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Tutor support material

Entry Level

Edexcel Entry Level Certificate in Science (8938)

Unit 4: Staying Fit and Healthy

May 2008

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Introduction

This *Tutor support material* accompanies the Edexcel Entry Level Certificate in Science specification and has been designed to help teachers prepare for first teaching of the qualification.

This document is for *Unit 4: Staying Fit and Healthy*, and includes worksheets to aid the teaching of this unit.

Additional documents are available for all other units within the Edexcel Entry Level Certificate in Science. There is also a *Teacher's guide* document available on the Edexcel website, which gives more information on specialist language, assessment of practical skills and information on *How Science Works*.

Attention is drawn to the need for safe practice when students carry out laboratory experiments or observe demonstrations. Centres are responsible for the overall risk assessment of experimental work undertaken by students. Reference must be made to COSHH regulations and any specific local education authority restrictions.

Relevant advice can be obtained from the following publications.

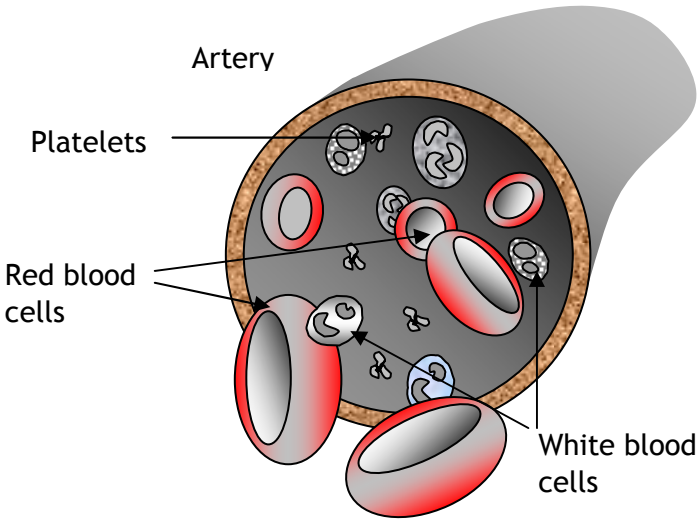
- *CLEAPSS Laboratory Handbook* (available from CLEAPSS School Science Service, website www.cleapss.org.uk)
- *Control of Substances Hazardous to Health Regulations* (HSE, 2005) ISBN 0717629813
- *Hazcards* (2004 update available from CLEAPSS School Science Service)
- *Topics in Safety, Third Edition* (ASE January, 2001) ISBN 0863573169

Worksheets for

Unit 4: Staying Fit and Healthy

What is blood? — 1

The diagram shows the materials that make up blood.



Blood contains a watery straw coloured liquid called plasma. Plasma carries dissolved food, carbon dioxide and chemicals called hormones.

Blood contains red blood cells.
Red blood cells carry oxygen around the body.

Blood contains white blood cells.
White blood cells fight infection by 'eating' the microbes which cause disease.

Platelets help to clot blood.

What is blood? — 2

Use a microscope to examine a slide of a blood smear.

Draw the red and white blood cells in the box below.

Cross out the word that is wrong in the following sentences.

1. Red cells are smaller/bigger than white cells.
2. Our bodies have more/less red cells than white cells.

Use the previous sheet to complete the table below.

Part of blood	Solid/liquid	Job
Red blood cells	Solid	
White blood cells		Fight infections
Plasma	Liquid	
	Solid	Help clot blood

Lifestyle

We need to keep our bodies working well to stay fit and healthy.

To do this we need to be careful of what we eat and drink.

We also need to be careful about how we live our lives.

Smoking can damage our lungs and the cells all around our bodies.

Cigarette smoke can cause lung diseases.

Blood can carry poisonous chemicals from the cigarette smoke to the cells in our bodies.

This can permanently damage the cells.

Our arteries and heart muscles are damaged by smoking.

Alcohol is poisonous.

It is diluted with water and flavoured to make beer, wine and spirits.

It can still be very harmful.

Alcohol can damage the brain and the liver.

The liver is where some very important chemical reactions happen in our bodies.

What we **eat** is very important.

Too much fatty food or just too much food can make us overweight.

This puts extra strain on our heart.

It can also cause our blood vessels to clog up making it difficult for blood to flow.

Exercise is important to help our heart and lungs to work properly.

Stress and worry can be harmful.

Additives in food and drinks can cause problems.

You may know someone who is affected by them.

How does caffeine affect your pulse rate? — 1

Some people like to have Coca-Cola, coffee or tea to perk them up.

These drinks contain a substance called **caffeine**.

Caffeine is a stimulant.

Some people say caffeine can speed up your pulse rate.

1. How can you find out if caffeine in Coca-Cola speeds up your pulse rate?

_____

_____

2. What would you have to do to make sure that it is the caffeine in the Coca-Cola that affects your pulse rate and not something like the colouring or sweetener?
   (Hint – you can buy Coca-Cola without caffeine in it)

_____

_____

3. How can you make sure the test is fair?
   (Hint - does it matter how much you drink each time?)

_____

_____

How does caffeine affect your pulse rate? — 2

4. Count your pulse for fifteen seconds.

   Pulse rate is usually measured over one minute.

   Do you know how many seconds there are in one minute?

   _____ seconds.

5. What number will you have to multiply (times) your fifteen second pulse rate by to get your pulse rate for one minute?

   _____

When you do your Cola investigation take your pulse rate before you drink the Cola.

Then take it again five minutes after you drink the Cola.

Enter your results in the table below.

Take your pulse rate again every five minutes for another five goes and enter your results in the table below.

Time (minutes)	Number of pulse beats in 15 seconds after drinking Cola
0	
5	
10	
15	
20	
25	
30	

Draw a bar chart to show your results.

Drugs: use and abuse — 1

Drugs affect the brain and the nervous system.
Some drugs help us and they are called medicines.
List some drugs which help us and some which are harmful.

Helpful drugs	Harmful drugs

Some drugs are shown below. Many people may not think some of these things are drugs, but they all can affect the body. They can all be poisonous. If you feel you have to take any of these to help you manage, think about how you may become addicted to them.

Give some reasons why people take drugs.

_____ _____

_____ _____

_____ _____

Think of a slogan which could be used to warn young people not to take harmful drugs. Write it in the box below.

Drugs: use and abuse — 2

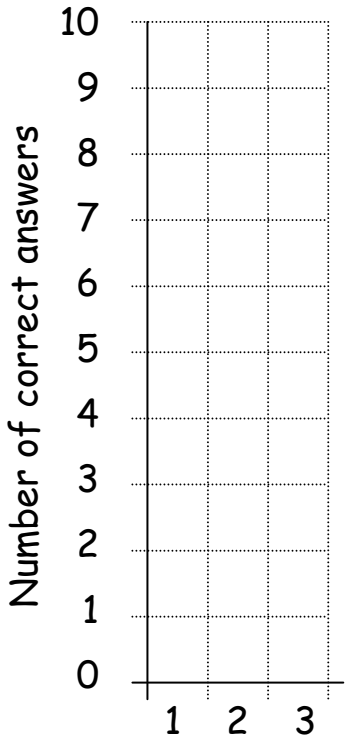
Alcohol and tobacco are used on a regular basis by many people. They are both forms of drugs.
Carry out the survey below to find out how aware your age group is of the dangers of alcohol and tobacco. (See if you know the right answers first.) Record your results in the boxes provided.

1. Which drug is present in cigarettes? _____

2. How many units of alcohol is it safe for a woman to drink each week? _____

3. How many people die each year in the UK from smoking related diseases? _____

4. Show the results of your survey in the bar chart below.



Question

Look at the results of your survey.
How aware do you think young people are of the effects of alcohol and smoking?

_____

_____

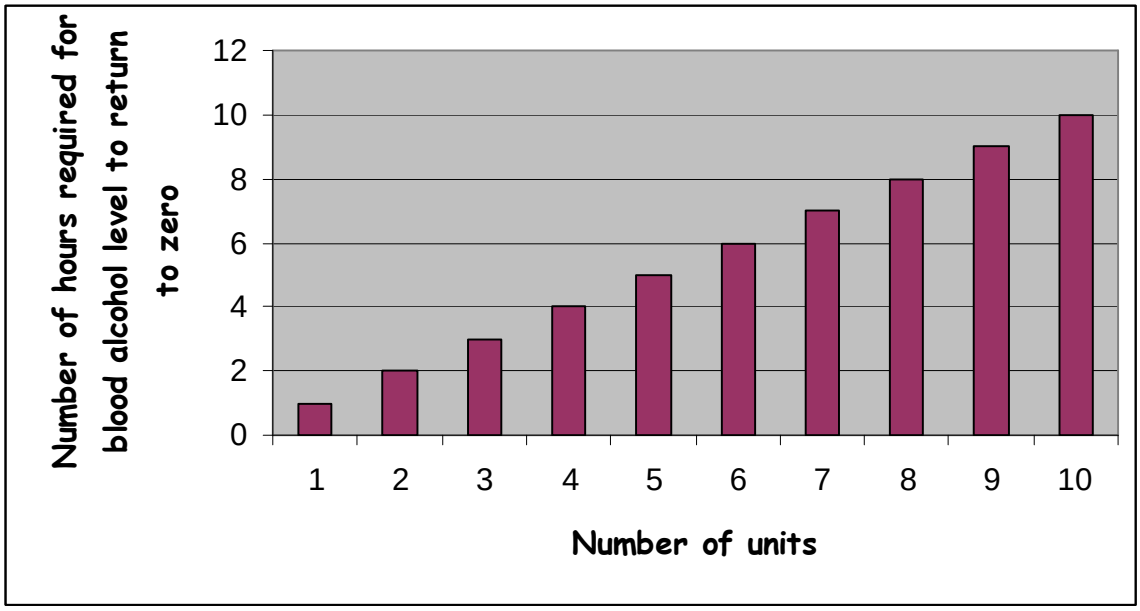
_____

_____

Answers to survey
1. nicotine 2. 15-21 3. 100,000 people

How long does alcohol stay in the body?

Alcohol is measured in **units** depending on the amount of **alcohol** in the drink. **One unit** = half a pint of beer, one glass of wine or one measure of spirits. On average, it takes one hour for the body to get rid of one **unit** of alcohol.



Your teacher will now show you how to make a breathalyser test.

Keywords

Alcohol	Unit	Breathalyser test

Drink-driving

The Highway Code says "Don't drink then drive."
Alcohol will

- reduce co-ordination
- slow down reactions
- affect judgement of speed
- take time to leave the body; you might still be unfit to drive the following morning. If you are going to drink, use public transport."

After drinking too much the drink driver may be involved in a crash.

The police will demand a **chemical breath test** using a **breathalyser**.

At the police station, a doctor will test the drink driver's **urine** or **blood**. These **chemical tests** are very **accurate**.
The guilty drink driver will be fined, lose their driving licence, or could even be sent to prison.

Keywords

Blood Chemical Tests Breathalyser Alcohol

A demonstration on smoking

You can see what happens when someone smokes a cigarette.

What your teacher does

1. Take the label off a clear plastic lemonade bottle.
2. Place a small amount of indicator solution, or indicator paper, in the bottle.
3. Insert a cotton-wool plug into the top of the bottle.
4. Fix a cigarette to the end of the neck of the bottle by making a cone of BluTac™.
5. Light the cigarette.
6. Squeeze the bottle gently to make it act like our lungs smoking the cigarette.
7. Gently shake the bottle to move the indicator solution or paper around in the smoke.

What happens to the colour of the indicator?

_____

Does this tell us anything about the smoke?

_____

8. Take off the BluTac™ and take out the cotton wool.
9. Open it out.

What does the cotton wool look like?

_____

This is what is left in people's lungs after one cigarette.

It is called tar.

Many people dislike the smell of tar.

Exercise

When you exercise

- your pulse rate (heart rate) increases
- your breathing rate increases
- your body temperature increases a little.

Carbon dioxide is made as you exercise and this is breathed out.

Your body needs energy to exercise (eg running).

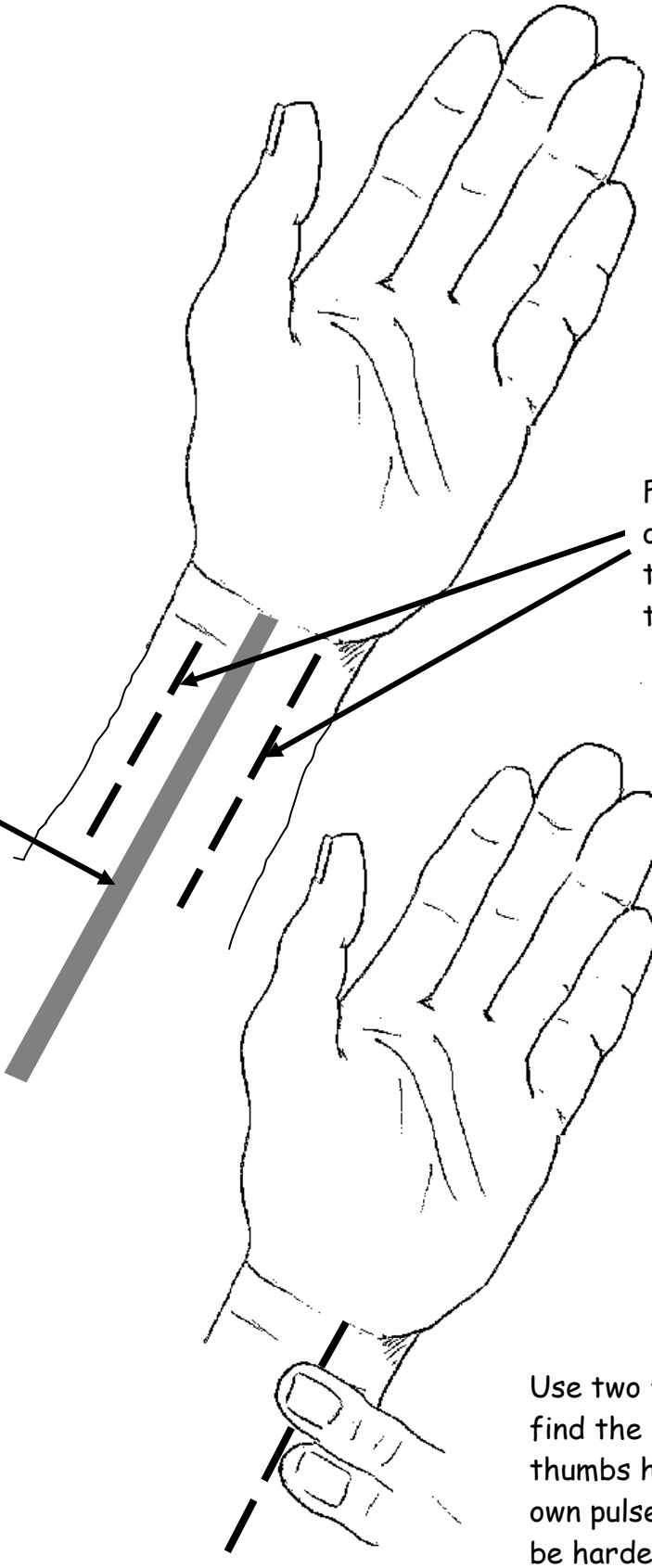
To get energy, your body needs **oxygen.**

Your body has to get oxygen quickly, and get rid of carbon dioxide quickly.

Your heart rate and your breathing rate both increase.

To help you cool down, you may **sweat.**

Taking your pulse



Find the pulse on either side of the wrist, near to the hand

TENDONS – they feel hard under the skin

Use two fingers to find the pulse, as thumbs have their own pulse so they will be harder to use

Pulse beats — 1

The heart pumps blood around the body.

The heartbeat can be measured by taking the pulse.

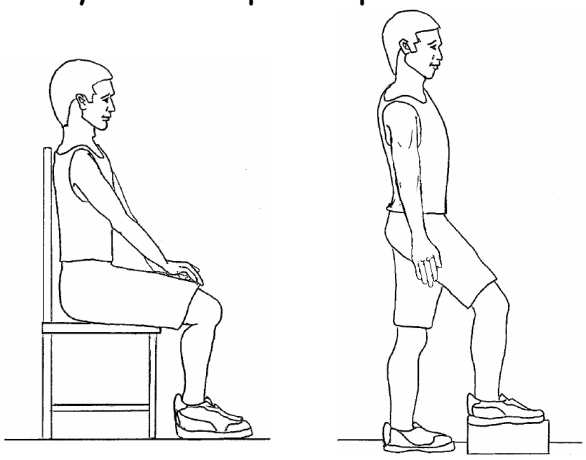
This can be found by placing the fingers on the inside of the left wrist, or the sides of your neck at the front.

You are now going to find out if your heart beat changes when you exercise.

What you need

A watch or clock that shows seconds.

Your teacher may have a special pulse meter.



What you do

1. Take your pulse rate for 15 seconds when you are sitting down.
2. Then do some step-ups and downs or other kinds of exercise (eg arm movements, running on the spot) for one minute.
3. Measure the pulse rate just after stopping the exercise.
4. Put your results in the table on the next page.
5. Collect information from other members of your group.

If there is not much difference, you can do more exercise (eg step-ups for two minutes).

Pulse beats — 2

	Number of pulse beats in 15 seconds	
Name	**Sitting**	**After stopping exercise**

1. What was your heart rate when you were sitting?

_____

2. What was you heart rate after you exercised?

_____

3. What happened to your heart rate?

_____

4. Why did this happen?

_____

_____

How fit are you?

The time it takes for your heartbeat (pulse rate) to go back to what it was before exercise is called the **recovery rate.**

Recovery rate is one way of measuring how fit someone is.

What you do

1. Take your resting pulse rate.
2. Do some exercise for two minutes.
3. Sit down again and take your pulse rate for 15 seconds.
4. Then take your pulse rate every 30 seconds.
5. Repeat step four until your pulse rate goes back to what it was before exercise.

It is best to do this activity in pairs, with your partner writing down the beats as you measure them.

Questions

1. How long did it take for your pulse rate to return to what it was before exercise? _____.

   This is called the **recovery rate**.

   The shorter the recovery rate, the fitter a person is.

2. Who was the fittest in your group? _____
3. What was their recovery rate? _____
4. What things can change your recovery rate? _____

_____

_____

_____

Wordsearch

Alcohol	Breathing rate	Circulatory system
Cigarettes	Heart disease	Microbes
Drugs	Plasma	Recovery rate
Infection	Pulse rate	Tar
Lung cancer	Reaction	Tobacco
Nicotine	Red blood cells	White blood cells

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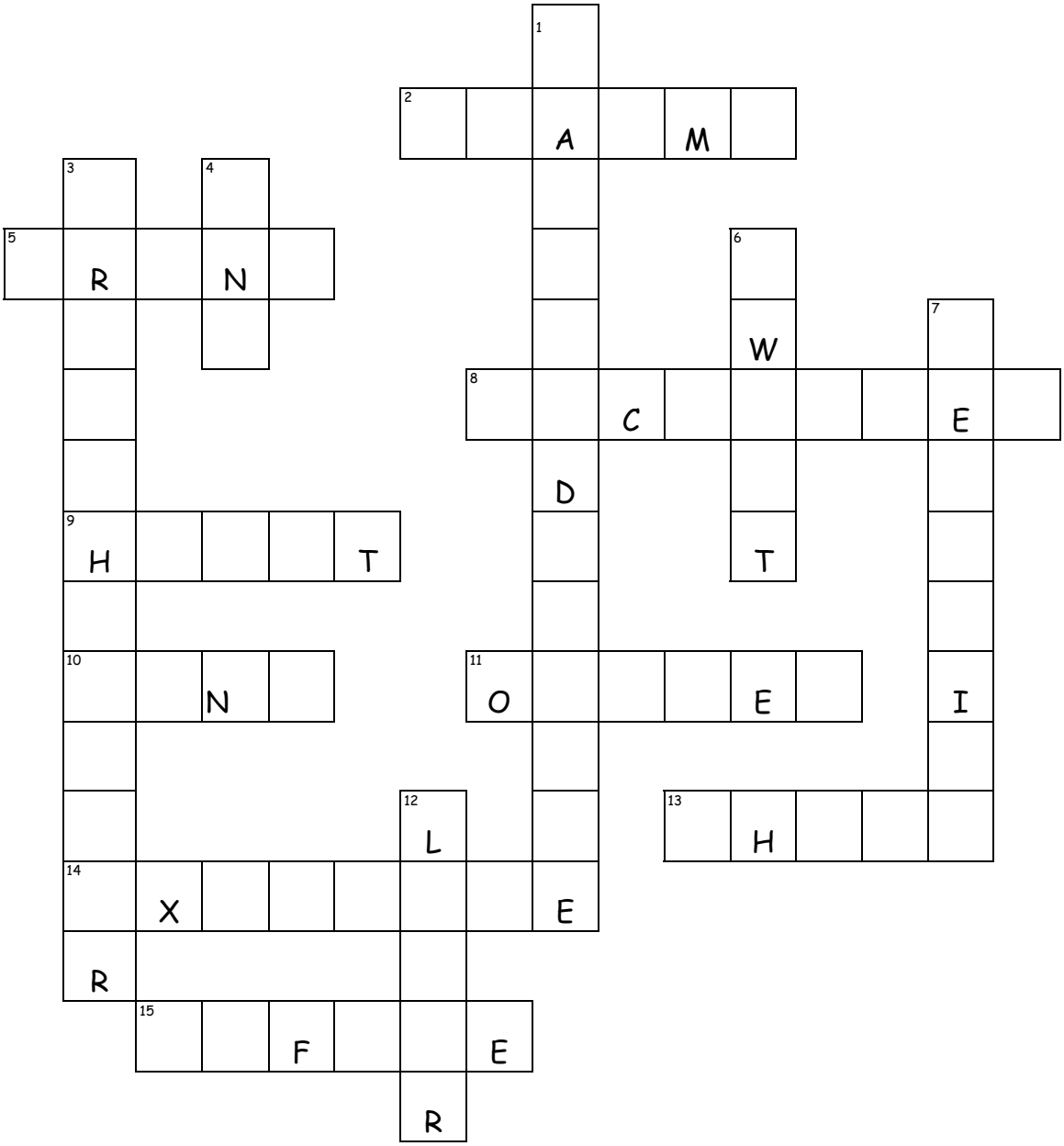
S	T	H	C	B	A	S	E	S	R	B	L	H	E	M	E	W	T
E	I	R	T	L	Q	L	E	Y	F	A	R	J	W	A	C	P	H
A	O	E	I	K	C	B	P	U	N	C	T	K	Q	P	I	O	I
S	N	W	O	M	O	N	C	N	I	C	O	T	I	N	E	L	N
E	M	A	N	R	S	B	V	I	J	O	G	P	A	Y	P	J	G
B	T	S	C	H	D	R	H	L	P	T	D	K	Z	D	E	H	R
W	H	I	T	E	B	L	O	O	D	C	E	L	L	S	M	T	A
I	M	F	B	G	F	V	N	M	I	Y	F	M	S	P	U	Y	T
C	I	G	A	R	E	T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

The letter ladder is on the next page.

Letter ladder



Across

2 Name the watery straw coloured liquid found in blood
5 Which liquid, taken from a drink driver, may a doctor test at a police station?
8 What happens to your heart rate when you exercise?
9 Which organ pumps blood around your body?
10 Which organ is damaged by smoking?
11 Which gas is carried around our body by red blood cells?
13 The colour of one type of blood cell
14 What should you do to help your heart and lungs to work properly?
15 This drink contains caffeine

Down

1 Which gas is carried away from cells by the plasma?
3 What do the police use to test drivers for alcohol?
4 How many hours does it take for the body to get rid of 1 unit of alcohol?
6 Your body may do this to help you cool down after exercise.
7 You take this type of drug when you are ill.
12 Which organ is damaged by drinking too much alcohol?

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