Activity One

Princess Elizabeth doesn't know what a scientist is. Lily, Rosa and Frank try to explain but they aren't doing a very good job of it.

Can you draw a picture of what a scientist looks like to help Princess Elizabeth understand?

Remember, Remember

Activity Two

Princess Elizabeth finds it very funny that the scientists don't know where they are, as everyone knows that Mr Lamb made a dam to direct water from the Fleet River so that people could make a street here and have fresh water, for drinking and washing. That's where Lamb's Conduit Street gets its name.

Princess Elizabeth says that you need to get from here to the Houses of Parliament in order to begin to investigate the Gunpowder Plotters. She draws the scientists a map that they can follow. Can you draw a map to either travel by road or water from Lamb's Conduit Street to the Houses of Parliament below?

Remember, Remember

Activity Three

Before you leave, Princess Elizabeth gives you a piece of paper with a message on it for the guards at the Houses of Parliament, she says it contains a codeword so they will let you in. The problem is she doesn't want anyone else to be able to read what that codeword is, so she asks you to turn the message into a code so that it can't be deciphered. That way if you lose it no one will be able to understand it (she doesn't much trust the scientists as they seem a bit clueless). Can you turn the below message into a coded message so that it is safe in case the scientists lose it on the way?

Dear Guards,

These people may be strange but they are here to help. They apparently can use good magic they call 'Science' to help us find the Gunpowder plotters. Please let them into the Houses of Parliament and listen to what they say.

Codename: Sugared Violets

Write what letter each of your code letter equates to below so:

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

Write your new encoded message in the box below so the scientists can take it with them:

Remember, Remember

Activity Four

Whilst the scientists are travelling using Princess Elizabeth's map they are shocked to see by how dirty London was in the past. People are wandering covered in dirt and they are eating with hands that they haven't washed.

Lily, Rosa and Frank ask the boatman why they don't wash their hands? He says that they don't know anything about hand washing. Frank tries to give him a hand hygiene leaflet that explains how to wash his hands and why it's important, but the boat man says he doesn't know how to read.

Rosa asks how he learns things if he doesn't know how to read? The boatman says that they make up rhymes and use those to learn instead.

Can you make up a rhyme about keeping clean or washing your hands that Rosa can teach the boatman so he can teach others about why it's important to keep clean?

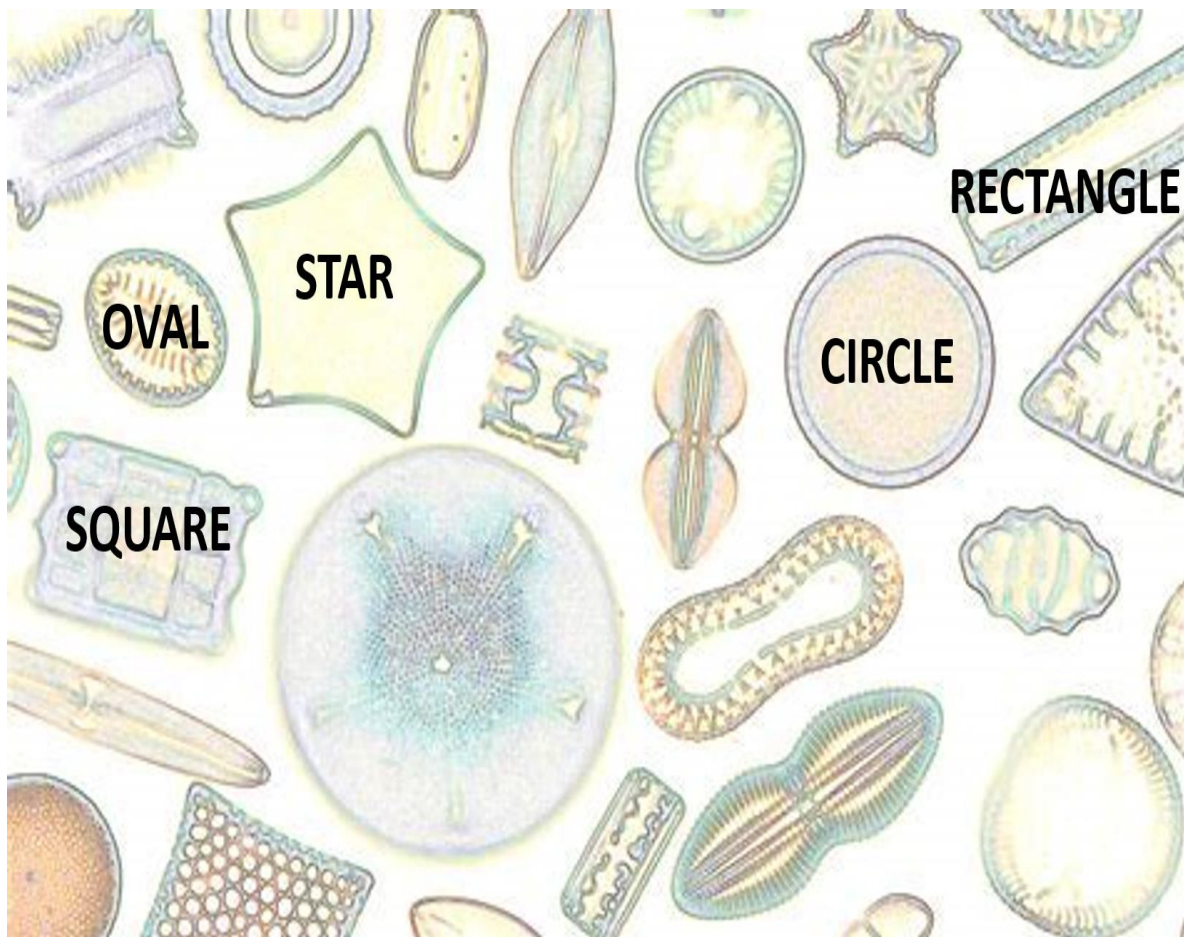
Remember, Remember

Activity Five

Lily, Rosa and Frank hand over the message to the guard at the Houses of Parliament. They are shown to an underground chamber where there are barrels of gunpowder, but also some barrels of river water, piles of wood and some blood where one of the plotters has hurt himself before they ran away.

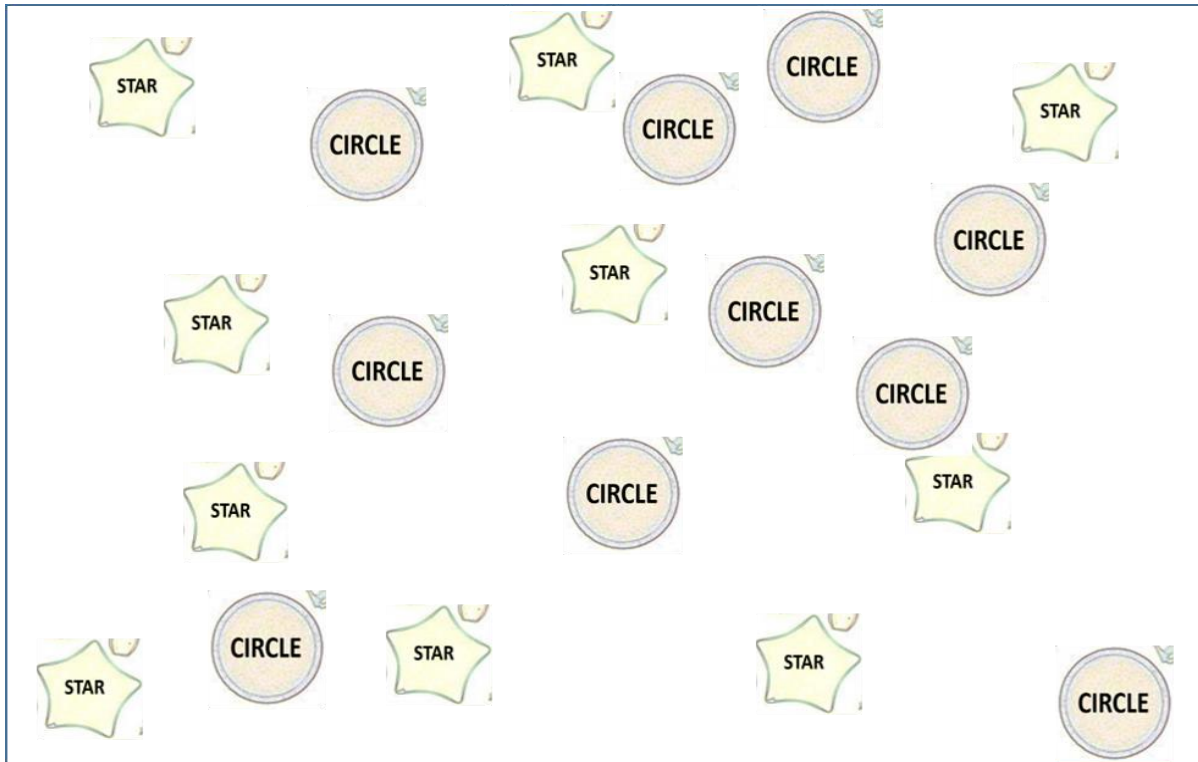
The scientists decide to investigate the scene using some science skills from working in the hospital. They look at where the river water came from, and investigate the blood that is on the wood.

The scientists look at some the micro-organisms (diatoms) in the river water. Lily says that what organisms are in there can be used to work out which river the water came from. Hopefully then we'll be able to narrow down where the plotters might be hiding!



Use the shape of the diatoms in the water to identify where the water has come from

Remember, Remember



Diatoms present in river water sample

River	Star	Oval	Rectangle	Square	Circle
Tyburn	Yes	Yes	No	No	No
Thames	No	Yes	Yes	No	No
Fleet	Yes	No	Yes	No	No
Lea	No	Yes	No	Yes	No
Oakley	Yes	No	No	No	Yes
Sample					

Diatoms present in different London rivers for comparison

Which river do you think that the river water came from?

Remember, Remember

Activity Six

In order to investigate the blood on the wood Rosa decides that she needs to look at the DNA in the blood sample.

DNA can give the scientists all kinds of information; from where they are likely to have come from, what hair and eye colour they have, to whether they have any infections.

This is because the DNA from the bacteria may be found in the blood sample along with the human DNA if they have been infected with something.

In order to decide whether the plotter who has been hurt has been infected with a bacteria the scientists need to work out which bits of the DNA in the sample are human and which bits are not.

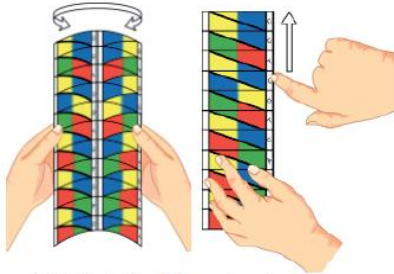
Can you help Rosa and Frank to put together the DNA so they have a complete section in order to understand what happened to the plotter?

(cut out pages 12 and 13 and follow the instructions on page 11)

Remember, Remember

Fold your own DNA

Note: All folds should have a thin line on the inside and a thick line on the outside.



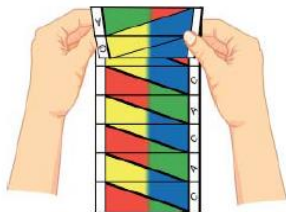
1. Fold in half lengthwise. Make all creases as firm as possible (use your fingernail!)



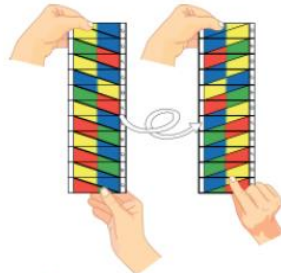
2. Hold the paper so that the thick lines are diagonal and the thin lines are horizontal. Fold the top segment down and then unfold.



3. Fold the top two segments down along the next horizontal line. Unfold.



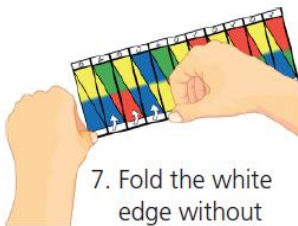
4. Repeat for all segments.



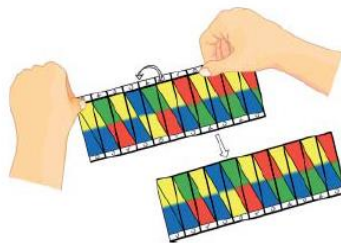
5. Turn the paper over.



6. Fold along the first diagonal line. Unfold and fold along the second diagonal line. Repeat for all diagonal lines.



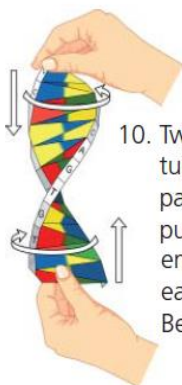
7. Fold the white edge without letters up.



8. Fold the other edge away from you. Partly unfold both edges.



9. You can now see how the model is starting to twist.



10. Twist and turn the paper while pushing the ends towards each other. Be brave!



11. Now let go.



Admire your completed DNA double helix!

Only another 2,999,999,989 (or so) more to complete your whole genome!

ASK?

EMBL-EBI
sanger

Designed by Alex Bateman (2003)

Remember, Remember

		C			G
		C			A
		T			G
		C			C
		G			A
		T			G
		C			T
		A			G
		C			T
		A			G
		C			T

Remember, Remember

		C			G
		C			A
		T			G
		C			C
		G			A
		T			G
		C			T
		A			G
		C			T
		A			G
		C			T

Remember, Remember

What happens next?

Lily, Rosa and Frank have investigated the scene under the Houses of Parliament using science skills from working in the hospital. They have looked at what the blood is made up of and where the river water came from. They know that the river water came from the River Oaxley and that one of the plotters has been infected with a bacteria from being injured when carrying the pile of wood.

Once they've finished doing this they look at the fungi growing on the wood and what kind of chemicals were found by the wood. By putting all this information together they have been able to look at maps of London and find where the plotters are hiding. Overnight the scientists find the plotters and persuade them to give themselves up.

The Plotters are due to be hung, drawn and quartered....but Guy Fawkes is more frightened of the scientists because they have with them the equipment they used to find him, plus their needles and swabs.

Lily, Rosa and Frank get a bit upset when Guy Fawkes is scared of them and say "but we are just trying to make people well and stop diseases".

Guy Fawkes replies "but that is why we were plotting! All these people in our towns are sick and we have had plague and we don't know what to do! No one is helping us".

Princess Elizabeth steps in and says that she can't have her people getting sick. She demands that the scientists help. The scientists decide to teach the plotters the rhyme they taught the boatman in order to remember how to stay well and avoid infection.

The Guard says, we can't just release them!

Lily, Rosa and Frank say you must release them – these rhymes, this knowledge are the antidote to the plague and all these illnesses.

OK, the guard and Elizabeth agree, but they have to all have fake names and never tell anyone the truth. We'll make up a story that they were all executed so no one will plot against us again, and they can make up for their crimes by doing good in the world.

It's a deal! Says everyone

And **it's** almost morning and the scientists have to get back to work. They get back in their boat and row and by the time they are back at Lamb's Conduit Street they are in 2021 again, and late for work.

Remember, Remember

What do Healthcare Scientists do?

Healthcare Scientists are often considered the forgotten workforce in the NHS, we are small in numbers, but in terms of impact, we are mighty. Eighty percent of diagnosis, and therefore people put on the pathway to better health, have that diagnosis made by Healthcare Scientists. We don't just work in labs, many of you will meet us and assume we are doctors or nurses.

Remember, Remember

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