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英语阅读手册

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赠品

ATOMS: THE BUILDING BLOCKS THAT MAKE US



?? TEST YOURSELF!

Memorise the facts, close the book, and write them down. How many can you remember and jot down in 3 minutes?

When you stop and think about it, the differences between the things around us are strange and awesome. Our bodies and our furniture are solid. But the air around us seems not to be there at all. The reasons for this are truly amazing.

To find out why, we have to zoom in really far. As you get nearer to any object, you will see new patterns and details. There is a limit to how much detail we can see with our eyes. However, we can use scientific tools to go further. They show us that everything, from air to armchairs, is made up of the same building blocks: atoms.

Atoms are incredibly small. We can only just see human hairs, but they are huge on the atomic scale. There are around 1 million atoms of the element called carbon lined up side by side in the narrow width of a hair. Atoms in air are usually much further from each other. But even then, we breathe in about 25 sextillion atoms in every breath – a huge number.

Although atoms were far too small for them to see, people realised that they must exist a long time ago. People in Greece over 2,000 years ago came up with the idea. That's why we call the building blocks atoms. Atomos is a Greek word meaning something that can't be divided. It turned out that atoms actually could be divided into smaller building blocks, but the name stuck.

Some types of atom exist alone, not linked to any others. But most of them link up tightly together, like carbon in a hair. Perhaps most awesome of all is what tells them to behave like this. Despite being so tiny, atoms follow detailed rules to link together to build us and the things around us.

ATOM ANATOMY

What atoms do depends on neutrons and protons at their nucleus, and the electrons that form a surrounding cloud

PROTONS

One of the key building blocks of the nucleus, protons behave a bit like magnets that can attract electrons.

ELECTRONS

Electrons behave like magnets that can attract protons. Far from the nucleus, they can flow in metal wires as electricity.

NEUTRONS

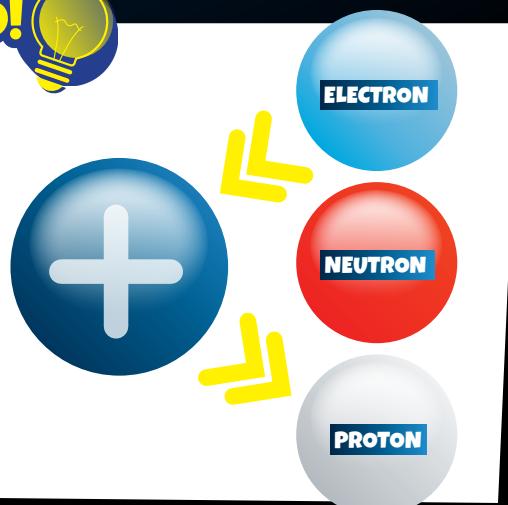
Neutrons are the other important building block for an atom's nucleus, but do not behave like magnets.

GIVE IT A GO!

Guess the charge!

Neutrons, electrons and protons have something called a charge. This means that they can be positive or negative. If these tiny particles didn't have a charge at all, then they would be known as neutral.

You've probably heard of the saying, 'opposites attract'. With this in mind, see if you can guess what charge a proton, neutron and electron each carry.



HAVE A GO!

Make your own edible atom!

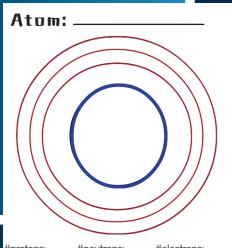
WHAT YOU'LL NEED

- Two colours of mini marshmallows
- Chocolate chips
- Printouts of the worksheet
- A periodic table that lists each element's atomic and mass numbers like this one. Here, the atomic number is above the element symbol, and the mass number below it.

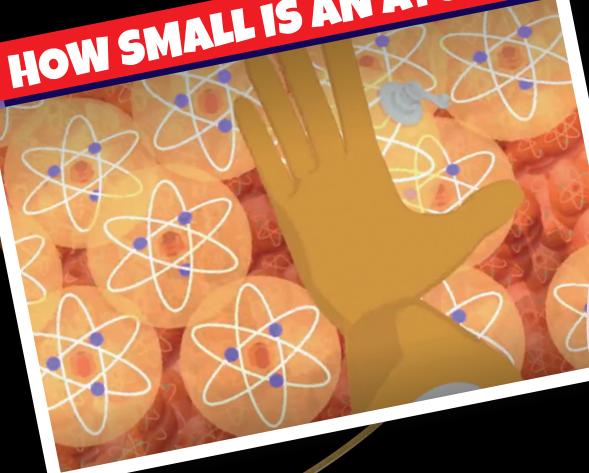
STEPS

- 1 Choose an element from the periodic table, and find its atomic number. Hydrogen's atomic number is 1, for example.
- 2 On the worksheet, next to #protons, write the atomic number of your element.
- 3 On the worksheet, next to #electrons, write the atomic number of your element.
- 4 Subtract your element's atomic number from its mass number. Write the answer on the worksheet, next to #neutrons.
- 5 Choose one colour of marshmallow for protons, and one for neutrons. Count out a pile of proton marshmallows equal to the #protons number. Put them in the blue circle on the worksheet, which represents the atom's nucleus.
- 6 Count out a pile of neutron marshmallows equal to the #neutrons number. Put them in the blue circle on the worksheet, which represents the atom's nucleus.
- 7 The chocolate chips represent the electrons floating around your element's nucleus. Count out a pile of chocolate chips equal to the #electrons. Put these on the thin red lines around the outside of the worksheet. The inner circle can only have two electrons, the next circle eight, and the outer circle 18. If your element has more than 28 electrons, put the remainder outside the third circle.

- 8 You have made an atom! You can now enjoy looking at it, make another one, or just eat it!



HOW SMALL IS AN ATOM?



BE CAREFUL!
If you get stuck on any activities, be careful and ask an adult to help!

5 THINGS YOU NEED TO KNOW ABOUT ATOMS

1 BUILDING BLOCKS MADE OF BUILDING BLOCKS

ATOMS ARE MADE OF A NUCLEUS MADE OF PROTONS AND NEUTRONS, AND ELECTRONS AROUND IT.

2 LIKE A MARBLE IN A FOOTBALL STADIUM

IF AN ATOM WAS FOOTBALL STADIUM-SIZED, ITS NUCLEUS WOULD BE A MARBLE AT THE CENTRE.

3 SENTENCE-STOPLINGLY TINY

THE FULL STOP AT THE END OF THIS SENTENCE CONTAINS ROUGHLY A QUINTILLION ATOMS.

4 IT ALL STARTED WITH THE BIG BANG

ATOMS WERE FIRST MADE IN THE BIG BANG AT THE START OF THE UNIVERSE.

5 BUILDING BLOCKS LARGE AND SMALL

THE VOLUME OF THE LARGEST ATOM, FRANCIUM, IS 15 TIMES THAT OF THE SMALLEST, HELIUM.

MOLECULES: WHEN ATOMS LINK TOGETHER



原版英文音频



Atoms are some of the simplest things we know, but link up in very clever ways to make molecules. It's almost like they're little robots that are programmed to hold onto each other and build bigger objects – only in this case, the instructions they follow are the laws of physics.

There are 118 different types of atom. We call the types of atom elements. The very simplest light molecules just hold onto one other atom. This is the case in oxygen molecules, where two atoms of the element oxygen hold onto each other. These are the molecules in the air that we breathe. But in other molecules, atoms link to more than one neighbour, including different elements. In water molecules, oxygen links to two hydrogen atoms.

If one atom's neighbours link to other neighbours, they can form larger molecules. For example, acetic acid is found in vinegar. Its molecules consist of two carbon atoms, two oxygen atoms, and four hydrogen atoms linked together.

Even larger molecules form when many atoms bond together into long chains and networks. Such large molecules usually form solid materials. For example, diamonds are made of large networks of carbon atoms. Each atom is bonded to four others in a continuing network. Something similar happens in the plastic in shopping bags.

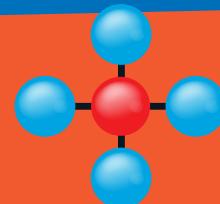
People have only known about how this works for a little over 200 years. When scientists started to work out the elements that chemicals are made of, they noticed clues. For example, in pure substances the elements are always present in amounts that relate in simple, constant ways. The gas carbon dioxide always contains twice as much oxygen as carbon they found, for example. Today, we know that this is because carbon dioxide molecules are made of one carbon atom and two oxygen atoms.

FAMOUS MOLECULES



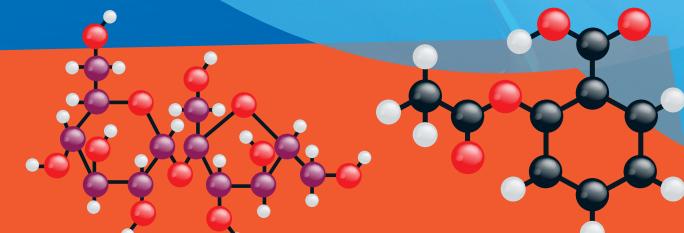
WATER

Water is a very simple molecule, with just one oxygen and two hydrogen atoms, but it has very special properties.



METHANE

With one carbon atom and four hydrogen atoms, methane is an energy-rich gas. We use it for cooking and heating.



SUCROSE

What we call sugar is a molecule called sucrose. There are many molecules that are sugars, which vary in sweetness.

ASPIRIN

Aspirin is a painkiller, discovered by modifying a natural molecule found in the bark of willow trees, called salicylic acid.

IONIC BONDING
Sometimes, atoms give electrons to other atoms completely. Many, such 'ions' attract each other, giving takers forming regular patterns.

METALLIC BONDING

Metals have lots of electrons, enough for an extreme kind of covalent bonding, with some left over to conduct electricity.

COVALENT BONDING

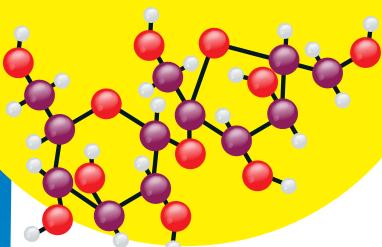
Atoms can connect together by sharing the electrons that surround their nuclei with other atoms to form 'covalent' chemical bonds.

DID YOU KNOW?

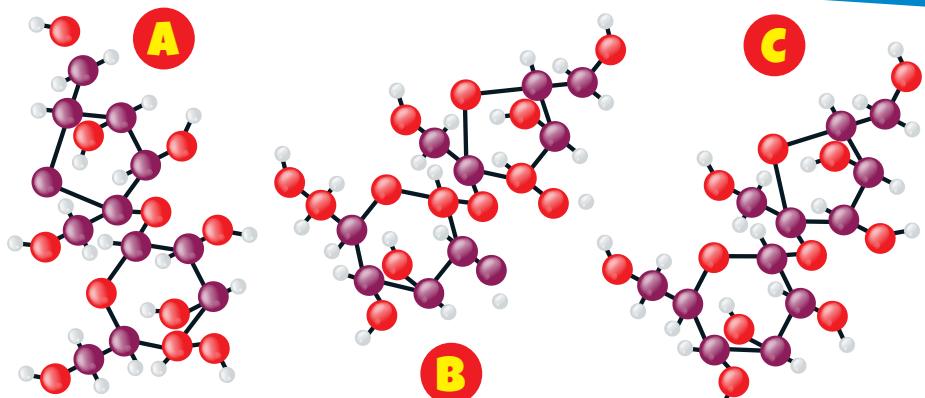
When molecules won't mix, they can sit on one another

QUIZ**WHAT DO YOU KNOW ABOUT MOLECULES?****HOW MANY DIFFERENT TYPES OF ATOMS ARE THERE?****HOW MANY ATOMS ARE THERE IN THE SIMPLEST MOLECULES?****WHAT IS WATER MADE OF?****WHAT ARE DIAMONDS MADE OF?****WHAT GAVE SCIENTISTS AN EARLY CLUE THAT ATOMS LINK UP TO FORM MOLECULES?****SPOT THE DIFFERENCE**

Sugar, which can be found in candy, among other types of food, is made up of an amazing 45 atoms. Can you match the image below with A, B or C?



ANSWER: C



ANSWER: 18. Two hydrogen atoms and an oxygen atom, large networks of carbon atoms, pure substances always contain elements in proportions that relate in simple, constant ways

THE CELL: WHAT YOUR BODY'S MADE OF



You are made of cells – trillions of them!

They are the living bricks that make up the human body. There are more than 200 different types, and each one has its own special job to do. There are cells that make sweat in your armpits, cells that make tears in your eyes, and cells that make wax in your ears!

Your brain and nervous system are made of nerve cells, which work like tiny telephone wires; they send messages from one part of your body to another. Some nerve cells stretch from your backbone right down to your toes! Just imagine how long they'll be when you're fully grown.

Your arms and legs are made of skin cells, fat cells, muscle cells and bone cells. They protect you from the outside world, store energy, move your body and keep your skeleton strong.

Your digestive system is a mix of gland cells, lining cells and muscle cells. The gland cells make the digestive juices that break your food down into nutrients. The lining cells take all those nutrients in, and the muscle cells keep everything moving, from your mouth right down to your bottom.

Even your blood is made of cells! There are red blood cells that carry oxygen around your body, and there are white blood cells that fight bacteria or viruses that try to make you sick.

Most cells decide what job they are going to do before you are even born, but some wait to choose until later. Scientists call these cells 'stem cells'. They can turn into almost any other cell in the body! They help you to heal when you get hurt, and replace your old cells when they wear out.

TEST YOURSELF



Memorise the facts, close the book, and write them down. How many can you remember and jot down in three minutes?

MEMBRANE

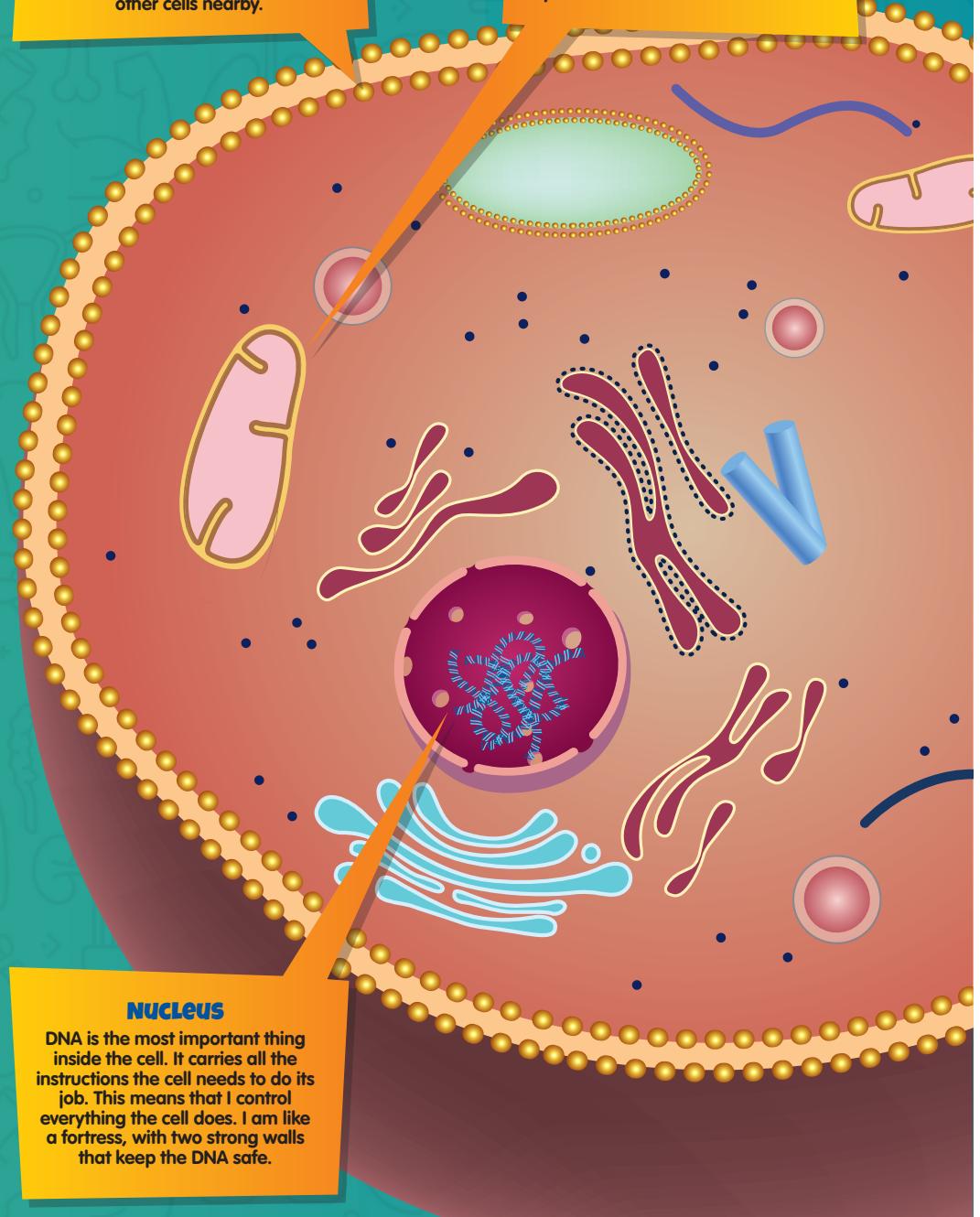
I am the walls that hold the cell together. I am like a stretchy bag that keeps the inside of the cell in. I get to decide what can come into the cell, and what can go out. I also listen out for messages from other cells nearby.

MITOCHONDRIA

I am a tiny energy factory. There can be hundreds of me inside a single cell! I use sugar and oxygen to make all the energy that the cell needs. I also make a lot of waste. All the carbon dioxide that you breathe out comes from me.

NUCLEUS

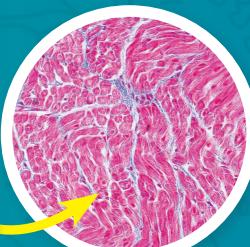
DNA is the most important thing inside the cell. It carries all the instructions the cell needs to do its job. This means that I control everything the cell does. I am like a fortress, with two strong walls that keep the DNA safe.



FIVE THINGS YOU NEED TO KNOW ABOUT CELLS

HEART CELLS BEAT ON THEIR OWN

The cells in your heart can beat by themselves without any instructions from your brain.



LIVER CELLS CLEAN YOUR BLOOD

The cells in your liver take chemicals out of your blood and break them down.



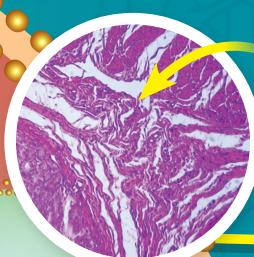
BRAIN CELLS MAKE ELECTRICITY

The cells in your brain are like living wires; they make electric currents.



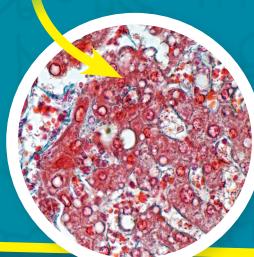
STOMACH CELLS MAKE ACID

The cells in your stomach make acid more sour than lemon juice.



LUNG CELLS LET AIR THROUGH

The cells in your lungs are so thin that air can cross through them into your blood.



CYTOPLASM

Cells run on chemical reactions. It's my job to make sure they happen in the right place and at the right time. I am mostly water, and everything inside the cell floats in me. I also have a kind of skeleton that helps the cell keep its shape.



How many of these facts surprise you and your friends?

GIVE IT A GO!

Discover DNA at home!



WHAT YOU'LL NEED

- A plastic bag
- A strawberry
- 2 teaspoons of washing-up liquid
- 1 teaspoon of salt
- 100ml water
- Damp coffee filter
- 20ml cold rubbing alcohol
- Two cups
- A spoon

INSTRUCTIONS

- 1 Put a strawberry in a plastic bag and squash it up.
- 2 Mix the washing-up liquid, salt and water in a cup.
- 3 Add two teaspoons of the mixture to your plastic bag.
- 4 Give it another good squash.
- 5 Put the coffee filter in the other cup.
- 6 Pour the strawberry mixture through the filter.
- 7 Take the filter out of the cup.
- 8 Pour the alcohol gently on top of the strawberries.
- 9 Look inside – do you see white strands?
- 10 Scoop them out with your spoon. That's DNA!

WHAT HAVE YOU LEARNED?

You've just pulled the DNA out of a strawberry! The washing-up liquid broke the strawberry cells open, the salt released their DNA, and the alcohol made the DNA stick together so that you could see it. Don't worry if it didn't work the first time – science is like that sometimes. Have another go!

YOUR ORGANS: THE CELLS AND TISSUES THAT KEEP YOU ALIVE



Your organs are groups of cells and tissues that work together to do jobs inside your body. There are lots of jobs to do, so there are lots of different organs! You'll meet some of them in more detail elsewhere in this book. Here, we'll have a look at some of the most important.

Five of your organs are known as 'vital organs'. These are the ones you absolutely cannot live without. They are your brain, heart, kidneys, liver and lungs.

These organs do essential jobs, like pumping blood around your body, making sure your cells have enough oxygen, and getting rid of toxic waste. You can survive with one kidney, or one lung, and you can even have part of your liver removed. But if you lost any of these organs completely, your body would just stop working.

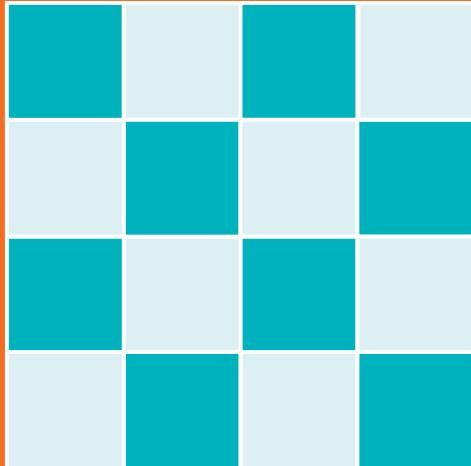
Your other organs are important too, but doctors have found ways to help people live without them. They include your sense organs, like your eyes, ears, nose and tongue, and your digestive organs, like your stomach and intestines.

Some of your organs, like your skin, are very big, but others are really quite small. You have an organ in your throat called your larynx (pronounced la-rinks). It contains your vocal cords, and its job is to let you talk.

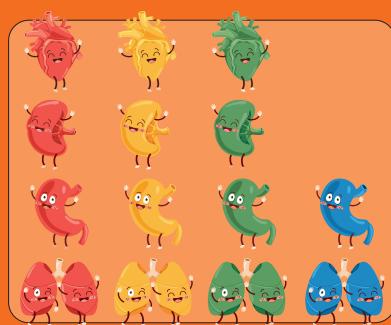
Strangely, there is one organ that doesn't seem to do anything useful. Your appendix (pronounced a-pen-dicks) is a little organ connected to your large intestine. It's about five centimetres (two inches) long, and it's the shape of a worm.

Scientists think that the appendix might be there to help the immune system fight infection, but lots of people have their appendix taken out, and their bodies don't seem to miss it at all!

ORGAN PUZZLE



Arrange the organs so that the same colour or shape isn't in the same row horizontally, vertically or diagonally. Draw them in pencil or on a notepad to make solving the puzzle easier.



WORD SEARCH

Now find each of your organs in the word search below.



INTESTINES
BLADDER
LIVER
STOMACH
LUNGS
SKIN
HEART
BRAIN

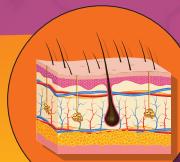
YOUR ORGANS: THE CELLS AND TISSUES THAT KEEP YOU ALIVE

SKIN

skin

MY MAIN JOB: PROTECTING YOU

I surround your entire body. It is my job to stop your insides getting out, and to stop the outside getting in! I am completely waterproof, and I contain colourful molecules that help to protect you from the sun.

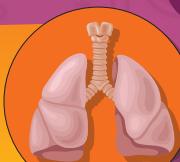


LUNGS

lungs

MY MAIN JOB: BREATHING

I am a set of stretchy bags in your chest. It is my job to get oxygen into your blood and take carbon dioxide out. Every breath you take moves around 500ml (1 pint) of air into and out of me.



LIVER

liv-er

MY MAIN JOB: CLEANING BLOOD

I am one of your biggest organs! If you put your hands just under your ribs, you'll notice that your right side is warmer than your left. That's me! I clean chemicals out of your blood, make sure you have enough energy, and make bile to help you digest food.



INTESTINES

in-tes-tins

MY MAIN JOB: DIGESTING FOOD

I am the tube that connects your stomach to your bottom. All your food has to pass through me. It is my job to make sure that you get all the goodness out of your food. I take out all the nutrients and all the water, and get rid of the waste.



BLADDER

bla-dur

MY MAIN JOB: STORING WEE

I am a stretchy bag at the very bottom of your tummy. I store wee until you're ready to go to the bathroom. Did you know that I can hold more wee at night than I can in the day?



BRAIN

brayn

MY MAIN JOB: CONTROLLING YOUR BODY

I am the control centre of your body. I send electrical signals through the nervous system to tell everything else what to do. I also listen for touch, taste, sight, smell and sound signals from the body. I let you think, imagine, remember, plan, feel and move.



HEART

hart

MY MAIN JOB: PUMPING BLOOD

I am one of the hardest-working muscles in your body. I beat around 60 times a minute, every minute of your life. Each beat sends blood around your body, carrying oxygen and nutrients to your cells and taking waste away.



STOMACH

stum-ak

MY MAIN JOB: DIGESTING FOOD

I am a stretchy bag just under your ribs. I collect all your food when you're eating, and squash it down into a paste before it moves on to your intestines. I am full of acid, which helps to kill any bacteria that might make you sick.

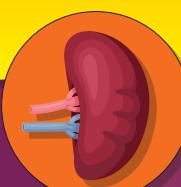


KIDNEY

kid-nee

MY MAIN JOB: MAKING WEE

I am like a filter. It is my job to clean the waste out of your blood and turn it into wee. I make around a litre (1.75 pints) of wee every day, and I send it through long tubes to the bladder.



© Getty Images

THE TECH AND TRANSPORT FROM ANCIENT EGYPT



Just like today, life didn't stand still in ancient Egypt. Society moved forward whenever someone invented a new technology or a fresh way of doing things. People also benefited from improvements in transportation, opening them up to new ideas and products. Ancient Egyptians would have been just as excited about a new invention as we are whenever we see a new game console or mobile phone today. In fact, some of the innovations pioneered by ancient Egyptians have stood the test of time, from the making of bronze to the invention of ink.

We've already explored how technology was used to improve Egypt's architecture. We've looked at the advances in medicine and the fascinating techniques involved in burying the dead.

In this section we're going to look more in depth at some awesome inventions and examine how technology improved the construction of boats to help the Egyptians transport goods and people. We will also see how ancient Egypt improved its army and turned itself into an empire.

Join us on the final leg of our journey through ancient Egypt as we continue to explore what helped make the country so great for so long.





WHAT AM I?

Ancient Egyptians used one of these more than 5,500 years ago, but what is it? Here's a clue: I have teeth, but I cannot chew.



What is it?

ANSWER: Comb

© Getty Images

ANCIENT EGYPTIAN INVENTIONS



原版英文音频

What's the date today? In giving your answer, you may have looked at a calendar and searched for the day, month and year. But who do you reckon realised there were 365 – and a quarter – days each and every year? The ancient Egyptians created calendars thousands of years ago.

Okay, so they didn't quite create the system we use today. Their weeks were ten days long and their 12 months of the year lasted three weeks each, but it's just one example of how innovative the ancient Egyptians were. What's more, it's not their only invention.

As you will have read in our section about medics, great strides were made in medicine by people who had a reasonable idea of how the human body worked. They also understood the importance of preventing their teeth from falling out by grabbing wooden twigs, creating bristles on the end and applying an early type of toothpaste. It was made by adding water to crushed rock salt, dried iris flowers, mint and pepper. It would have tasted and smelled very fresh!

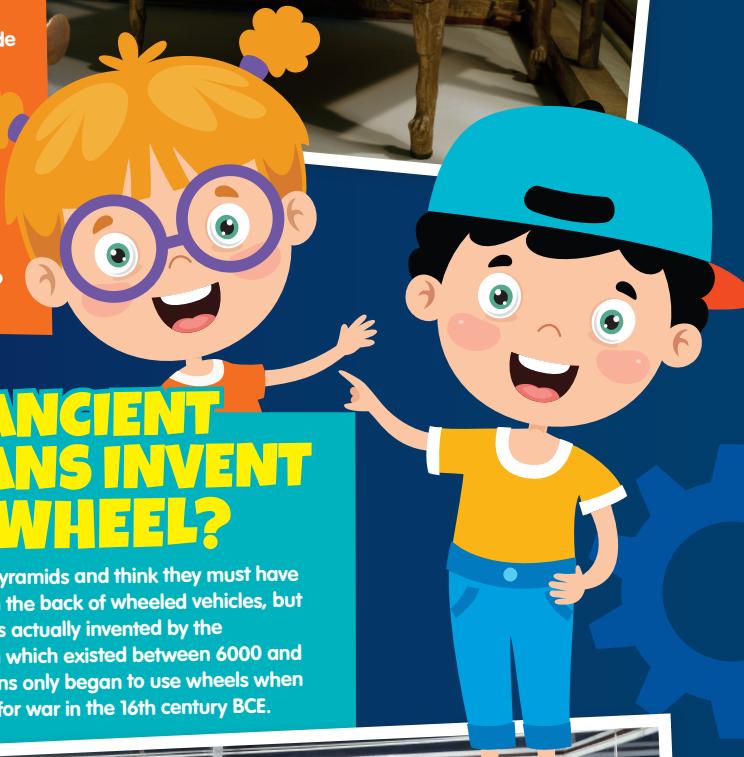
It wasn't all about looking and smelling good – even though they did invent eye makeup!. Ancient Egyptians were practical, too! They used fractions to plan the farming cycle and they created an early plough, using oxen to carry it, thereby allowing them to loosen the soil before planting or sowing seeds.

Mathematics helped them build their mega-structures, and they became the first civilisation to mine for gold on a large scale – placing sand in a bag made from animal fleece and pouring water through it to leave only the metal behind.

We know a lot of this because the ancient Egyptians wrote things down on parchment made from papyrus plants, inventing a system of writing in the process. They then placed the records in archives and ensured they were safe by locking them away. They created a simple but effective pin-tumbler lock sometime around 1000 BCE, which let them secure doors using a key. It was definitely a great improvement over simply sliding a plank of wood across to bar entry or protect treasures.

TIME TO PUT YOUR FEET UP

Are you sitting down on a chair to read this book? Thank the ancient Egyptians! Wealthy and royal Egyptians enjoyed resting on splendid, well-decorated chairs made of ebony, ivory, wood or metal. It was a real improvement over sitting on stools or on the floor. Ancient Egyptians also created tables as we know them today, allowing them a raised surface on which to eat, play and write.



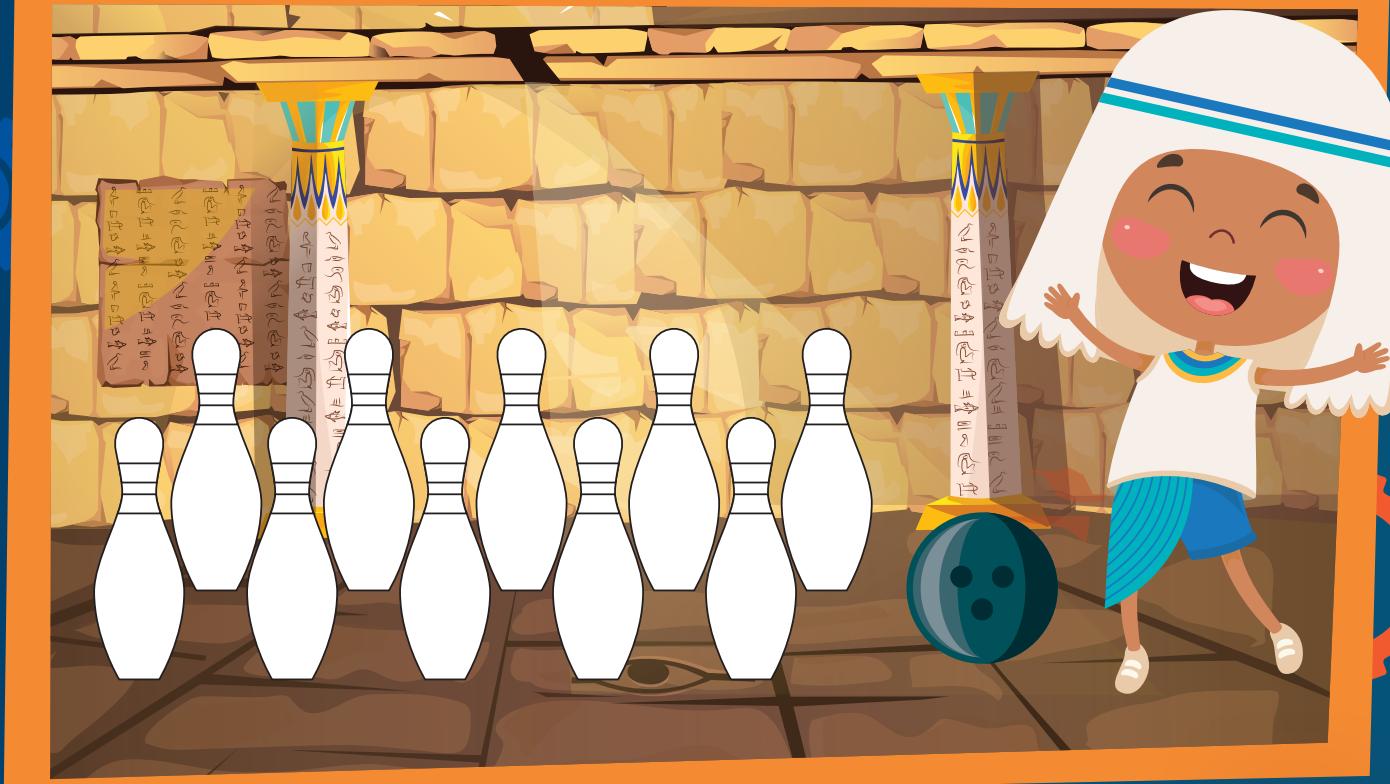
DID ANCIENT EGYPTIANS INVENT THE WHEEL?

No! You may look at the pyramids and think they must have moved all of that stone on the back of wheeled vehicles, but they didn't. The wheel was actually invented by the Mesopotamian civilisation which existed between 6000 and 1550 BCE. Ancient Egyptians only began to use wheels when chariots were introduced for war in the 16th century BCE.



GO BOWLING

Ancient Egyptians invented the first form of bowling around 5000 BCE. Players aimed small rocks at pins made out of carved stone. An Ancient Egyptian is hoping to knock some down. On his first attempt, he hits a fifth of them. Colour these ones in yellow. On the second attempt, he knocks down half. Colour them red. Then he knocks down a quarter. Colour them blue. How many are left?



ANSWER: Three

DID YOU KNOW?

Ancient Egyptians invented high-heeled shoes. They were worn by noblemen and women, but they also became the favourite footwear among butchers, who could use them to avoid blood and guts on the floor.



WORD SEARCH

Can you find the inventions in the word search below?

F	U	R	N	I	T	U	R	E	H	K	I	P	J	M
S	F	D	C	Z	T	U	B	N	M	F	N	E	W	L
A	Z	G	H	I	O	B	V	Q	L	H	K	N	O	S
P	H	G	F	R	J	B	L	F	M	H	L	O	C	F
A	K	D	U	P	C	N	T	K	F	Y	H	N	G	D
T	C	J	F	M	A	T	H	E	M	A	T	I	C	S
R	O	J	J	K	F	P	N	U	A	D	J	L	A	E
Q	V	O	J	F	Y	N	E	D	K	L	E	W	L	Z
F	H	K	T	F	D	E	U	R	E	I	O	L	E	D
H	B	V	N	H	S	X	Y	I	U	E	W	Q	N	L
H	K	L	D	G	P	T	B	M	P	D	S	W	D	N
U	Y	P	J	K	D	A	G	E	I	O	B	J	A	S
C	A	D	S	W	I	G	S	T	F	H	I	M	R	G
B	H	V	G	I	N	D	E	T	L	P	J	E	M	M
S	Q	M	E	D	I	C	I	N	E	J	N	E	D	C

MATHEMATICS

MAKEUP

WIGS

CALENDAR

TOOTHPASTE

PAPER

INK

FURNITURE

MEDICINE

英文单词记录表

✓	words	translation & soundmark
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
	序号:	日期: 页码:

✓	words	translation & soundmark
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