

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
<b>TOTAL</b>	



General Certificate of Secondary Education  
Foundation Tier  
June 2013

# Additional Applied Science

# AAS1FP

Unit 1 Science at Work

# F

Written Paper

Tuesday 14 May 2013 9.00 am to 10.00 am

**For this paper you must have:**

- a ruler
- a calculator
- the Equations Sheet (enclosed).

**Time allowed**

- 1 hour

**Instructions**

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8 should be answered in continuous prose.  
In this question you will be marked on your ability to:
  - use good English
  - organise information clearly
  - use specialist vocabulary where appropriate.

**Advice**

- In all calculations, show clearly how you work out your answer.



J U N 1 3 A A S 1 F P O 1

Answer **all** questions in the spaces provided.

**1** The following organisations collect information.

Draw **one** line from each organisation to the kind of information it collects.

**Organisation**

**Information the  
organisation collects**

Forensic Science Service

The number of accidents in  
the workplace

Health and Safety Executive

The evidence from a crime  
scene

Food Standards Agency

The contaminants in food

The number of hospital beds  
needed

(3 marks)

3



2 A physiotherapist wants to get some crutches for her patients.



The crutches must not be damaged easily. They must also be easy to lift.

Which **three** properties should the crutches have?

Draw a ring around **three** properties.

low density

high electrical  
conductivity

stiff

brittle

high thermal  
conductivity

transparent

strong

(3 marks)

3

Turn over for the next question

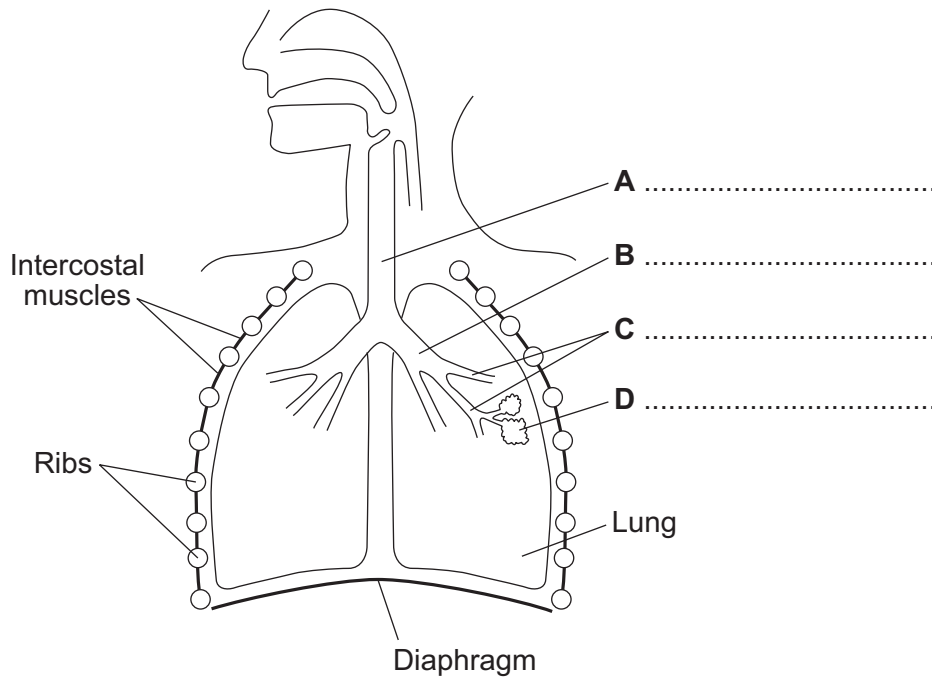
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3 The diagram shows the breathing system.

3 (a) (i) Use the correct answers from the box to label parts **A**, **B**, **C** and **D** on the diagram.

alveoli	artery	bronchus	bronchioles	oesophagus	trachea
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(4 marks)

3 (a) (ii) Which **two** structures on the diagram are important in helping the lungs to expand?

- 1 .....
- 2 .....

(2 marks)

3 (b) Complete the sentences.

We need the gas ..... for respiration.

This gas is carried by red blood cells in the .....

to the ....., where energy is released.

(3 marks)



**Turn over for the next question**

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ANSWER IN THE SPACES PROVIDED**

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0 5

**4** A forensic scientist separates fragments of DNA.

This process produces a DNA profile.

**4 (a)** The forensic scientist uses a standard procedure when he obtains a DNA profile.

Why does he use a standard procedure?

.....  
 .....

(1 mark)

**4 (b)** The forensic scientist used blood from a crime scene to produce a DNA profile.

He compared this DNA profile with the DNA profiles from three suspects, **P**, **Q**, and **R**.

The profiles are shown in the diagram.

Band number	DNA profile from crime scene	Suspect P	Suspect Q	Suspect R
1	████████	████████	████████	████████
2				
3	████████		████████	████████
4		████████		
5			████████	
6	████████	████████		████████
7				
8	████████	████████	████████	████████

**4 (b) (i)** Which of the suspects, **P**, **Q** or **R**, is most likely to have committed the crime?

Explain your answer.

Suspect .....

Explanation .....

.....  
 .....  
 .....  
 .....

(2 marks)



4 (b) (ii) Could the DNA profile also match the DNA profile of the victim of the crime?

Explain your answer.

.....  
.....  
.....

(1 mark)

4 (c) Which **two** statements about DNA profiling are correct?

Tick (✓) **two** boxes.

It uses electrophoresis.

It joins together strands of DNA.

It separates the DNA into different colours.

It can be used on small samples.

(2 marks)

4 (d) Which part of the cell contains DNA?

.....

(1 mark)

4 (e) DNA profiling is used to analyse samples from a crime scene.

Give **one** other use for DNA profiling.

.....

(1 mark)

8

Turn over for the next question

Turn over ►



**5** The amount of water in the body needs to be controlled.

The tables show the amount of water a student gained and lost in a typical day.

Water gained in ml per day	
Drinks	1400
Food	800
Respiration	300
<b>Total</b>	<b>2500</b>

Water lost in ml per day	
Urine	1500
Faeces	100
Breath	350
Sweat	
<b>Total</b>	<b>2500</b>

**5 (a) (i)** Calculate how much water the student lost as sweat in a typical day.

.....  
 .....

Answer ..... ml  
 (2 marks)

**5 (a) (ii)** Suggest how this amount would change if the student goes for a long run during the day.

Give a reason for your answer.

.....  
 .....

(2 marks)





**5 (b)** When the student went for a long run, she noticed some changes in her body.  
What **two** changes in the list would she notice?

Tick (✓) **two** boxes.

Her breathing rate increased.

The volume of each breath decreased.

The volume of blood pumped with each heartbeat decreased.

Her heart rate increased.

(2 marks)

**5 (c)** The student also noticed that her temperature increased.  
Describe how the student could measure her temperature.

.....  
.....  
.....  
.....

(2 marks)

**5 (d)** Which part of the brain controls the body temperature?  
Draw a ring around the correct answer.

**thermoregulatory centre**

**pituitary gland**

**cerebellum**

(1 mark)

9

Turn over ►



**6** There are two bottles of chemicals. The labels are missing from the bottles.  
One bottle contains sodium chloride. The other bottle contains potassium chloride.  
An analytical scientist wants to find out which chemical is in each bottle.  
She decided to do a flame test on each chemical.

**6 (a)** Describe how the scientist does the flame test.

You should include:

- the equipment she uses
- what she does
- the results she would get for each chemical.

You may draw a labelled diagram to help you answer the question.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5 marks)



**6 (b)** Another scientist tests some water to find out if it contains chloride ions ( $\text{Cl}^-$ ).

To do the test she adds silver nitrate solution to the water.

**6 (b) (i)** What colour solid is made when silver nitrate solution is added to water containing chloride ions?

.....  
(1 mark)

**6 (b) (ii)** What do we call the type of solid formed in this reaction?

Draw a ring around **one** answer.

**a crystal**

**a precipitate**

**a solvent**

(1 mark)

**6 (c)** Sodium chloride reacts with silver nitrate.

Sodium nitrate and silver chloride are made.

Write a word equation for this reaction.

.....  
.....  
(1 mark)

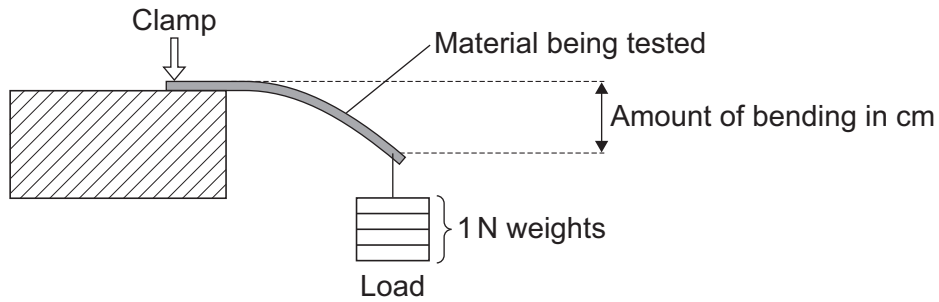
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**Turn over for the next question**

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7 A technician tested the stiffness of a material.  
The diagram shows the equipment the technician used.



7 (a) Part of the material being tested is in compression. On the diagram, label the part in compression with the letter **C**.  
(1 mark)

7 (b) Suggest how the technician would use the weights to test the stiffness of the material.

.....

.....

.....

.....

.....

(2 marks)

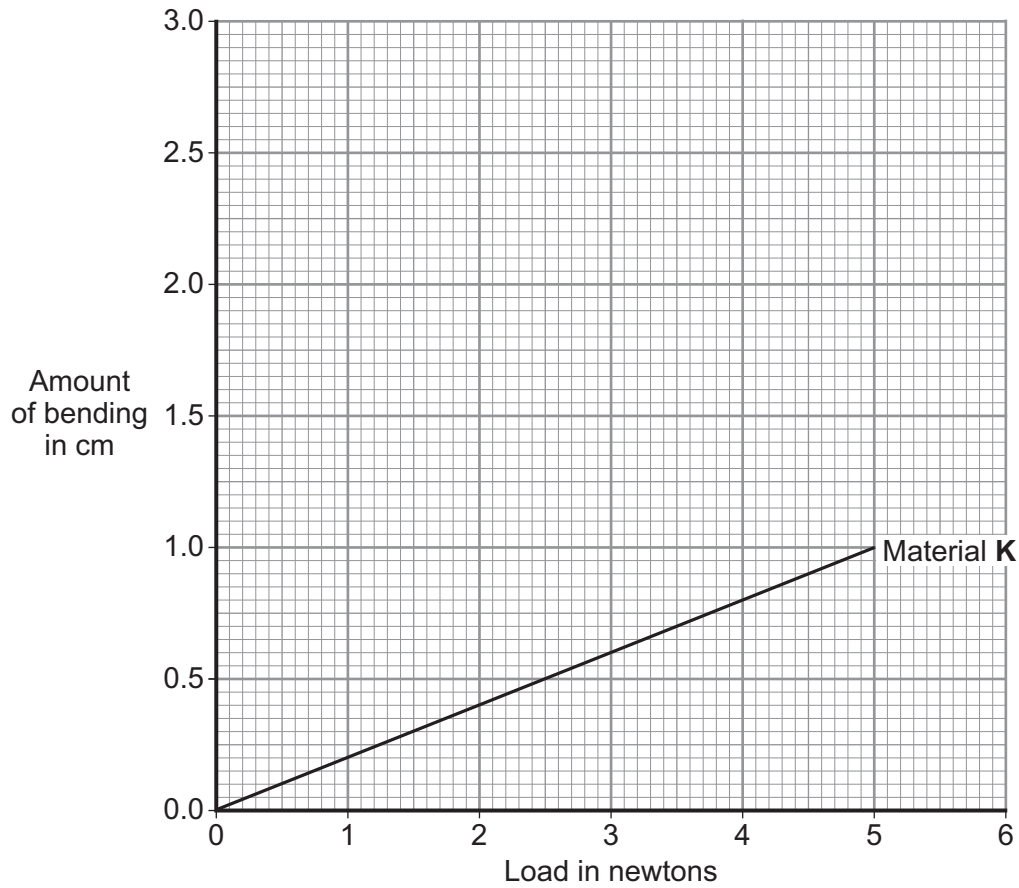
7 (c) The technician tested the stiffness of two materials, **J** and **K**.

The results for material **J** are shown in the table.

Load in N	Amount of bending in cm
0	0.0
1	0.5
2	1.0
3	1.6
4	2.0
5	2.5



**7 (c) (i)** The results for material **K** have been plotted on the graph.  
 On the same axes plot the results for material **J**.  
 Draw a line of best fit.



(2 marks)

**7 (c) (ii)** Look at your graph.

Which material is stiffer, **J** or **K**?

Give a reason for your answer.

.....  
 .....

(1 mark)

6
---




**Turn over for the next question**

**Turn over ►**



- 8 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

The information in the table shows how tennis racquets have changed since 1950.

Wooden racquet, 1950	Aluminium racquet, 1980	Composite racquet, 2010
		
Mass 400 g Head size 420 cm <sup>2</sup>	Mass 280 g Head size 700 cm <sup>2</sup>	Mass 330 g Head size 645 cm <sup>2</sup> Composite may contain: <ul style="list-style-type: none"> <li>• carbon fibre</li> <li>• glass fibre</li> <li>• titanium</li> <li>• ceramics</li> </ul>





**9** Athletes need to drink more fluids when they are training.

**9 (a) (i)** Which drink in the table, **W**, **X**, **Y** or **Z**, shows the correct list of ingredients for an isotonic sports drink?

Tick (✓) **one** answer

Drink	Ingredients	Tick (✓)
<b>W</b>	Glucose, water, sugar	
<b>X</b>	Glucose, water, electrolytes	
<b>Y</b>	Sucrose, water, electrolytes	
<b>Z</b>	Sucrose, water, sugar	

(1 mark)

**9 (a) (ii)** What does 'isotonic' mean?

.....

.....

.....

.....

(2 marks)

**9 (a) (iii)** Athletes drink isotonic drinks when exercising.

Suggest **one** reason why.

.....

.....

(1 mark)





9 (b) A nutritionist measured a man's height and mass.

9 (b) (i) The man's height was 1.6m and his mass 74kg. Calculate the man's BMI.

Use the Equations Sheet to help you answer the question.

.....  
.....  
.....

BMI .....  
(2 marks)

9 (b) (ii) The table below shows what the BMI values mean.

BMI	What it means
<18.5	Underweight
18.5–24.9	Ideal weight
25.0–29.9	Overweight
>30.0	Obese

What advice would you give to the man?

Use the information from your calculation and the table to help you.

.....  
.....  
.....  
.....

(2 marks)

8

END OF QUESTIONS



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