



# CHELtenham COLLEGE

## 13+ Entrance Examination Paper 2014 - 2015

# Science

*Time allowed: 1 hour*

### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must **not** be used.
- **Fill in your name at the bottom of this sheet.**
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

### Information

- The total mark for this paper is 57.
- The marks for **each** question are shown in brackets  
- *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.
- You may use a calculator in this exam paper.

Candidate's name: \_\_\_\_\_



**QUESTION ONE**



Jenny puts some water into the freezer and removes a tray of ice. Jenny removes the ice from the freezer and places it on her hand, and the ice turns to water, she puts the water into a beaker.

- 1.1. What processes have just occurred as Jenny puts the water in the freezer and then places the ice on her hand? ( 2 marks)

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- 1.2. What is the highest temperature the freezer should be set at to ensure the ice forms? ( 1 mark)

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- 1.3 a Is the above process a physical or chemical change? Explain your answer.

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(2 marks)



Jenny next pours a white soluble solid A into her beaker and stirs the beaker.

1.3 b What would she observe? ( 2 marks)

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Jenny also decides to pour in some yellowy brown insoluble solid B, into the beaker and stirs the water.

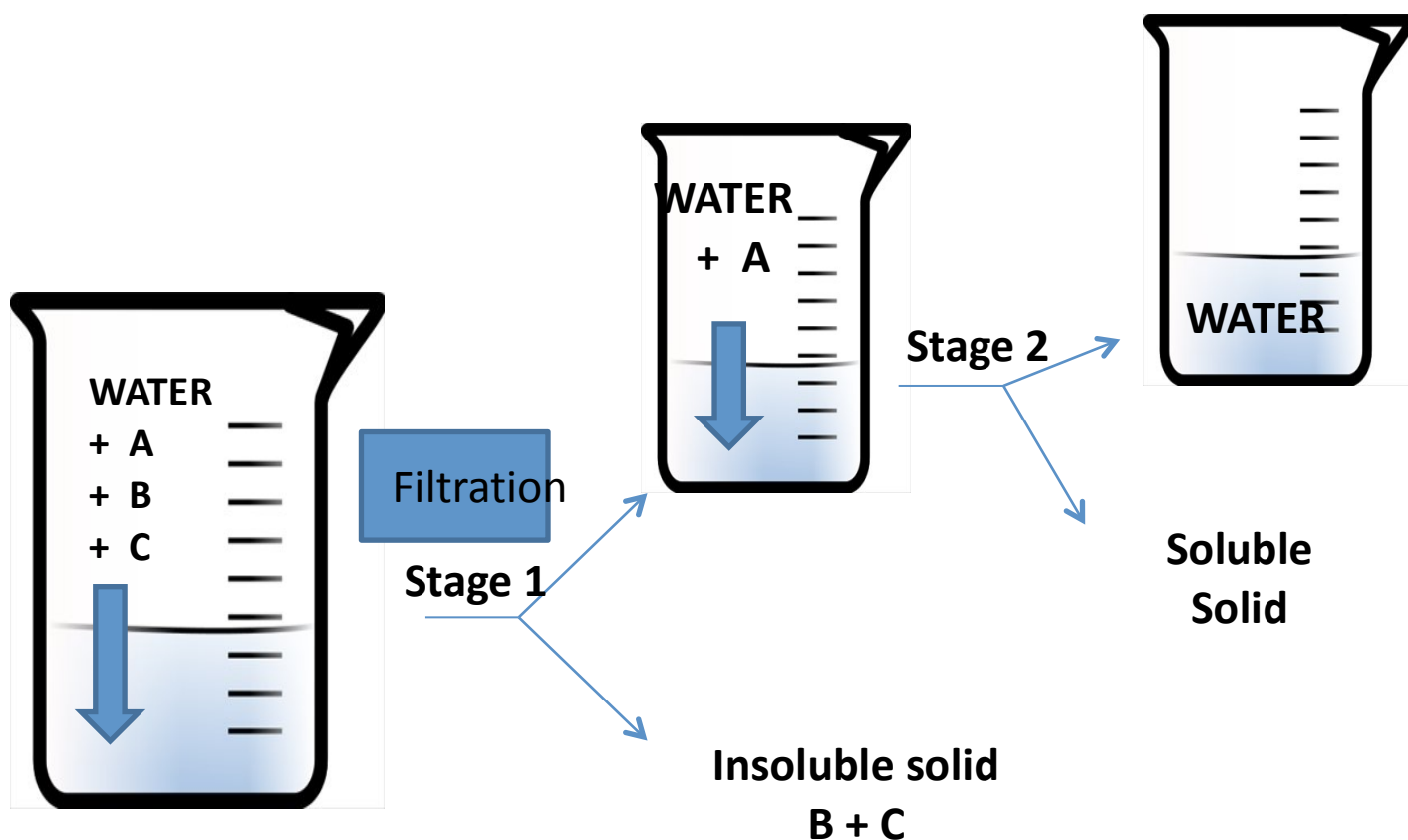
1.4 Describe what she would observe this time? ( 2 marks)

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Jenny also decides to add some magnetic grey solid C to her beaker. Her teacher gets cross at this and then asks Jenny to separate out the mixture of water, A, B and C.



Above is a flow diagram to show how Jenny should separate the mixture.

1.5 Draw a labelled diagram of the apparatus she could use in stage 1 and describe what she should do in stage 1. ( 5 marks)

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1.6 What is the name of technique used in stage 2? ( 1 mark)

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1.7 Describe how Jenny could separate out the insoluble solid B from insoluble solid C? ( 1 mark)

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1.8 Suggest identities for A, B and C? (Try and name A, B and C)  
( 3 marks)

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**QUESTION 2**

James and David have been having an argument in their biology lesson. They cannot agree about the design of an experiment which would determine whether heavier fruits fall to the ground more quickly than those with a lower mass.

The apparatus they have available to them is

Paper

Scissors

Paper Clips

Stop Clocks

Tape Measures



**2.1. Your task is to settle the disagreement and design a suitable experiment which would prove that heavier fruit falls to the ground more quickly than fruit with a small mass. Your write up should include the following information:**

- \* what you plan to measure**
- \* what you plan to change**
- \* the factors you intend to keep the same**
- \* how you plan to ensure that your experiment is a fair test**
- \* a prediction**

**You may include diagrams if you wish.**

**( 8 marks)**

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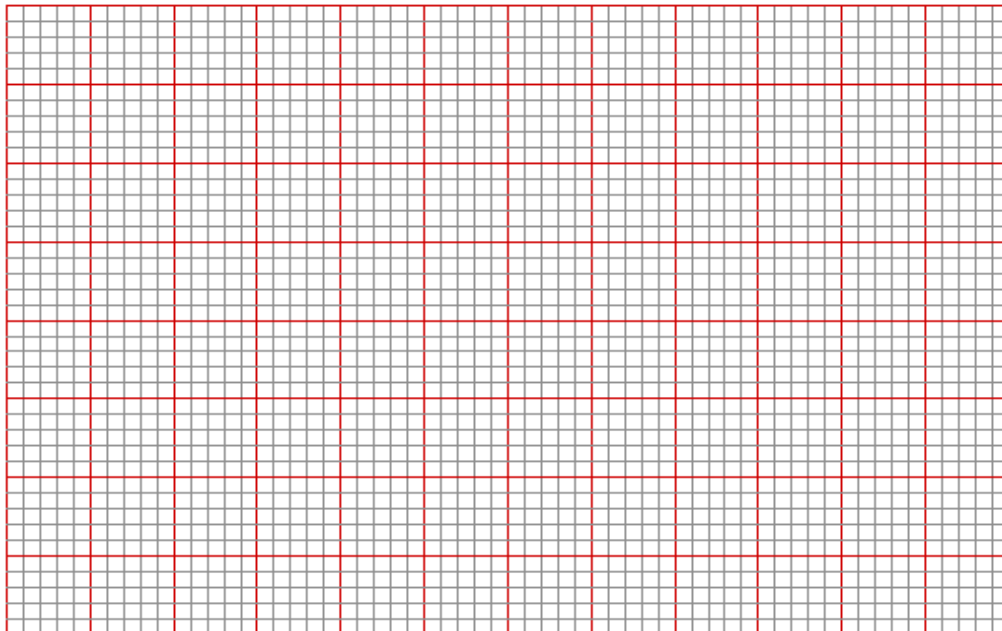
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2.2. In the same Biology class Jane carried out an experiment to find out the effects of mass on the rate at which sycamore fruits fell to the ground and she obtained the following results:

Mass number	0	1	2	3	4
Time (in seconds)	5.7	4.5	4.3	4.2	2.9

Plot a graph of these results.

(4 marks)



2.3. What conclusion can you draw from these results?

(2 marks)

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### QUESTION THREE

Sally wanted to find out which brand of sticky tape would stick most strongly to paper. She did some tests using three different brands of sticky tape – X, Y and Z.

She stuck an equal length of the different tapes on to the paper and measured the amount of force needed to pull each piece of sticky tape off.

These are her results:

Brand of tape	Width of tape (cm)	Force in N	Force in N	Force in N
		Trial 1	Trial 2	Trial 3
X	1.0	1.8	2.0	1.9
	2.0	3.9	3.8	4.2
	3.0	6.4	5.6	5.8
Y	2.0	4.0	4.5	4.3
	2.5	5.4	5.3	5.7
Z	1.0	2.1	1.6	1.9
	2.0	4.1	3.9	3.5

3.1. Which brand, X, Y or Z sticks most strongly to the paper? (1 mark)

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3.2. Explain your answer. (2 marks)

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**3.3. Explain what happens to the force measured in newtons as the width of Tape X increases? ( 2 marks)**

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**3.4. Give one piece of information which suggests that this has been a 'fair' test.**

**Explain your answer (2 marks)**

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**3.5. Why do you think Sally repeated these tests three times? ( 2 marks)**

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**3.6. Sally was then given the task of calculating the averages of the three repeats for 1.0cm, 2.0cm and 3.0cm for Tape X. However she has forgotten how to do this. You need to help her do this, but you must remember to show your working. ( 3 marks)**

**Average for trials 1, 2 and 3 for 1.0cm of Tape X:**

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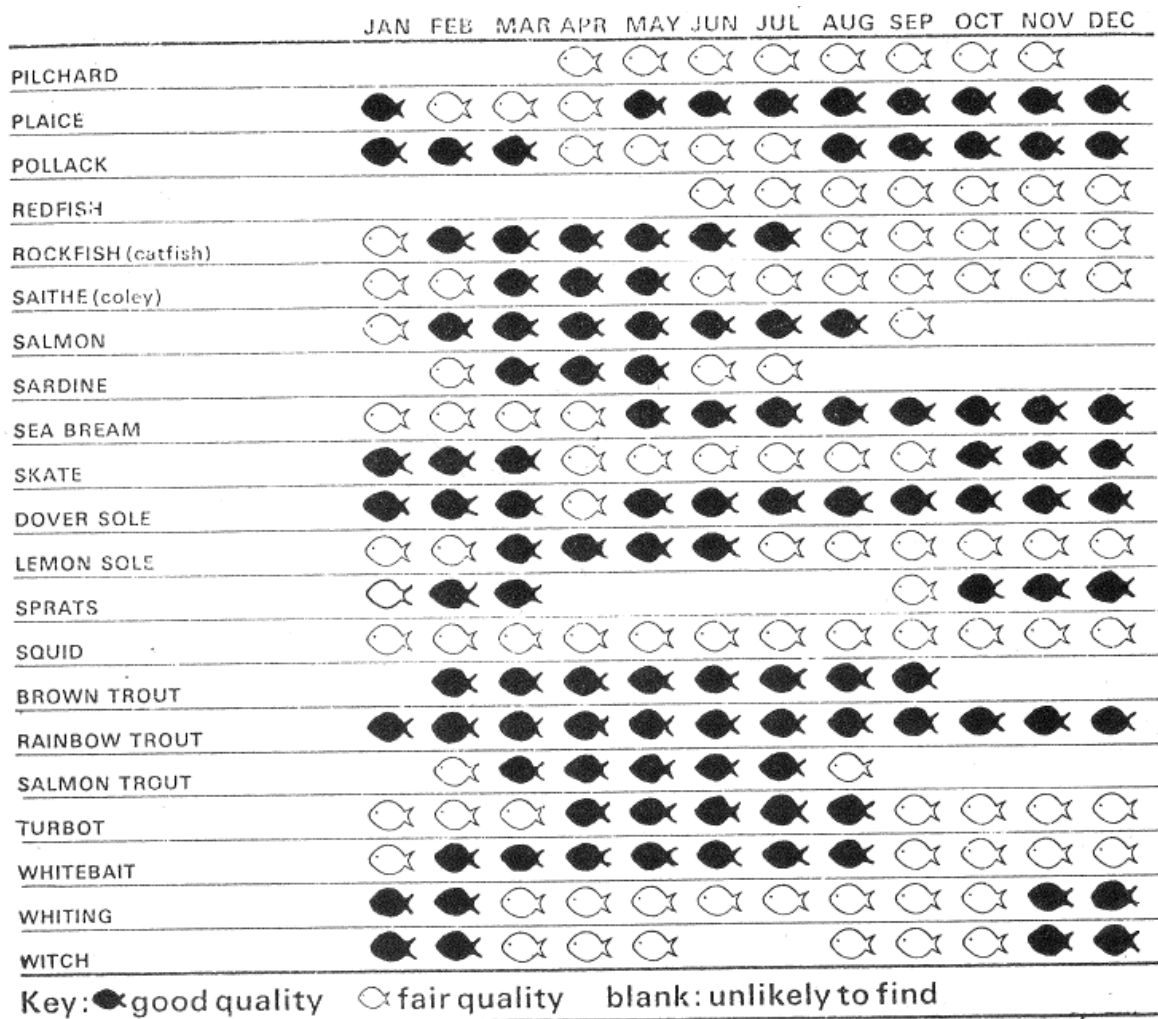
**Average of Trials 1, 2 and 3 for 2.0cm of Tape X:**

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Average of Trials 1, 2 and 3 for 3.0cm of Tape X:

**QUESTION FOUR**

4.1. This is part of a chart which appeared in a magazine in August 2008. It is aimed at helping people when they are shopping for fish:



Use the chart to answer the questions:

- (i) In some months you cannot find sprats for sale. Which months are these?

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- (ii) Name one fish that is of good quality only in March, April and May.

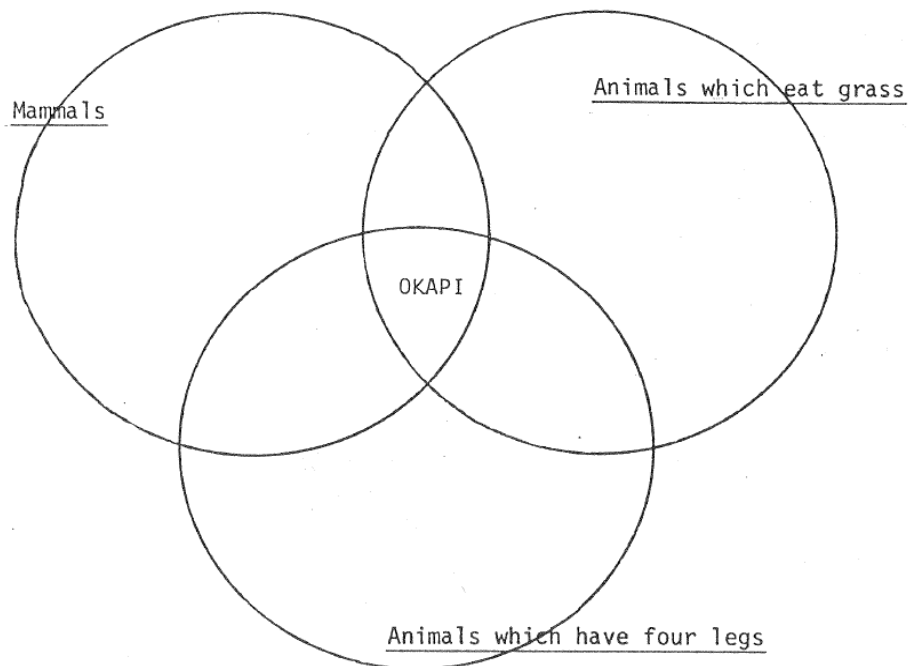
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- (iii) One fish is for sale all year round but is never likely to be of good quality. Which one is this?

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(3 marks)

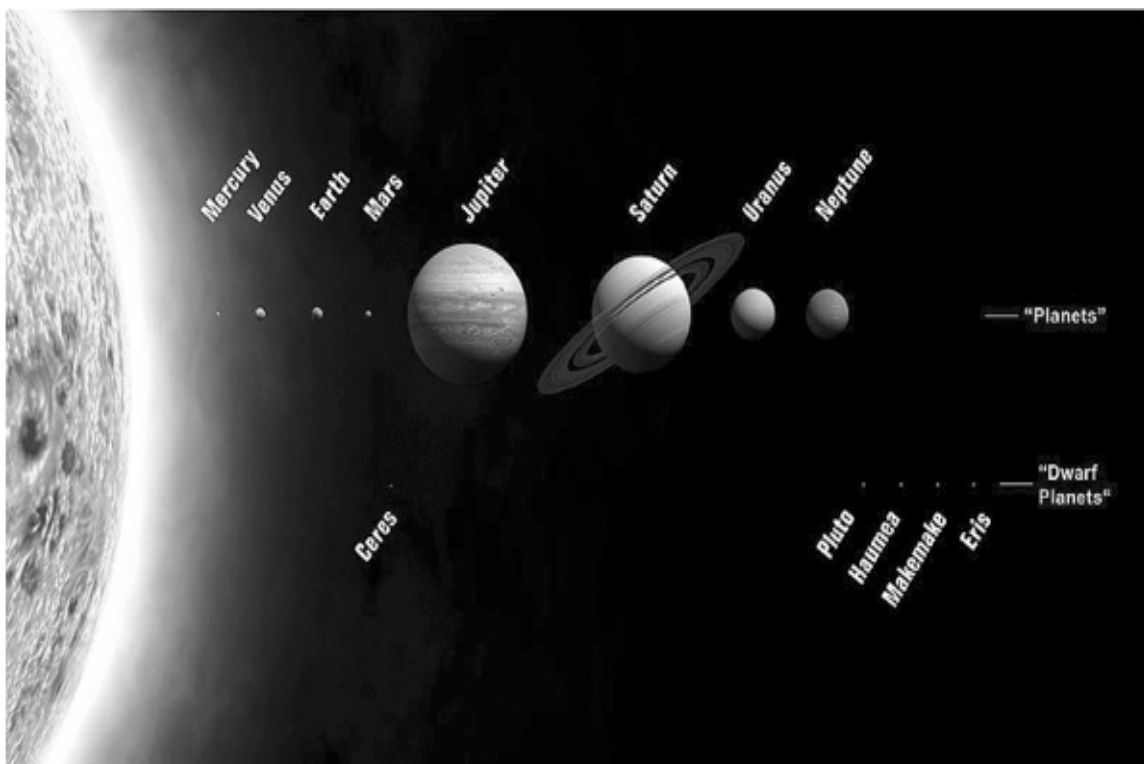
4.2. This diagram tells you what sort of animal an Okapi is.



Put a tick beside any statement with which you agree and a cross beside any with which you do not agree:

- A. An Okapi has four legs
- B. An Okapi eats grass
- C. An Okapi has four legs but is not a mammal
- D. An Okapi is a mammal that eats grass but does not have four legs
- E. An Okapi is a mammal with four legs which eats grass. ( 3 marks)

4.3. The following diagram shows the position of numerous planets in relation to the Sun:



Look at the following table:

<u>Planet</u>	<u>Distance from the Sun (kilometres)</u>	<u>Time for one trip around the Sun</u>
Mercury	58 million	88 days
Venus	108 million	225 days
Earth	150 million	1 year
Jupiter	780 million	12 years
Uranus	2 870 million	84 years
Neptune	4 500 million	165 years

- (i) There are some other planets not in this table. One of them is about 1 430 million kilometres from the Sun.

About how long do you think it will take this planet to make one trip around the sun? Tick in the box next to the one you choose. (1 mark)

- A 10 years
- B 100 years
- C 100 days
- D 30 years
- E 300 days

- (ii) Why do you think it will take this time? (2 marks)

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4.3. Susan tested five different coloured substances from plants to find out if they were good indicators.

Indicators are chemicals that have a different colour when placed in acid, alkali or water.

She added each substance, one at a time, to an acid, an alkali and the water. The colour changes are in the table below:

Coloured Substance			
	Acid	Alkali	Water
V	Red	Red	Blue
W	Red	Purple	Purple
X	Yellow	Yellow	Yellow
Y	Red	Purple	Green
Z	Red	Yellow	Yellow

From the results Susan decided that all of the coloured substances would make good indicators to show whether a liquid was an acid, an alkali or water.

(i) Do you agree or disagree with Susan? ( 1 mark)

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(ii) Give a reason for your answer. ( 1 mark)

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(iii) Which indicator would you pick? ( 1 mark)

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