21 How come?

Explaining why

1 What happens to water if you:

1 reduce its temperature to 0 °C?
2 raise its temperature to 100 °C?

2 21.1 Listen to another question about water. What's the question and what's the answer?

3 21.1 Are these sentences true or false? Correct the ones that are wrong. Then listen again to check your answers.

1 Tom's calling because he and his wife have been disagreeing.
2 Tom's question is: Can you boil water by heating it?
3 Dr Carter's answer is 'Yes'.
4 You can boil water by removing heat, or by reducing the pressure.
5 If you increase the air pressure, water boils faster.
6 If you increase the air pressure, the boiling point rises.
7 Reducing the air pressure is a good way to cook spaghetti.

Explaining causes and effects

if	*If you reduce the air pressure, water boils faster.*
make	*Reducing the pressure **makes** the boiling point drop.*
so	*The pressure goes down, **so** the boiling point drops.*
mean	*Higher pressure **means** a higher boiling point.*
that's why	***That's why** you can cook food faster under pressure.*
because	*You can cook food faster **because** the water is hotter.*

4 Explain the answers to some more science questions. First read the questions and see if you can answer them. Then match the beginnings and endings of the sentences to explain why.

What happens if you put an egg in a jar of vinegar and leave it for three weeks?

1 If you put an egg inside a jar of vinegar ...
2 The vinegar makes ...
3 The vinegar contains $C_2H_4O_2$ ...
4 That means it eats away ...
5 So the shell dissolves because of ...
6 But it's a very weak acid and that's why ...

a so it's acidic.
b it takes three weeks.
c at the shell.
d the shell dissolve.
e the egg shell slowly disappears.
f the acid in the vinegar.

Is the earth's North Pole a magnetic north pole, or a magnetic south pole?

1 If you allow a magnet to rotate freely ...
2 The earth's magnetic field makes ...
3 So the magnet points towards ...
4 But this means the north pole ...
5 This is because opposite poles attract and ...
6 So the earth's magnetic south pole is in the north ...

a the magnet point 'north'.
b similar poles repel or push apart.
c it acts like a compass.
d and that's why magnets point north.
e is really a magnetic south pole.
f the earth's geographic north pole.

5 Here are some more science questions. What are the answers? Discuss them with some other students.

a raisin = a dried grape

① What happens to a balloon filled with helium if you let go of it? Why?

② What happens if you have a football in your car and you stop the car suddenly? Which direction does the ball roll, and why?

③ What happens if you have a balloon filled with helium in your car and you stop the car suddenly? Which direction does the balloon move, and why?

④ What happens if you drop a raisin* into a glass of champagne? Why?

⑤ What happens if you put a frog inside a very powerful magnet? Why?

6 Choose the correct word.

① The balloon rises upwards *why/because* the air above the balloon is lighter and less dense.*

② The ball is heavier, and denser* than the air in the car. A sudden stop *make/makes* the ball roll towards the front of the car.

③ When the car stops suddenly, the air inside the car keeps moving forward. That *mean/means* the air in the front of the car becomes denser than the air at the back. This increases the pressure on the front side of the balloon and *make/makes* it move towards the rear of the car.

④ Bubbles of air collect around the raisin and *make/makes* it rise to the top of the glass. When it reaches the surface, the bubbles escape, so it sinks back to the bottom again. Then the process starts again and repeats itself and that's *because/why* the raisin keeps moving up and down.

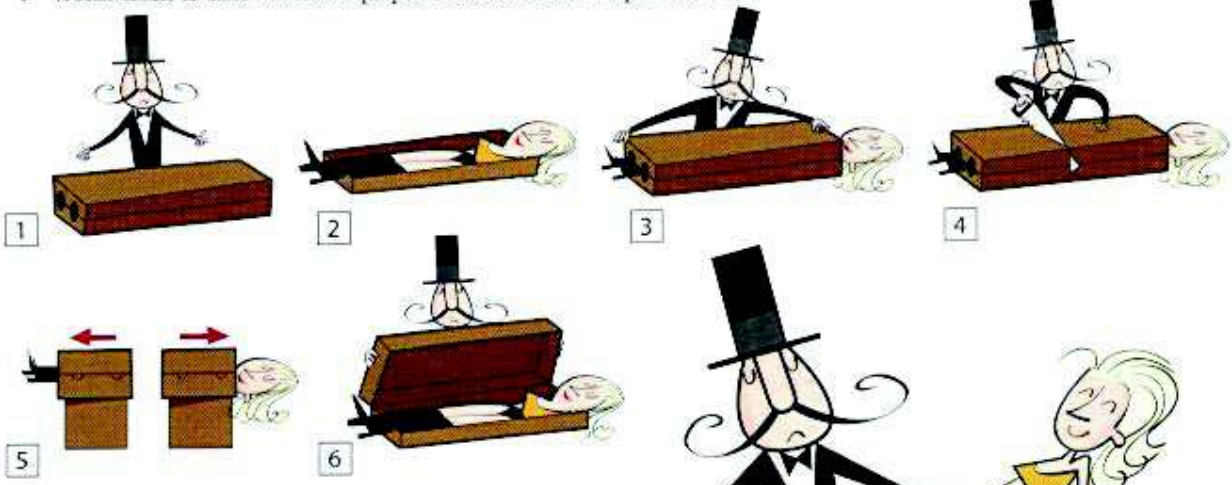
⑤ Some materials are diamagnetic. This *mean/means* a magnet repels them. Carbon-graphite, water, protein, DNA, wood, silver, and gold are all diamagnetic. A frog's body is diamagnetic *because/why* it contains a lot of water, protein, and DNA. So if you put a frog inside a powerful magnet, the magnet repels it, and the frog rises up into the air.

* If something is dense, it is heavy in relation to its size. Density is the relationship of weight to volume.

7 Work in pairs or small groups. Think of another science question to ask the other students in the class and write it down. Then take turns to ask your questions. See if any 'experts' in the class can answer them.

Explaining procedures

1 What trick is this? What equipment is needed to perform it?



2 Here are seven steps of the trick, but they are in the wrong order. Match each one to the correct picture.

..... A girl lies down in the box. Her head sticks out one end and her feet stick out the other.
..... The two halves of the box are separated.
..... The girl is sawn in half.
..... The audience is shown a long rectangular box with holes at each end.
..... The girl gets out of the box and she's in one piece!
..... The lid is placed on the box and fastened.
..... The two halves are put back together again and the lid is removed.

3 How does the trick work? What step is missing?

4 Here's the missing step. Where does it fit in?

The magician turns the box around so the audience can't see the girl's feet. The girl removes her feet from the holes at the end of the box and replaces them with false feet. She folds up her legs, so the bottom half of the box is empty. The magician turns the box back so the audience can see the false feet.

5 Compare these sentences:

She folds up her legs.
She is sawn in half.

Which one describes:
1 what the girl does?
2 what happens to the girl?

Which sentence is active and which is passive? Complete the rule. Write *passive* and *active* in the correct spaces.

Active and passive

When we're interested in what people or things do, we use ..... sentences.
The girl folds up her legs – The focus is on what the girl does.

When we're interested in what is done or what happens to someone or something, we use ..... sentences.
The girl is sawn in half – The focus is on what happens to the girl.

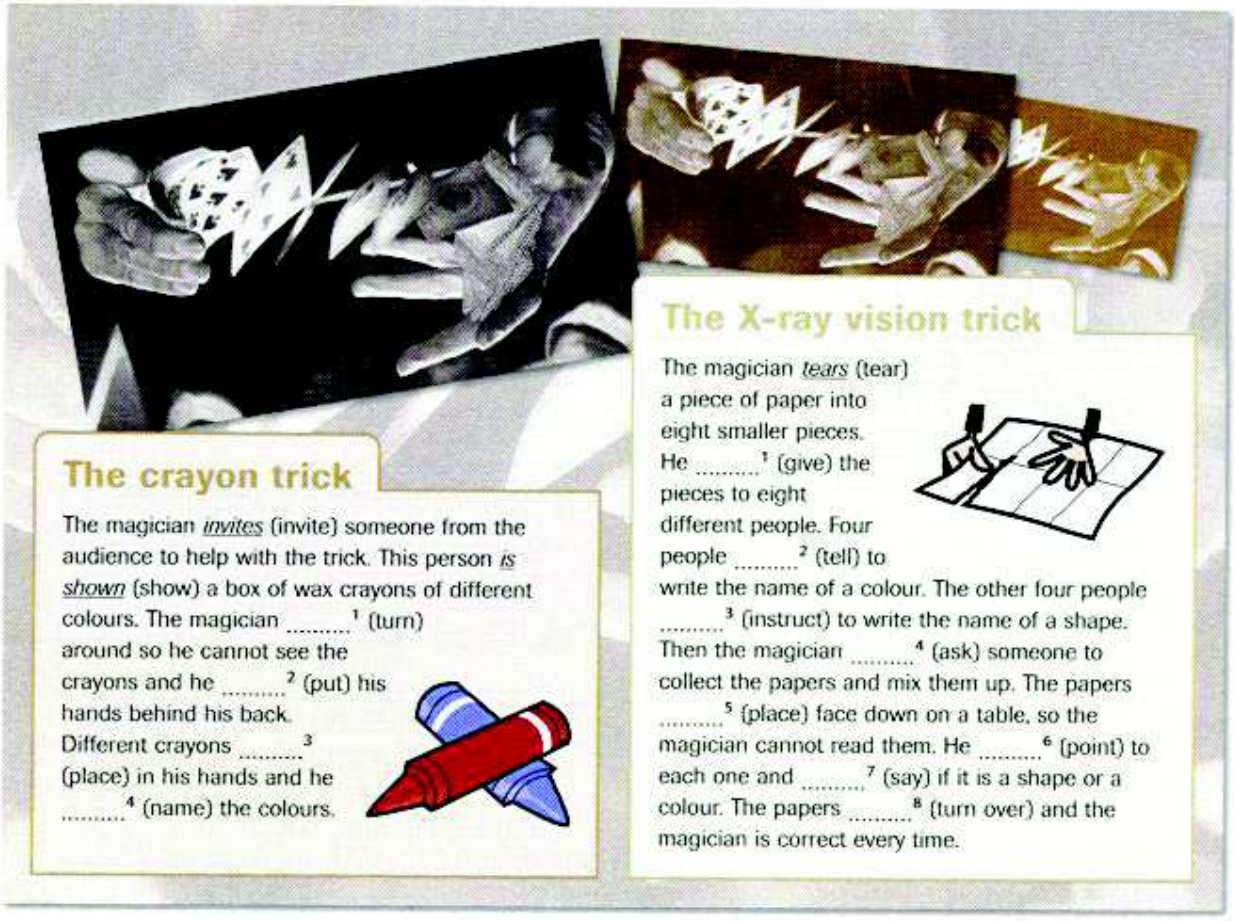
6 These sentences say what the magician does. Change the focus and say what happens to the box, the lid, and the audience.

The magician shows the box to the audience → The audience is shown the box.

The magician:

1 shows the box to the audience
2 places the lid on the box
3 fastens the lid
4 turns the box around
5 saws the box in half
6 separates the two halves of the box
7 puts the box back together again
8 surprises the audience.

7 Complete these descriptions of some more magic tricks. Use the active or passive form of the verb in brackets. (Think about whether you're saying what people do or what happens to them.)



The crayon trick

The magician *invites* (invite) someone from the audience to help with the trick. This person *is shown* (show) a box of wax crayons of different colours. The magician .....[1] (turn) around so he cannot see the crayons and he .....[2] (put) his hands behind his back. Different crayons .....[3] (place) in his hands and he .....[4] (name) the colours.

The X-ray vision trick

The magician *tears* (tear) a piece of paper into eight smaller pieces. He .....[1] (give) the pieces to eight different people. Four people .....[2] (tell) to write the name of a colour. The other four people .....[3] (instruct) to write the name of a shape. Then the magician .....[4] (ask) someone to collect the papers and mix them up. The papers .....[5] (place) face down on a table, so the magician cannot read them. He .....[6] (point) to each one and .....[7] (say) if it is a shape or a colour. The papers .....[8] (turn over) and the magician is correct every time.

8 How are the tricks in **7** done? (You can check your answers in file 7 on page 103.)

9 Learn how to perform a magic trick and then teach it to another student. Show them how it's done. Different magic tricks can be found in file 4 on page 103, file 10 on page 104, file 19 on page 107, file 34 on page 115, and file 38 on page 117.

10 Take turns performing your magic tricks for the class. Work out how they are done.