



penUp Science



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Issue 48
Ancient
Egypt

Welcome to OpenUpScience

from Cambridge Science Centre.

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This issue is all about Ancient Egypt.

The ancient Egyptian civilisation was one of the greatest and most powerful in the history of the world, lasting for over 3,000 years!

They are famous for lots of scientific triumphs for example:

Using the stars, they devised a calendar with 365 days, divided into 12 months of 30 days.

They made paper from river reeds called the papyrus plant.



They understood how to melt and mix metals to make things.

They invented the first measurement called a cubit, which is the length from your fingers to your elbows. They used this to build...

1 cubit



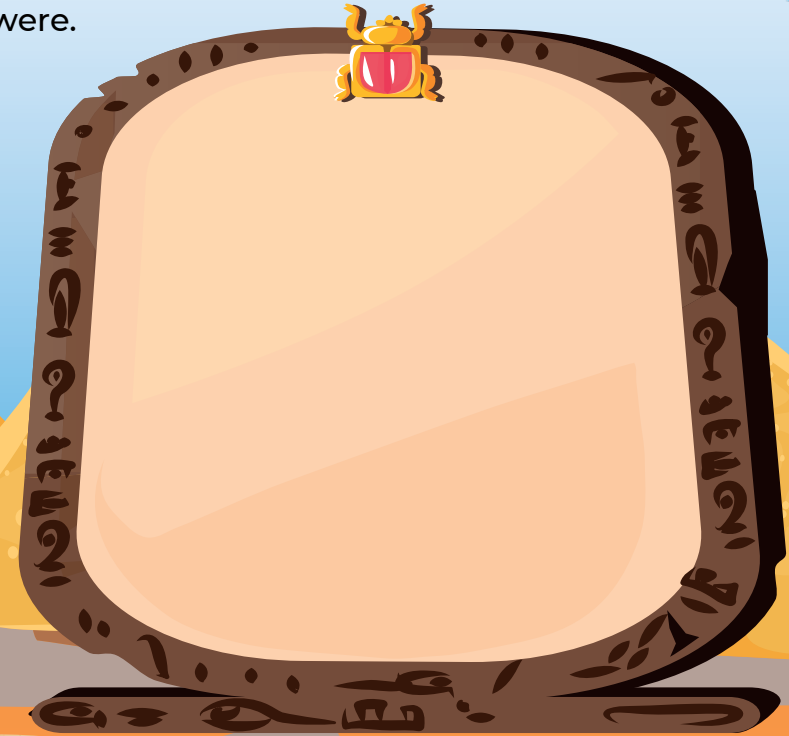
...the great pyramids!



Write Your Royal Name

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The frame below is a cartouche. The names of the Pharaohs were written inside this shape so people knew who they were and how important they were.



Write your name in the cartouche and be a Pharaoh for the day!

Hieroglyphics were used to write the ancient Egyptian language. In a vertical cartouche like this, the images were written bottom to top. Hieroglyphics were also usually written right to left!

Remember to write your name bottom to top. Try right to left.

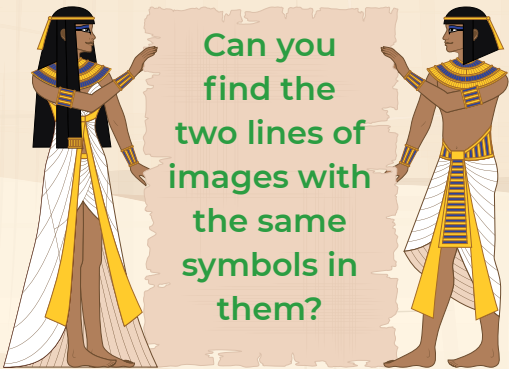


Cleopatra



Cleopatra was the last ancient Egyptian Pharaoh. She was born nearly 2,100 years ago, but the ancient Egyptians were around for so long that she lived closer in time to the building of the first pizza hut than the pyramids! When she was 17, her Pharaoh father made her his co-ruler with her 10 year old brother. When he was 13, her brother took power from Cleopatra, but she regained control of Egypt with the help of a Roman, Julius Caesar. It is thought that Cleopatra was a brilliant mathematician, chemist and philosopher. She met weekly with her science experts, wrote books on science and spoke Latin, Greek and Egyptian.

- Cleopatra was the last _____ of Egypt.
 - A. Pharaoh
 - B. Tsar
 - C. King
- How old was her brother when they became co-ruler?
 - A. 13
 - B. 10
 - C. 21
- Who helped Cleopatra take back control from her brother?
 - A. Julius Caesar
 - B. Aristotle
 - C. Alexander
- Which of these languages did Cleopatra **not** speak?
 - A. Greek
 - B. Latin
 - C. French
- How often is it said that Cleopatra met with her science experts?
 - A. Every full moon
 - B. Once a week
 - C. Never



Can you find the two lines of images with the same symbols in them?



Mummification



Ancient Egyptians are well known for preserving the dead bodies of their pharaohs, or rulers.

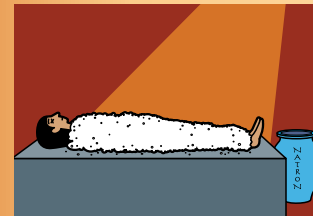
HOW TO MAKE A MUMMY



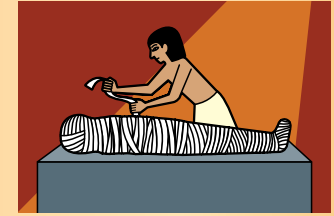
1. Wash the body and remove the brain through the nose using a hook.



2. Remove all the organs except the heart and place them in canopic jars.



3. Cover the body in natron salt found by the Nile river and leave for up to 70 days.



4. Wrap in linen and place the mummy in a highly decorated sarcophagus (or coffin).

After the ancient Egyptians prepared the body, they sealed it in a burial chamber inside a pyramid. The stomach, intestines, lungs and liver were placed in 4 separate canopic jars and also placed inside the burial chamber along with all the stuff the Egyptians thought they might need in the afterlife, like food, riches and even pets!

An esteemed job in the Pharaoh's household in ancient Egypt was **Neru Pehut**, which roughly translates as **Guardian of the Royal Anus**.

True



False



Mummify a Tomato

Mummification is a process of drying out with salts and wrapping to preserve a body.

Recreate this at home with a tomato.



The ancient Egyptians used to keep the insides of their mummies in canopic jars like these, but you can throw the inside of the tomato in the food waste!

What you'll need

- Two tomatoes
- A knife and a teaspoon
- Salt
- Bicarbonate of soda
- Kitchen roll
- Hand sanitiser
- Two containers slightly larger than your tomatoes

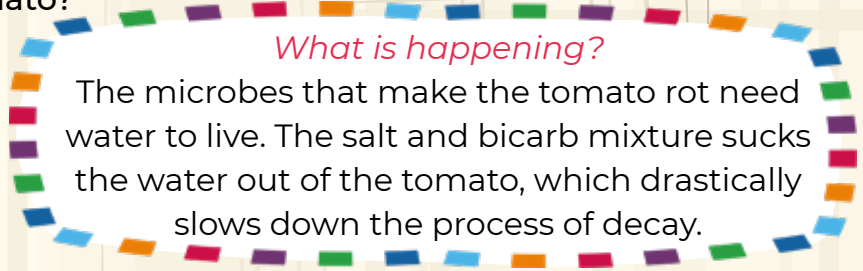
What to do

1. Write down what each tomato looks, feels and smells like, write it in the results table, and then choose one tomato to mummify!
2. Get rid of the guts! Slice a hole into the top of one tomato and gently squeeze and scoop out the pips and the pulp.
3. Wash the empty tomato using water and the hand sanitiser.
4. Carefully dry the tomato.
5. Mix together equal amounts of salt and bicarbonate of soda to make a mixture just like the natron salts from the Nile that the ancient Egyptians used.
6. Fill the inside of the empty tomato with the salt mixture and then bury it in more of the salt mixture inside a container.
7. Put the other tomato inside the other container just as it is. This is your control, so you can see how well the mummification has worked.
8. Put the tomatoes in a warm and dry place and wait! Check both the tomatoes every week and record what you see.



Mummify a Tomato Results

The ancient Egyptians were so good at mummification that they could preserve bodies for thousands of years. How did you do with your tomato?



What is happening?

The microbes that make the tomato rot need water to live. The salt and bicarb mixture sucks the water out of the tomato, which drastically slows down the process of decay.

RESULTS TABLE

	Mummified tomato	Control tomato
At the start of the experiment		
After 1 week		
After 2 weeks		
After 3 weeks		
After 4 weeks		

Try weighing the tomatoes before and after? What do you notice? Why do you think this happens?

Pyramid Maths

As Pharaoh, you want to build a pyramid. But how many bricks will you need? Identify the sequence to find the answer.



Layer 1 = 1 brick

Layer 2 = 4 bricks

Layer 3 = 9 bricks

Layer 4 = 16 bricks

Layer 5 = 25 bricks

Layer 6 = 36 bricks

Layer 7 = 49 bricks

Layer 8 = _____ bricks

Layer 9 = _____ bricks

Layer 10 = _____ bricks

What is the total number of bricks you need to build a ten layered pyramid?

TOTAL

How many bricks would the 20th layer need?

If each layer were hollow, what would the numbers be for layers 1, 2, 3, 4 and 5?

Get The Bricks



The granite bricks come by boat from Aswan, which is a city along the banks of the river Nile. How many river trips will it take to build a 10 layer pyramid?

7 x

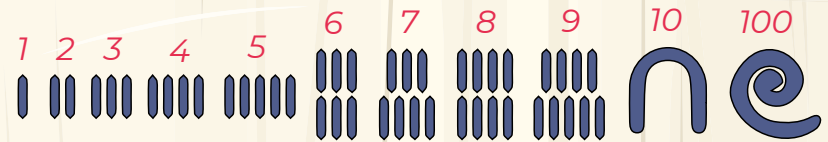


5 x



You have 7 felucca, or boats and each boat can take 5 bricks. How many boat trips need to be taken?

This is the ancient Egyptian number system:



Numbers are written by adding together these symbols:

For example: 122 =

Write your answer in the ancient Egyptian number system

NUMBER OF BOAT TRIPS



Mark And Make Your Own Jewellery



Almost every ancient Egyptian wore jewellery. They wore it for protection, to show power, to tell stories and for luck in the afterlife. The rich wore jewellery made of gold and copper, and the poor made jewellery from clay and bone.



What you'll need

- Tin foil
- Scissors
- Sticky tape
- String
- Pen or pencil
- Something soft to lean on like felt



What to do

1. Cut a rectangle out of the foil. Gently fold it in half to make a square with the shiny side on the outside.
2. Place the square of foil on something soft.
3. Choose a hieroglyphic from page 2. Take your pen and gently draw the symbol on the square, engraving the foil. Be careful not to go all the way through. Cut out your shape. This is your metal pendant.
4. Cut some thin strips of foil. Wrap these around your pen or pencil and secure with sticky tape. Slip the ring of foil off the pen or pencil. These are the beads for your necklace.
5. Take one of the beads and carefully stick it to the back of your pendant, making sure you can thread the string through the bead.
6. Take your string and cut it to 30cm. Thread your beads and pendant onto the string to make your necklace.

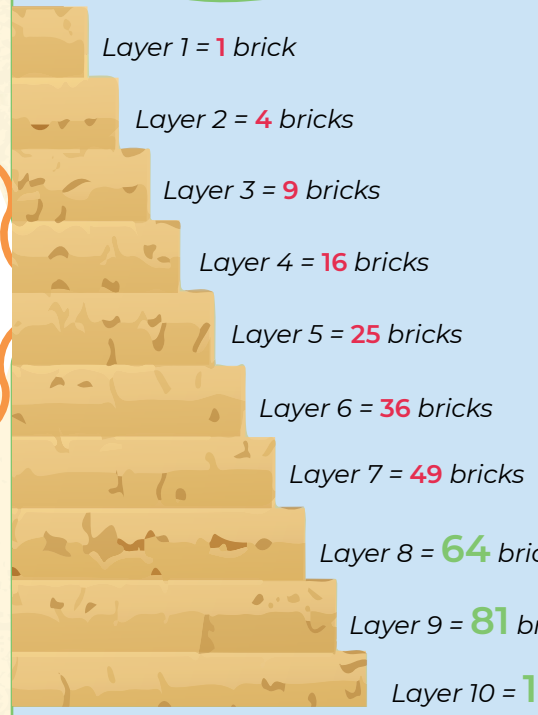


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Puzzle solutions



If you have any questions or want to send us a photo of your experiments, drop us an email at openupscience@cambridgesciencecentre.org



NUMBER OF BOAT TRIPS
 11

TOTAL
 385

How many bricks would the 20th layer need?
 400

If each layer were hollow, what would the sequence of numbers be for the first 5 layers?
 1, 4, 8, 12, 16

- Quiz Answers:**
1. A
 2. 10
 3. A
 4. C
 5. B



An esteemed job in the Pharaoh's household in ancient Egypt was **Neru Pehut**, which roughly translates as **Guardian of the Royal Anus**.

True False

Some Pharaohs had different doctors for different body parts, including the anus!

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