

# Tutor support material

Entry Level

Edexcel Entry Level Certificate in Science  
(8938)

Unit 3: Sending Messages Around the Body

April 2008

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# Introduction

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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 3: Sending Messages Around the Body*, 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 from 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](http://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

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# **Worksheets for**

## **Unit 3: Sending Messages Around the Body**



## How our body senses change — 1

Our bodies pick up change in the world around us with the **sense organs**.

The sense organs are: skin, tongue, eyes, ears and nose.

### Activity

Write the name of the sense organ on the blank line of the diagram labels.

Hearing -

\_\_\_\_\_ detects sound

Sight -

\_\_\_\_\_ detects light



Taste -

\_\_\_\_\_ detects chemicals

Touch -

\_\_\_\_\_ detects touch, pressure, pain and temperature

## How our body senses change — 2

Receptors pick up information from outside the body.

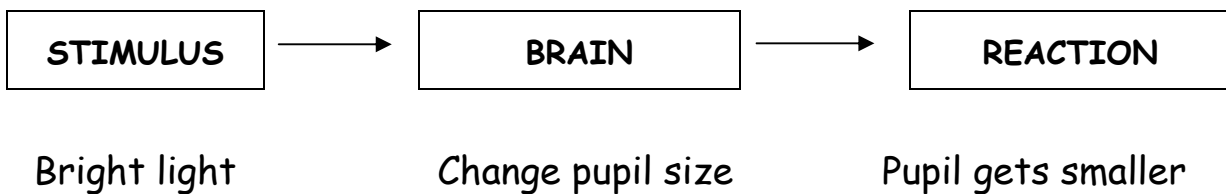
This information is known as the stimulus.

The information travels along the nerves to the brain.

Our brain uses this information to find out what is happening outside the body.

The brain also gets information about what is happening inside the body.

When you look at a bright light (*stimulus*) the dark part of your eye (the *pupil*) gets smaller.



Some of the time the brain's decision is automatic - you do not think about it.

This is called a *reflex reaction*.

Some of the time you think before the brain makes a decision.

This is called *conscious control*.

## Taste and smell — 1

### Teacher/technician notes

Provide small pieces of a range of foods of different tastes on dishes: sweet, sour, salty, bitter. You may wish to label them (A, B, C etc).

### Suggestions

Bread, onion, pickled onion, pickled cabbage, jam on bread, chocolate, olives, carrot, apple, pear, cheese, cereal, crisp, cheese biscuits, peaches, green leaves (eg spinach etc), coffee powder.

**\*\* Check carefully for any allergies in pupils \*\***

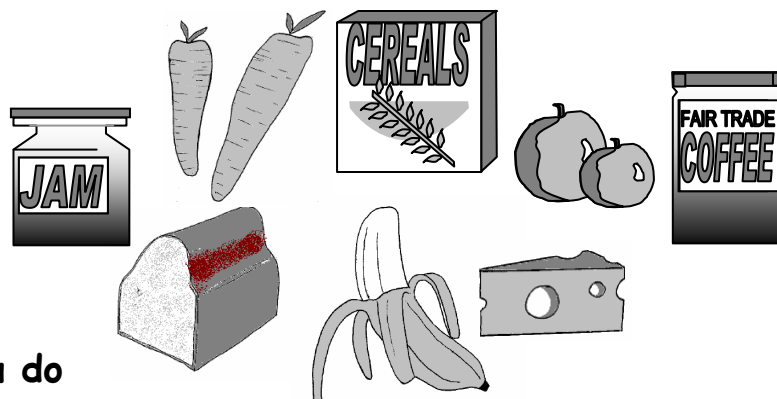
Pupils will need guidance on

- not chewing or swallowing food
- rinsing the mouth between samples
- how to dispose of food sample once tasted.

## Taste and Smell – 2

### What you need

Selection of food (in small quantities).



### What you do

Work with a partner in class.

1. Shut your eyes.
2. Let your partner put a very small piece of food on your tongue.  
Do not chew or swallow the food.
3. Does it taste sweet, sour, salty or bitter?
4. What was the food?

Repeat the test for several different foods (with your eyes closed). Put your results in the following table.

Sweet	Sour	Salty	Bitter

### Taste and Smell – 3

6. This time you are going to see if holding your nose makes any difference.

Hold your nose and close your eyes.

Let your partner put a very small piece of food on your tongue.

Does it taste sweet, sour, salty or bitter?

7. Put your results in the table below.

Sweet	Sour	Salty	Bitter

8. Do you find it more difficult to taste when you cannot smell the food?

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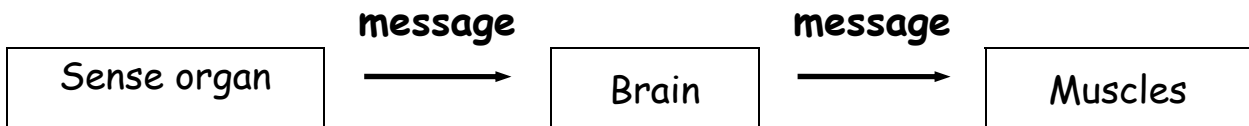
9. You can see that our senses of taste and smell are closely linked. Why do you think that we sometimes cannot taste food when we have a cold?

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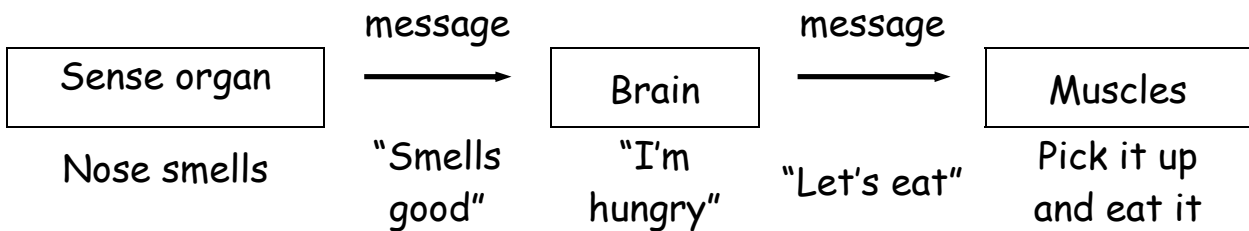
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## Reflex reactions

The sense organ sends a message to the brain.  
Usually we think about doing something and then we do it.  
To do this the brain sends a message to our muscles.

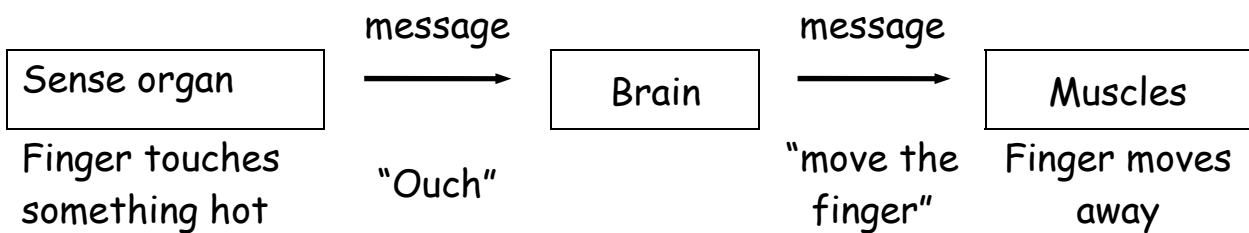


Here is an example.

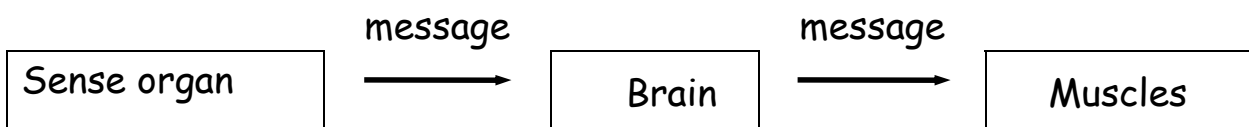


Sometimes we do something without thinking about it.  
The message comes from the sense organ and we react to it.  
This is called a reflex reaction.

Here is an example.



Describe another reflex reaction below.



## How fast are you?

### Testing your reaction time

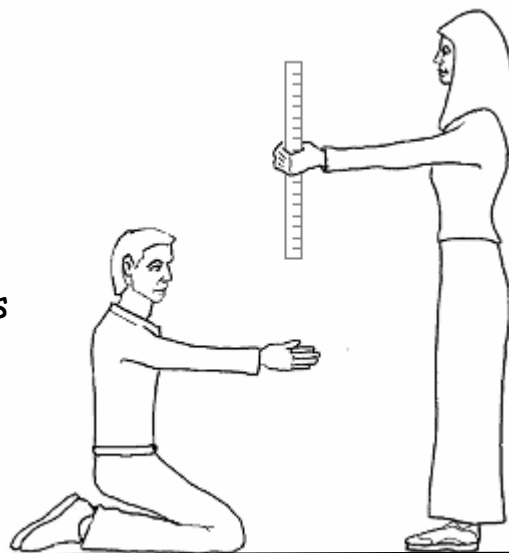
#### What you need

1-metre ruler.

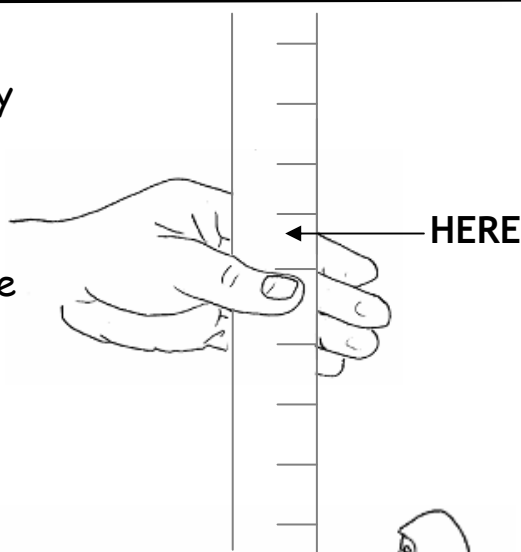
#### What you do

Work in pairs.

1. Hold the ruler between your thumb and first finger above your partner's hand. Get your partner to hold their hand ready to catch the ruler as it drops (fingers straight out).



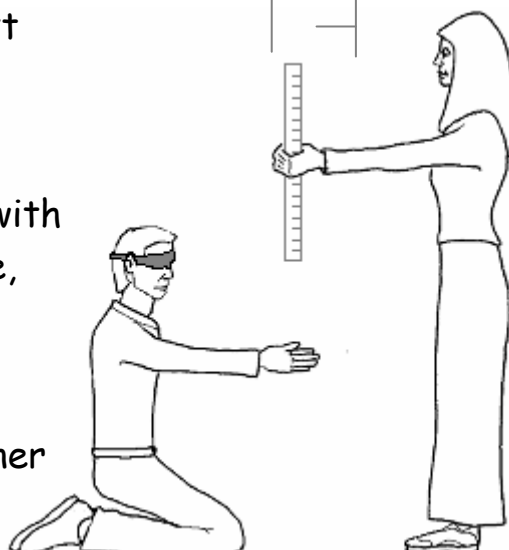
2. Suddenly, let the ruler drop. Your partner must try to catch it as quickly as they can.



3. Record the number on the ruler at the top of your partner's hand.

4. Repeat steps 1-3 five times. Record your results in the table on the next page.

5. Repeat the whole experiment, but with your partner blindfolded. Each time, call out as you drop the ruler.



6. Now change over so that your partner drops the ruler.

## Reaction time results

	Number on ruler when caught:		Number on ruler when caught
Test number	Not blindfolded	Test number	blindfolded
1		6	
2		7	
3		8	
4		9	
5		10	
Total (1-5):		Total (6-10):	
Average (+5):		Average (+5):	

### Questions

1. Add up the five readings for test numbers 1- 5.
2. Write the total in the box provided in the table above.
3. Divide the total by 5.  
This will give you the **average** reading for the test when not blindfolded.
4. Write your answer in the box provided in the table above.
5. Repeat the calculations for test numbers 6 - 10.  
This will give you the **average** reading for the test when blindfolded.
6. Write your average reaction time in the table on the chalkboard.
7. Who had the fastest reaction time? \_\_\_\_\_
8. How did you know this?
9. Did you catch the ruler more quickly after you had tried a few times?  
\_\_\_\_\_
10. How did the results change when you were blindfolded?  
\_\_\_\_\_
11. What senses did you use in the two kinds of test?  
Not blindfolded \_\_\_\_\_  
Blindfolded \_\_\_\_\_

## Reaction times

Fast reactions help keep us safe.

1. Make a list of things you do that need fast reactions for safety.

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1. List 3 things that can change a person's reaction time.

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

2. Why is it against the law to drink and drive?

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4. Long distance lorry drivers are only allowed to drive for 10 hours a day. Is this a good thing?

Yes/No

5. Give a reason for your answer.

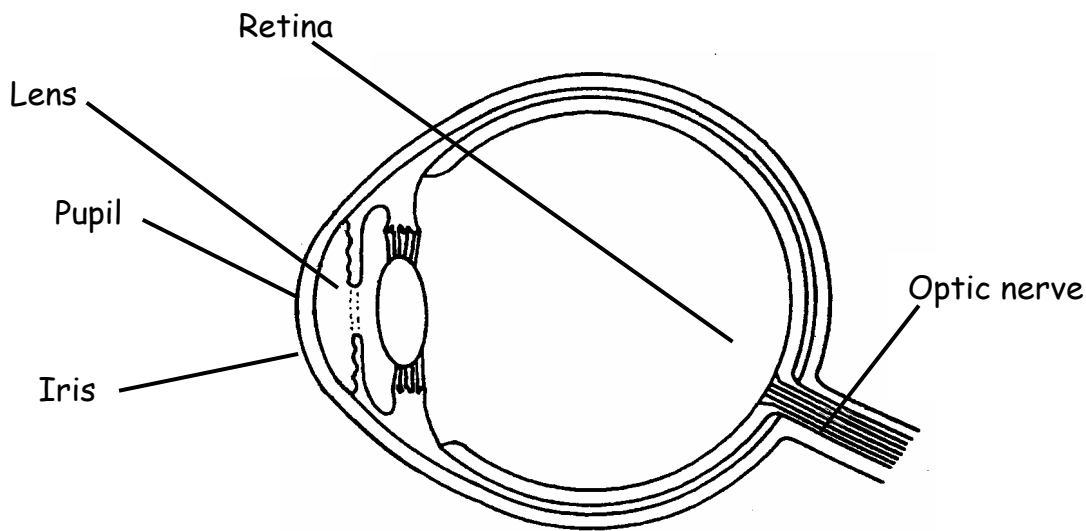
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## The eye

The main parts of the eye are the

- **pupil** (a hole to let light in). It looks black
- **iris** (the coloured part of the eye). The iris makes the pupil bigger or smaller to alter the amount of light that goes into the eye (this is a reflex reaction)
- **lens** (which focuses light onto the retina)
- **retina** (the back of the eye)
- **optic nerve** (which carries messages from the retina to the brain).



Which part of the eye

(a) lets light in? \_\_\_\_\_

(b) is coloured? \_\_\_\_\_

(c) sends the image to the brain? \_\_\_\_\_

What is the lens for ? \_\_\_\_\_

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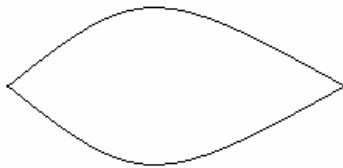
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## Does light make the iris and pupil change?

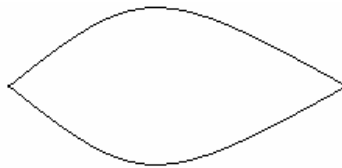
### What you do

Work in pairs.

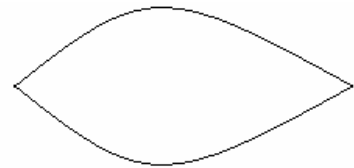
1. Look at your partner's eyes.
2. On outline 'A' draw in their pupil and iris (coloured part).



A



B



C

3. Now ask your partner to look out of the window (in sunshine) or to look at a bright light (on a dull day).  
Look at their eye.
4. On outline 'B' draw in their pupil and iris.
5. Now ask your partner to cover their eyes with their hands for 30 seconds. Then look at their eye as soon as they remove their hand.
6. On outline 'C' draw in their pupil and iris.

Discuss with your partner what is happening and suggest why it happens.

## Body temperature

The temperature inside a healthy body is normally 37°C.

Your surroundings are usually much colder than this.

The body loses heat to its surroundings.

The body stays warm because heat is produced inside the body.

Movement and exercise cause the body to create heat.

Shivering can produce extra heat if the body gets cold.

If the body gets too warm, sweating will help to cool it down.

It is vital that the body temperature remains constant.

Some illnesses can overheat the body.

Exposure to wind or water can dangerously cool the body.

## Cool it!

When you exercise you become hot, and you sweat.

Sweat helps you cool down.

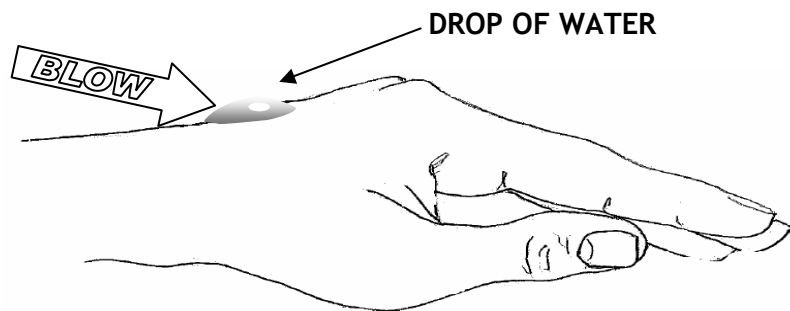
Heat from your body makes the sweat evaporate.

The sweat changes from a liquid to a vapour.

As it does this it takes heat away with it.

You can feel this happening by doing a simple experiment.

Put a little water on the back of one hand.



Blow gently on your dry hand.

How does this feel?

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Blow gently on the wet hand.

How does this feel?

---

Why did they feel different?

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What things do athletes do to keep themselves cool?

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## Sweating

Sweat is when moisture from our bodies comes out through tiny openings/holes in our skin.

These openings or holes are called pores.

Sweat is mainly water.

Sweat also contains some other chemicals that are lost from our bodies.

Sometimes we taste one of these chemicals.

What chemical do we sometimes taste when we sweat?

---

When we exercise and get hot we sweat.

We also sweat on hot days.

Why do we sweat?

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A special paper called cobalt chloride paper is used to show moisture. It turns from blue to pink when moisture is present.

Do some exercise. Put some pieces of cobalt chloride paper on your forehead, chin and hand.

Did the cobalt chloride paper change colour?

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What does this mean? \_\_\_\_\_

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## Taking your temperature — 1

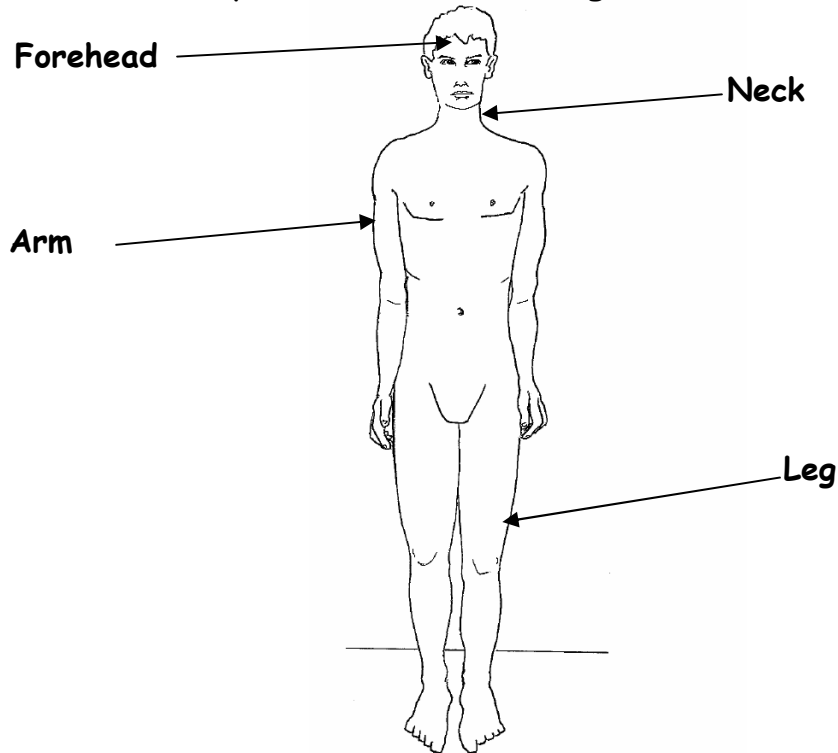
The temperature inside a healthy body is normally  $37^{\circ}\text{C}$ .

You are warmer than your surroundings.

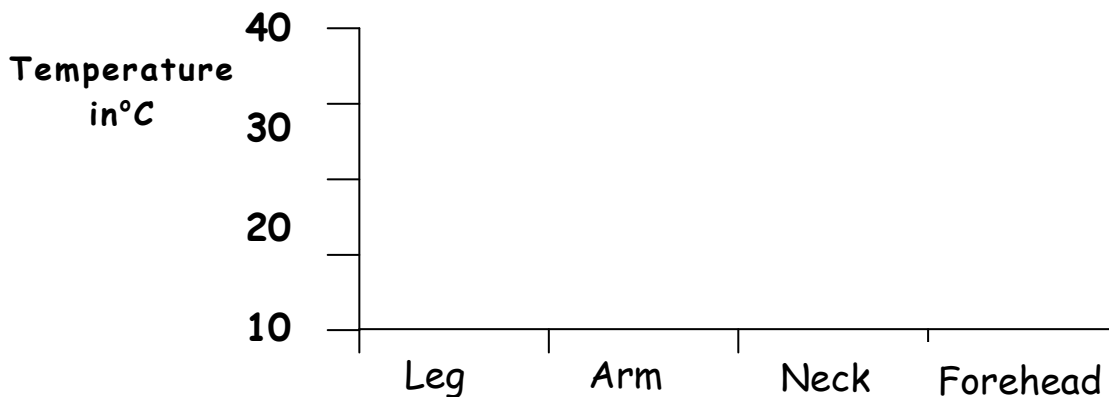
You lose heat to your surroundings.

Measure the temperature of different parts of your body using a strip thermometer.

Record these temperatures on the diagram below.



Use your results to complete the following bar chart:



1. Which part of your body was the coldest? \_\_\_\_\_

2. Why do you think this part was the coldest?

## Taking your temperature — 2

3. Which part of your body was the warmest?

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4. What happens to your temperature after exercising?

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5. What happens to your temperature when you are ill?

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6. What happens to your temperature after eating?

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7. Do a tally chart of the temperature of everyone's forehead in your class.

lower	36.5 to 37 °C	37 to 37.5 °C	37.5 to 38 °C	38 to 38.5 °C	higher

8. What temperature was the most common?

---

## Change of temperature

Get together in groups of 3 or 4 people.

Discuss why you wear different clothes in winter and summer.

Use your ideas to complete the table below.

Season	Type of clothes	Why?
Winter		
Summer		

Use these words to complete the sentences below.

**cold**      **energy**      **cool**      **less**      **more**

In winter we wear \_\_\_\_\_ clothes to keep warm.

In summer we wear \_\_\_\_\_ clothes so that heat can leave our bodies.

This helps us to stay \_\_\_\_\_.

In winter we eat more food for \_\_\_\_\_.

Old people cannot move around much.

Old people who do not keep warm in winter can become very

\_\_\_\_\_.

## Controlling body temperature

It is important to keep our body temperature steady.

Use the following words to complete the sentences below.

heat

cold

warm

skin

Our bodies heat up in the summer because the air is \_\_\_\_\_.

If our bodies get too hot we can die from heat stroke.

We need to lose heat in the summer.

We lose \_\_\_\_\_ through our skin.

Our bodies cool down in the winter because the air is \_\_\_\_\_.

Losing heat through the \_\_\_\_\_ in the winter is not useful.

If our bodies get too cold we can die from *hypothermia*.

Old people who cannot move around much in winter may get too cold.

Old people may die of hypothermia.

To keep our internal body temperature normal we can sweat or shiver.

a) Shivering warms us up.

b) Sweating cools us down.

1 Which of these do you think happens more in winter?

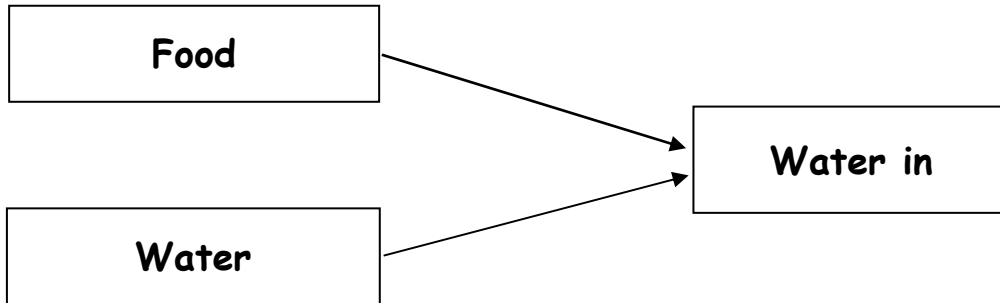
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2 Which of these do you think happens more in summer?

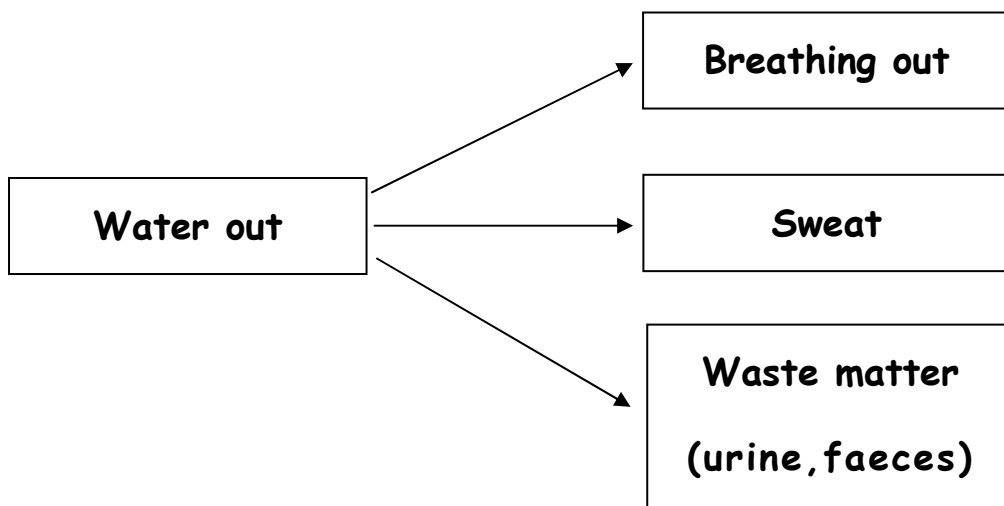
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## Water in – water out

It is important that the water in our bodies is kept in balance.



Water goes into the body by eating food and drinking water.



Water comes out from the body by breathing out, by sweating and in waste matter.

The water coming out of the body balances the water going into the body.

## The kidneys — cleaning the blood

Some parts of foods that we eat are not needed by the body.

Some of these parts are changed into **urea**.

Some of the **water** in food and drink may not be needed.

The urea and the unwanted water are carried by the blood to the kidneys.

You have two kidneys.

It is possible to live with only one kidney!

Put your hands on your hips, with your thumbs pointing inwards.

Your kidneys are under your thumbs.

The kidneys do two jobs.

1. As blood flows through the kidneys they remove urea from the blood.
2. As blood flows through the kidneys they remove unwanted water from the blood.

The urea and unwanted water are made into a watery liquid called **urine** by the kidneys.

Urine goes from the kidneys to the bladder.

Urine is stored in the bladder until it is emptied from the body.

## The work of the kidneys

1. What two jobs do the kidneys do?

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2. Name the liquid that is made in the kidneys.

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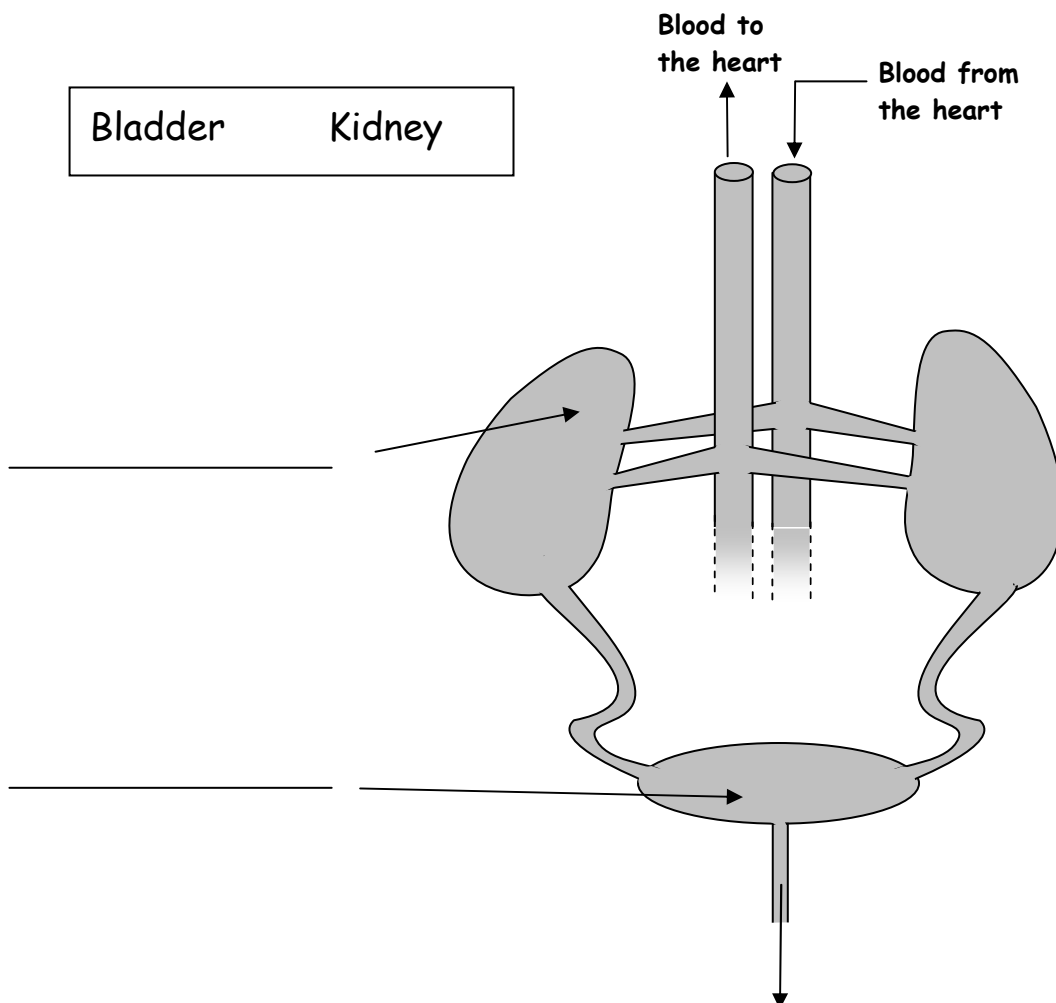
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3. Where does the liquid go after the kidney?

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4. Label this diagram using the words in the box.

Bladder      Kidney



## Wordsearch

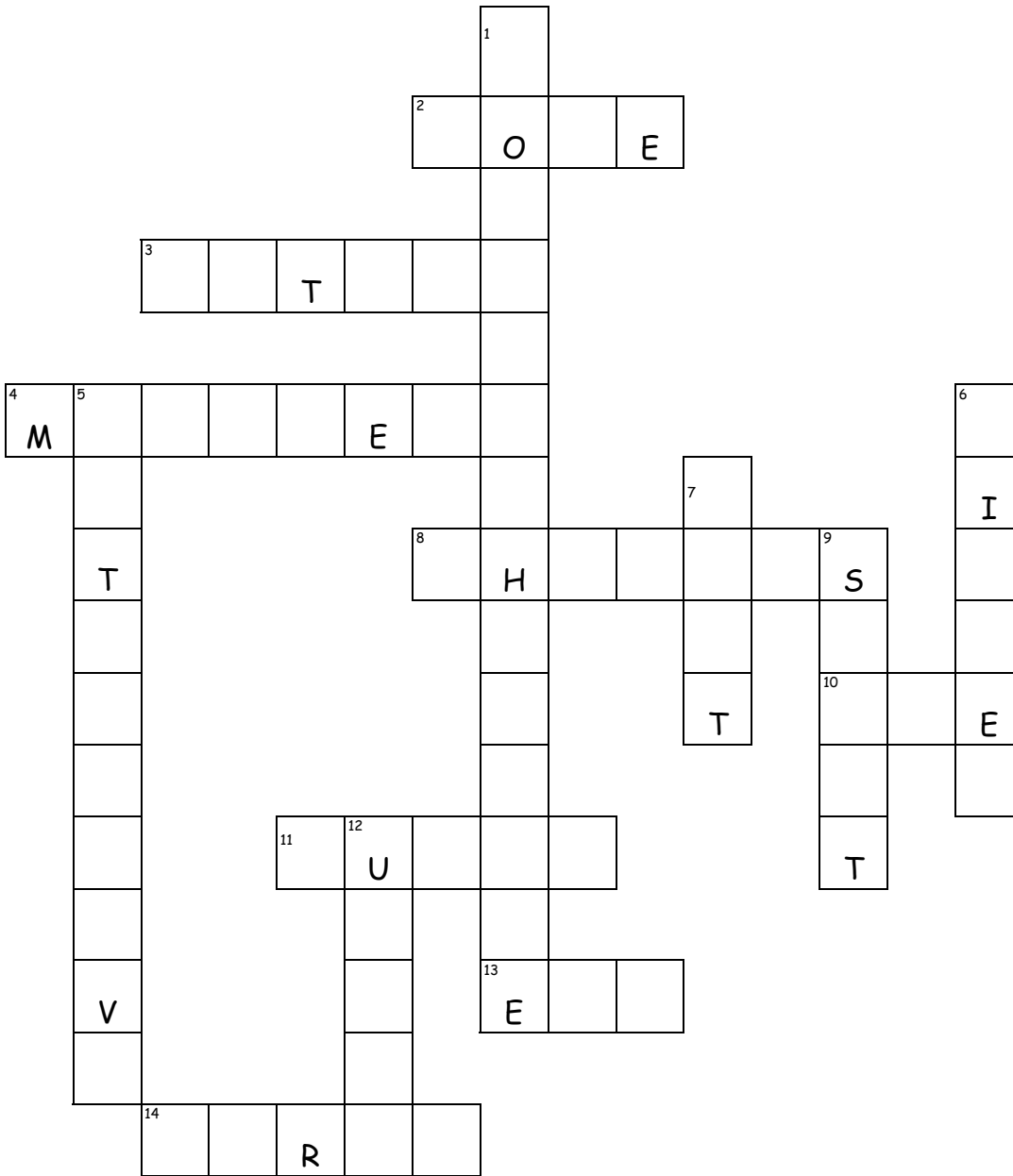
energy starch sugar food stored

rice potato pasta glucose cereal

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

The letter ladder is on the next page.

# Letter ladder



**Across**

- 2 Which sense organ detects smell?
- 3 The back part of the eye
- 4 This causes the body to produce heat
- 8 The body does this to produce heat when you are cold
- 10 Which sense organ detects light?
- 11 The dark part of the eye
- 13 Which sense organ detects sound?
- 14 Sweat comes out of these tiny holes in our skin

**Down**

- 1 This paper turns from blue to pink when moisture is present
- 5 Which part of the eye sends messages to the brain?
- 6 This organ removes urea from the blood
- 7 The body stays warm because this energy is produced inside the body
- 9 The body produces this if it gets too hot
- 12 This liquid is stored in the bladder

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