

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	



General Certificate of Secondary Education  
Foundation Tier  
January 2010

# Additional Applied Science **AASC/2F**

## Unit 2 Science at Work

# F

Thursday 14 January 2010 9.00 am to 10.00 am

**For this paper you must have:**

- a ruler.

You may use a calculator.

### 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. Answers written in margins or on blank pages will not be marked.
- 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.



J A N 1 0 A A S C 2 F 0 1

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

1 A Scenes of Crime Officer (SOCO) investigated a crime scene.

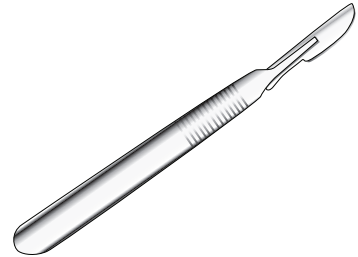
The diagrams show the equipment she might have used to collect the evidence found at the crime scene.



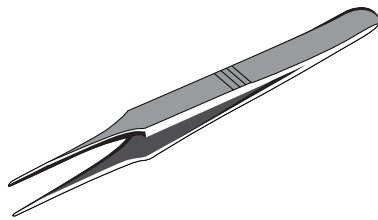
**Cotton swab**



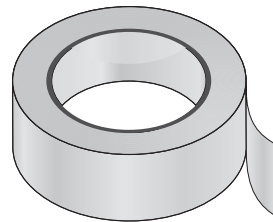
**Plaster of Paris**



**Scalpel**



**Tweezers**



**Sticky tape**

1 (a) Complete the table to show which equipment she used to collect each of the pieces of evidence found at the crime scene.

<b>Evidence found</b>	<b>Equipment used to collect the evidence</b>
Dried blood	
Hair	
Wet blood	
Fingerprints	

(4 marks)



1 (b) (i) Give **two** pieces of information that the SOCO could obtain from the sample of blood found at the crime scene.

1 .....

2 .....

(2 marks)

1 (b) (ii) Blood contains many organic substances.

What does *organic* mean?

Draw a ring around the correct answer.

**contains oxygen**

**comes from living things**

**contains calcium**

(1 mark)

1 (c) The SOCO also found a cigarette end in an ashtray. She collected it for DNA analysis.

What might be left on the cigarette end that would contain DNA?

Draw a ring around the correct answer.

**saliva**

**nicotine**

**tar**

(1 mark)

1 (d) The SOCO wore special clothing when she collected evidence from the crime scene.

1 (d) (i) Name **two** items of special clothing worn by the SOCO.

1 .....

2 .....

(2 marks)

1 (d) (ii) Give **one** reason why the SOCO wore special clothing when she collected the evidence from the crime scene.

.....

.....

(1 mark)

11

Turn over for the next question

Turn over ►



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**



- 2 A hospital dietician makes sure that children who are in hospital get enough vitamins in their diet.

Different vitamins have different functions.

- 2 (a) (i) Vitamins A, B, C, E and K are found in food.

Complete the table by writing A, B, C, E or K next to its correct function.

Vitamin	Function
	healthy gums, absorption of iron
	release of energy from food
	healthy eyesight
	clotting of blood

(4 marks)

- 2 (a) (ii) Vitamin D is important for the absorption of calcium.

Why is calcium important for children?

.....

.....

(1 mark)

- 2 (a) (iii) Which food is a good source of vitamin D?

Draw a ring around the correct food.

**lettuce**

**liver**

**orange**

(1 mark)

**Question 2 continues on the next page**

**Turn over ►**



- 2 (b) The dietician told the children that they must have plenty of fruit or vegetables to get vitamin C.

The table shows the vitamin C content of 14 common fruits.

<b>Fruit</b>	<b>milligrams vitamin C per 100 grams</b>
Apple	6
Banana	9
Blackcurrant	180
Grape	11
Grapefruit	34
Kiwifruit	98
Orange	50
Peach	7
Pear	4
Pineapple	15
Plum	10
Raspberry	25
Strawberry	57
Tangerine	30

- 2 (b) (i) Which fruit has got the most vitamin C per 100 g?

.....  
(1 mark)

- 2 (b) (ii) Which fruit has got the lowest amount of vitamin C per 100 g?

.....  
(1 mark)



- 2 (b) (iii) The Recommended Daily Allowance (RDA) for vitamin C is 60 mg.

How many grams of tangerines would you need to eat in a day to receive your RDA of vitamin C?

Show your working.

.....  
 .....

Answer ..... grams  
(2 marks)

- 2 (b) (iv) Vitamin C is sometimes used as an additive in food.

Draw a ring around the correct reason for adding vitamin C to food.

**antioxidant**

**preservative**

**thickener**

(1 mark)

- 2 (c) The dietician also makes sure the children are getting the correct amount of fat in their diet.

Draw a ring around the **main** use of fat in the diet.

**energy**

**growth**

**repair**

(1 mark)

12
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**Turn over for the next question**

**Turn over ►**



- 3 The following nutritional information was found on a jar of a meal supplement for a weightlifter and a jar of meal supplement for a runner.

Weightlifter		Runner	
Nutritional Information		Nutritional Information	
	Per 25 g serving		Per 25 g serving
Energy	98.6 kcal	Energy	109 kcal
Protein	19.5 g	Protein	3.85 g
Carbohydrates	1.0 g	Carbohydrates	15.27 g
Fat	1.7 g	Fat	3.7 g

- 3 (a) (i) Which nutrient is most important to the weightlifter?

.....  
(1 mark)

- 3 (a) (ii) Why is this nutrient important to the weightlifter?

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

- 3 (a) (iii) Suggest why the supplement for the runner has more carbohydrate.

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

- 3 (a) (iv) Which foods in the list contain a lot of carbohydrate?

Draw a ring around **two** foods.

**biscuit**

**bacon**

**eggs**

**potato**

**tomato**

(1 mark)





3 (b) (i) A sports physiologist tested the runner’s urine to see if it contained any sugar (glucose).

Describe how the sports physiologist could find out if there was any glucose in the urine.

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

(2 marks)

3 (b) (ii) Use words from the box to complete the sentences about the control of blood sugar.

**decrease    glucagon    heart    increase    insulin    pancreas**

When you eat a sugary snack or meal it will make the level of glucose in the blood .....

The brain sends a message to the ..... to release a hormone called .....

which reduces the level of glucose in the blood.

(3 marks)

9

**Turn over for the next question**

**Turn over ▶**



4 A forensic scientist examined the ink found on a ransom note.

He used paper chromatography to compare the ink found on the ransom note with the ink from three pens.

4 (a) Use words from the box to complete each sentence about chromatography.

<b>compound</b>	<b>mixture</b>	<b>quickly</b>	<b>slowly</b>	<b>solvent</b>
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4 (a) (i) Chromatography is a method used to identify chemicals in a .....  
*(1 mark)*

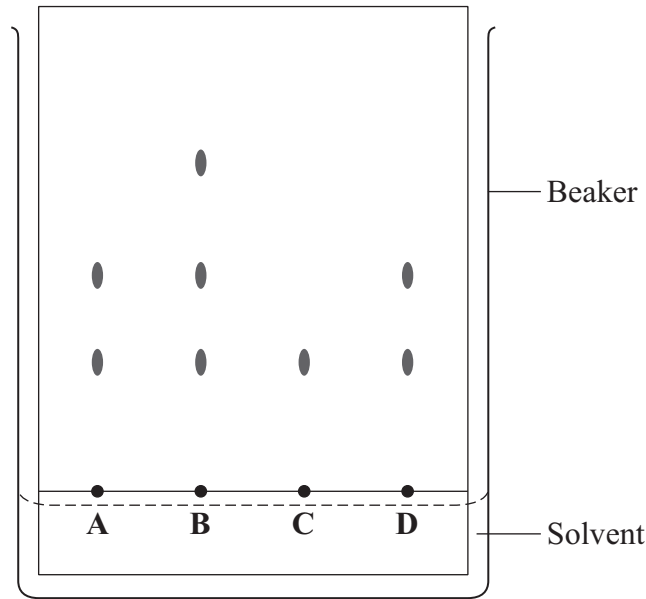
4 (a) (ii) The chemicals dissolve in a .....  
*(1 mark)*

4 (a) (iii) The substance that is the most soluble travels more .....  
up the paper.  
*(1 mark)*

4 (b) Describe how the forensic scientist would produce a chromatogram to compare the different inks.  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
*(3 marks)*



- 4 (c) The diagram shows the chromatogram of ink **A** from the ransom note and the inks **B**, **C** and **D** from the three pens.



- 4 (c) (i) Which ink, **A**, **B**, **C** or **D**, does **not** contain a mixture of colours?  
Write your answer in the box.

(1 mark)

- 4 (c) (ii) Explain your answer to (c)(i).

.....  
 .....

(1 mark)

- 4 (d) The ink **A** from the ransom note was the same as the ink from a pen found on a suspect.

- 4 (d) (i) Which ink, **B**, **C** or **D**, matches the ink from the ransom note?

(1 mark)

- 4 (d) (ii) This does **not** prove that the note was written by the suspect.

Explain why.

.....  
 .....

(1 mark)

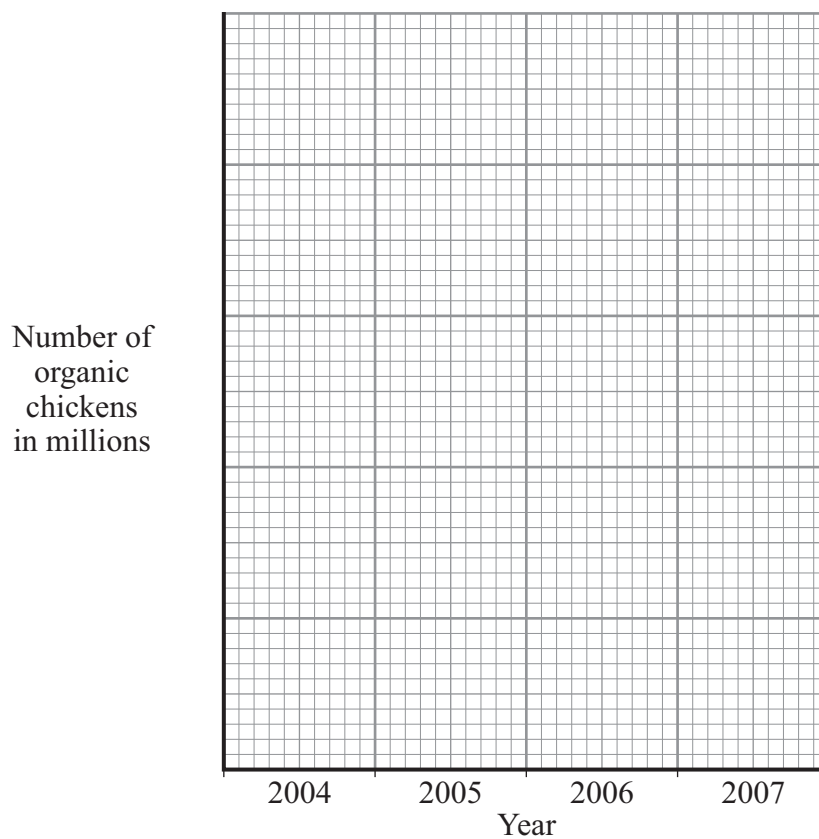


5 Many farmers keep chickens. Chickens can be reared on organic farms.

The table shows the numbers of chickens (in millions) reared on organic farms in the UK from 2004–2007.

Year	Number of organic chickens (in millions)
2004	2.2
2005	2.5
2006	3.5
2007	4.4

5 (a) (i) Use the data in the table to plot a bar chart.



(3 marks)



5 (a) (ii) Describe what the bar chart shows.

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

5 (a) (iii) Suggest a reason for your answer to 5(a)(ii).

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

5 (b) (i) Describe how chickens are reared on organic farms.

.....  
.....  
.....  
.....  
(2 marks)

5 (b) (ii) Give **two** disadvantages to the **farmer** of rearing chickens on organic farms.

1 .....

2 .....

(2 marks)

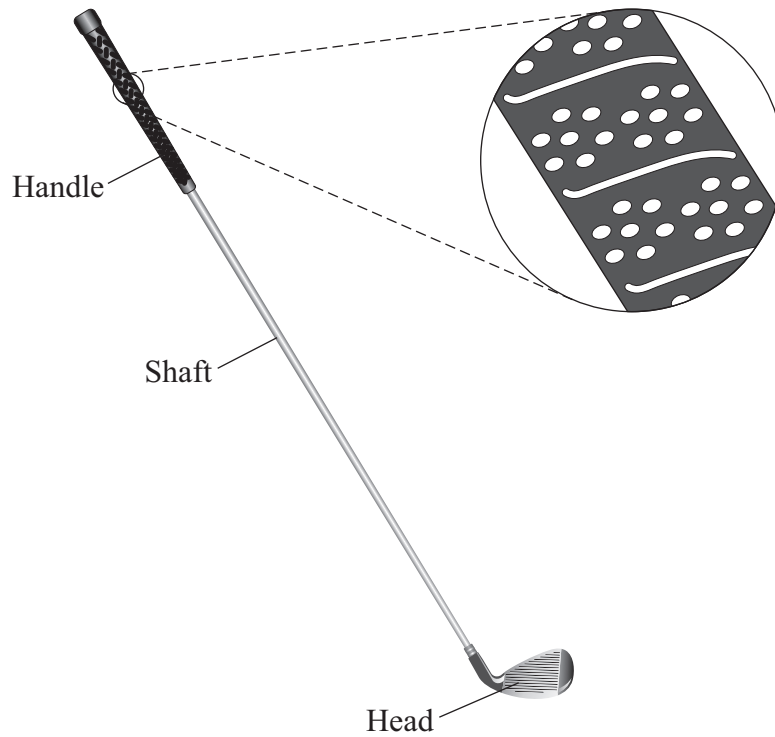
9

**Turn over for the next question**

**Turn over ►**



6 The diagram shows a golf club and details of the covering of the handle.



6 (a) (i) Suggest a type of material from which the covering of the handle could be made.

.....  
(1 mark)

6 (a) (ii) Suggest why the covering of the handle has an uneven (dimpled) surface.

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



- 6 (b) The table shows some properties of materials used in the manufacture of golf clubs.

Property	Titanium	Aluminium	Steel	Carbon fibre reinforced plastic
Density (g/cm <sup>3</sup> )	4.5	2.7	7.7	2.1
Strength (GPa)	120	70	200	150
Melting point (°C)	1668	660	1370	250
Corrodes	No	No	Yes	No
Hardness (10=hard)	6	2.7	4.2	3.5

Use the information in the table to answer the following questions.

- 6 (b) (i) Give **two** advantages of using carbon fibre reinforced plastic for the shaft of the golf clubs.

1 .....

2 .....

(2 marks)

- 6 (b) (ii) The heads of some golf clubs are made of titanium.

Give **two** reasons why this metal is used.

1 .....

2 .....

(2 marks)

- 6 (c) What type of material is carbon fibre reinforced plastic?

.....

(1 mark)

**Question 6 continues on the next page**

**Turn over ►**



6 (d) Golf shoes can be made from leather, which is a natural material, or from a synthetic material.

Give **two** advantages of making the golf shoes out of a synthetic material rather than leather.

1 .....

.....

2 .....

.....

(2 marks)

9

**END OF QUESTIONS**

