Version 1.0
September 2009

B

ASSESSMENT and QUALIFICATIONS ALLIANCE

Centre Assessed Unit

Meeting Notes & Tasks

2009/2010

Issue No. 4

Core Science	
Specification A	4461
Specification B	4462
Additional Science	4463
Biology	4411
Chemistry	4421
Physics	4451

Coursework Deadline

7th May 2010

Contents

GCSE Sciences

The Centre Assessed Unit
Administering the CAU
Autumn 2009/ Spring 2010

Agenda

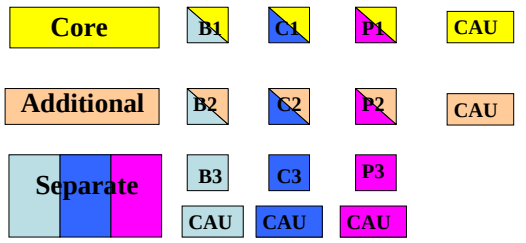
9.00	Arrival and coffee	1.00
9.30	Welcome	1.30
9.35	Administration of the CAU	1.35
10.45	Coffee	2.45
11.00	Exemplar material	3.00
12.30	Finish	4.30

Agenda

1.00	Arrival and coffee
1.30	Welcome
1.35	Administration of the CAU
2.45	Coffee
3.00	Exemplar material
4.30	Finish

GCSE Science Units

External 75% Internal 25%



AQA

Key Dates

21st February
- Entry for CAU
- Entry for certification

21st March
- Entry for June written papers

28th April
- Entry for June Objective tests

7th May
- Submission of CAU marks

AQA

Submission for Moderation

- moderation takes place once per year
- entries for the CAU must be submitted by **February 21st** each year. At that point you must "attach" the ISA to a subject

BUT

- after the results of the January / March units are published you have until **April 21st** to change the entry at no extra cost
- marks must be submitted by **May 7th**

Moderation

- all work from a centre is moderated as one package, whether it be for Science, Additional Science or the Separate Sciences
- this makes internal standardisation of vital importance

Using an ISA for more than one subject

If a candidate is taking two subjects with a common component, eg Science (core) and Physics, the same ISA may be used for both subjects if moderation is requested for both subjects at the same time

BUT

- The candidate must be entered for SCYC and PHYC, and the mark entered for both
- The candidate must take two different versions of the common **written** component

Carrying coursework marks forward

Coursework marks that have been **moderated** by AQA the previous year can be carried forward

e.g. a candidate who has a P1 ISA moderated in year 10, and used to certificate Science, can use the same moderated CAU for Physics in Year 11

BUT

Whilst the mark can be carried forward, the candidate must be entered for PHYC and the Centre Mark Form filled in with CF

Centre Assessed Unit

- Is a unit in its own right
- Constitutes 25% of the subject total
- Consists of 40 marks
  - 6 marks for the PSA
  - 34 marks for the ISA

Teachers must remember to submit the total (PSA + ISA) CAU mark

Practical Skills Assessment

- Consists of 6 “Can-do” statements
- Assessed at any point during the course when a candidate is carrying out practical work
- Centre submits a mark out of 6
- This is NOT moderated – we trust the teacher

Implementation of Practical work (PSA)

Marks	Skills
2	*Practical work is conducted:* • safely, but with help to work in an organised manner *The candidate:* • uses the apparatus with assistance
4	*Practical work is conducted:* • safely and in a reasonably organised manner *The candidate:* • uses the apparatus skilfully and without the need for assistance
6	*Practical work is conducted:* • safely and in a well-organised manner *The candidate:* • uses the apparatus skilfully in a demanding context

Advice on PSAs -1

- Don't attempt to carry out PSA assessment at the same time as an ISA
- Details are in the Teachers' Guide concerning the "demanding contexts" for the award of the higher marks
- No documented evidence will be required by AQA, but a suggested record sheet is in the Standardising booklet.
- There is space on the Candidate Record Form to make a comment about the PSA mark if you wish

Advice on PSAs -2

- AQA expects that PSAs will not be very discriminating
- BUT – we hope that they will be motivating, especially to the lower ability candidates
- Don't worry if most of your candidates score 5 or 6 out of 6
- PSAs will NOT be moderated
- Use the spreadsheet shown in the standardising book to help – or develop your own.

Investigative Skills Assignments

- Centres should have received the CD containing the Set 4 ISAs at the start of September
- The fifth set of ISAs will be issued:
  - Teachers' Notes and ISA titles
    - April 2010
  - ISAs and mark guidance
    - September 2010.

New Style ISAs

- As a result of an QCA requirement, the ISAs from Set 4 onwards will be slightly different.
- ISAs from Set 3 may still be completed and submitted in the normal way
- The marks from any Set 2 ISAs that were completed by the candidates before August 2009 may also be submitted

New style ISAs - Section 1

Candidates will no longer be asked:

- "What were you trying to find out?"
- "What did you find out?"

They will be asked to:

- draw conclusions from their investigation
- use their data to justify their conclusions

New style ISAs - Section 2

Candidates

- will be required to use ideas from their own investigations to answer some of the questions
- may be required to compare the findings of their own investigation with those of the investigation described in Section 2

Implications of new style ISAs

- The Teachers' Notes may have to be more prescriptive in terms of the method used for carrying out the investigation
- As before, candidates may not count any marks from Section 1 if they have not participated in the practical work
- Candidates will now be disadvantaged when answering Section 2 if they have not carried out any practical work

ISA Planning

- Candidates are not required to produce their own written plan
- Teachers will provide an outline of the techniques required
- The Teachers' Notes offer a suggestion
- If teachers amend the suggested method, they must give details on the ISA Explanation Sheet. If the candidates are given a worksheet, this should be attached to the Explanation Sheet.
- Any changes MUST still address the original title/ cover the same topic

The Three-Stage Process

Stage 1

- Stage 1 –An open discussion session, in which the teacher outlines the problem to be investigated
- This may involve some preliminary work
- At the end, the teacher should ensure that the candidates have a clear outline of the method
- Candidates must then draw up a blank table for the results **on their own**.

Headings in the table

Candidates should be encouraged to write complete headings in the table, e.g.

- Volume of water, not just 'volume'
- Time to fall, not just 'time'
- Length of the leaf, not just 'length'

The table for the results

- The table should be able to accommodate all the measured data.
- Table with correct headings AND units for both independent and dependent variable = 2 marks
- Table with incomplete headings or units = 1 mark
- Table is marked 0, 1 or 2
- Once table is marked, it then does not matter if candidate alters table.
- The results themselves are not "marked"

Marking the table

Teachers must mark the table before the next stage.

There are 3 reasons for this

- Prevents cheating/copying
- Any candidate unable to draw a table may be given one (although cannot obtain marks for it)
- Teacher may want to devise a class results table, e.g. for fieldwork

The table for results for use in the practical

Candidates can use their own marked table

or

Teachers may give either:

- A blank table, or
- A table **for** results from another candidate in that class, or
- A table **for** results to encompass the pooled results of that class

Stage 2

- Candidates carry out the practical work and fill in the table.
- The practical may last for more than one lesson – if so, any work must be collected in at the end of each lesson
- Candidates unable to write down any meaningful results for themselves may be given a table of results from another candidate - but both candidates must have been present for the practical.
- The teacher may pool the results of a class and issue the results to all candidates **in that class**.

Drawing the graph or bar chart

- When the practical work is complete, each candidate must produce an individual graph or bar chart of the results **on their own**,
- Computer-generated graphs are acceptable, but must be produced individually by the candidate in the laboratory while the practical session is taking place.
- Candidates are **not** allowed to take tables and graphs out of the class or home for further improvement

Labelling the axes

As with tables, candidates should be encouraged to write complete labels, e.g.

- *Mass of trolley, not just 'mass'*
- *Area of solar cell exposed, not just 'area'*

There is no 'error carried forward' for missing units from the table to the graph. This is because they are completed at different times

Marking the graph

Graphs *may* be marked at this stage, or could wait until ISA has been taken

Graphs are given up to 4 marks

- *1: x axis correctly scaled and labelled*
- *2: y axis correctly scaled and labelled*
- *3: points plotted correctly to within ± 1mm (allow 1 plotting error per 5 plots made)*
- *4: suitable line drawn*

N.B. At least 3 points must be plotted in order to be able to draw a line

Marking a bar chart

Bar charts *may* be marked at this stage, or could wait until ISA has been taken

Bar charts are given up to 4 marks

- *1: x axis correctly labelled with bars of equal width*
- *2: y axis correctly scaled and labelled*
- *3: bars plotted correctly to within ± 1mm (allow 1 plotting error per 5 plots made)*
- *4: bars labelled correctly on bar chart*

Bar charts or line graphs

- A bar chart should be used if the independent variable is *categoric*
- A line graph should be used if the independent variable is *continuous*
- If either of the variables is *discrete*, either a line graph or a bar chart may be used
- If the candidate chooses the wrong type, they cannot gain the "x-axis" mark
- Usually a line of best fit will be the most appropriate. Remember that a line of best fit may be a curve!
- If no line is possible because there is no correlation, the candidate must say so on the graph in order to gain the 4th mark.
- Axes may be reversed with no penalty

Stage 3

Candidates take the ISA test

- This is under *controlled* conditions, not exam conditions, i.e. it can be in normal teaching room
- No communication allowed
- Mobile phones not allowed
- Posters etc. referring to variables etc. must be taken down or covered over
- 45 minutes allowed, but usual access arrangements rules apply, e.g. scribe, extra time. Centres should apply before ISA is taken

Stage 3

Candidates must hand in the ISA, together with:

- *their own* table (the one the teacher marked first)
- class/group table (if one has been issued)
- their own graph/bar chart

N.B. even if group/class results have been issued, the candidate's own table must be attached

Marking the ISA

- Mark in red ink, using a tick or a cross for every mark - no half marks
- Put sub-totals (including zeros)in the margin
- Put separate marks for the table & graph in the margin at the end of Section 1
- Annotate where necessary (use the 'D' for doubt where appropriate)
- Annotate the mark guidance if necessary, and include with moderation sample

General points

- All work is done under the direct supervision of the teacher – candidates are not allowed to take work home
- Completed operational ISAs must **never** be returned to candidates
- Use the updated exemplar ISAs for practice

Internal Standardisation

- It is a requirement that, if more than one teacher at a centre is responsible for marking the CAU, internal standardisation must take place
- You may use the materials provided at this meeting for this purpose
- It is also a good idea to cross check some of the marking between teachers

Centre Assessed Unit
Overall Grade Boundaries for 2009
(out of 40 marks)

A*	36 marks	**D**	22 marks
A	34 marks	**E**	18 marks
B	30 marks	**F**	14 marks
C	26 marks	**G**	10 marks

Moderation of the CAU

- **Moderation** takes place once per year
- Submit the entry code for a CAU by February 21st
- CMFs to arrive at AQA/moderator by 7th May
- You will receive one set of CMFs for each **subject**, even though you are only required to send **one sample** covering all subjects

What to send to the moderator

- 20 candidates or fewer at the centre – send CMF + all work to moderator by 7th May
- More than 20 candidates **in total** at the centre, only send CMF(s)
- On each subject's CMF, circle the candidate with the **highest** CAU mark and the **lowest** CAU mark

How to help your moderator

- Check that you have enclosed:
  - A signed Centre Declaration Sheet
  - The appropriate ISA Explanation Sheets
  - The work of all the required candidates, comprising:
    - Candidate Record Form, signed by teacher and candidate
    - ISA test paper
    - Tables
    - Graphs/charts
- **Check that you have added the PSA mark to the ISA mark correctly**

Rank Order Lists

We are not insisting on Rank Order Lists this year, but they are still very helpful.

If you do supply such a list, it is even more helpful if it shows the ISA code for each candidate

Shelf Life of ISAs

- ISAs have a shelf-life of 2 years
- ISAs should be completed and marked within the validity period of 2 years, but **marks** may be submitted for moderation for **one** further year. The work **must** be kept secure for the entire period.
- BUT – if submitted for moderation within this time, that particular CAU mark for that candidate can be used for the life of the specification

What Moderators do

- Moderators check the sample of ISAs to ensure that centres have been fair and reasonable in the application of the Mark Guidance
- There is a tolerance of ± 2 out of the 34 marks. If one or more of the candidates in the sample exceeds this tolerance, a centre's marks *may* be adjusted
- After the publication of results, the centre will receive a feedback from AQA – this single feedback form will cover all subjects entered, as an ISA may be used for more than one subject.

Entry Codes for CAU

When submitting an entry for the CAU, you must attach an ISA to a particular subject.

This is done by using the appropriate code:

Science	-	SCYC
Additional Science	-	ASCC
Biology	-	BLYC
Chemistry	-	CHYC
Physics	-	PHYC

Surname	Smith	Other Names	John
Centre Number	1 2 3 4 5	Candidate Number	0 0 0 7
Candidate Signature		Date	Oct 2007.

Leave blank

General Certificate of Secondary Education
June 2008 / June 2009

SCIENCE / BIOLOGY **ASCC/BLYC/B2.2**
ISA B2.2 Photosynthesis

To be conducted before 4 May 2009
For submission in May 2008 or May 2009 or May 2010

For this paper you must have:
- results tables and charts or graphs from your own investigation.

You may use a calculator.

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	**YES / NO**

Signature of teacher marking this ISA ..... Date .....

LEAVE MARGIN BLANK

SECTION 1

These questions are about the investigation that **you** did.

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

1 What were you trying to find out in your investigation?

We were trying to find out how the number of bubbles would change as there was less light.

(2 marks)

2 (a) In your investigation, what was the **independent** variable (the variable that you deliberately changed)?

Distance of the light source

(1 mark)

(b) (i) How many different values of this variable were used? 5

(1 mark)

(ii) Suppose you could choose **one** more value of this variable to use.

What value would you choose?

30 cm

Give a reason for your answer.

As it would be another 5cm away from the Elodea, therefore another set of results

(1 mark)

3 State **one** variable that you needed to measure during your investigation.

The number of bubbles

(1 mark)

LEAVE MARGIN BLANK

4 Suggest why you needed to wait a short time before you collected results each time you changed the value of your **independent** variable.

to give the elodea time to get use to the light to make it a fair test

(1 mark)

5 Suggest **one** way of making your investigation more accurate.

make sure no other light source is close to the pond weed

(1 mark)

6 (a) Which, if any, of your results would you repeat if you could?

The 5cm one

(1 mark)

(b) Explain your answer.

I would do this because I may have started to experiment too early rather than giving it a chance to settle.

(1 mark)

7 What did you find out from your investigation?

I found out that the amount of bubbles that are released differs to the distance of the light. The closer the light the more bubbles counted, the further away, the less bubbles

(2 marks)

8 Make sure that **your** results tables and charts or graphs are handed in with this paper. You will be awarded up to 6 marks for these. *(6 marks)*

18

SECTION 2

These questions are about an investigation that may be similar to the one that you did.

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

Lettuces sold to the shops in April can be sold at a higher price than in June.

A farmer plans to speed up the growth of lettuces in his greenhouses by using heaters.

He works out that the cost of using electric heaters is about the same as using paraffin heaters.

The farmer sets up a series of experiments at different temperatures in his greenhouses, using either electric heaters or paraffin heaters.

He recorded the number of days before the lettuce plants were ready to sell.

His results are shown in **Tables 1** and **2**.

Table 1 Using an electric heater

Temperature in °C	Time in days before lettuce plants are ready to sell
16	40
18	32
20	25
22	20
24	17
26	16

Table 2 Using a paraffin heater

Temperature in °C	Time in days before lettuce plants are ready to sell
16	33
18	27
20	22
22	18
24	15
26	14

9 Describe the pattern shown by the results in **Table 2**.

The pattern is that the higher the temperature gets the less days which the lettuce are ready to sell.

(2 marks)

10 Which was the **dependent** variable in this investigation?

Put a tick (✓) in the box next to your choice.

The type of lettuce plants used	☐
The time for the lettuces to be ready to sell	☑
The temperature	☐
The type of heater	☐

(1 mark)

11 The farmer sowed 100 lettuce seeds in each of the test greenhouses.

Why will this give more reliable results than if only five lettuce seeds had been used in each test?

Because more will make the test fairer and it will make it easier to see the result clearer

(1 mark)

12 The farmer decided to use paraffin heaters at 24 °C in his greenhouses.

Using information from **Tables 1** and **2**:

(a) suggest why he chose to use paraffin heaters instead of electric heaters;

there are still less days before they are ready at 24°C using paraffin, than there is at 26°C with the electric heater

(1 mark)

(b) suggest why he chose a temperature of 24 °C instead of 26 °C.

He might as well save power as he is still getting more lettuce ready using paraffin heater than the electric heater

(1 mark)

Growth of the lettuces can also be speeded up by adding liquid fertiliser to the soil. Fertilisers increase the amount of minerals available to the lettuces.

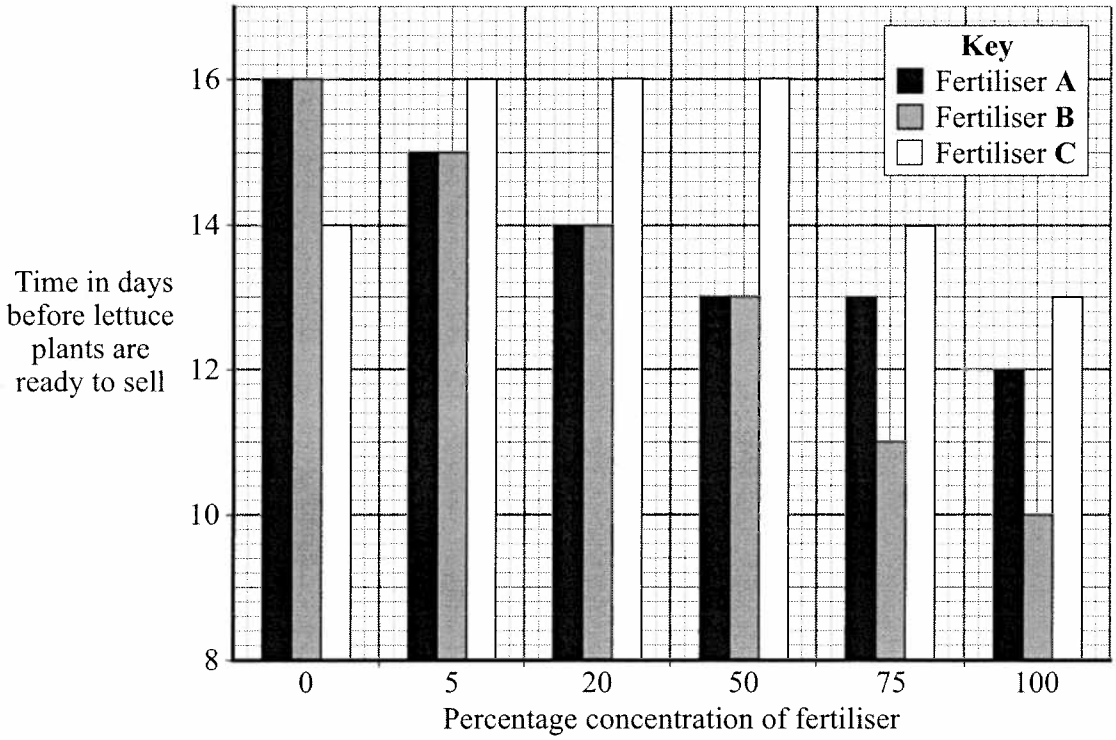
The farmer used a range of concentrations of three fertilisers: **A**, **B** and **C**.

At 100% concentration, the solution is undiluted fertiliser.

The farmer mixed different ratios of fertiliser and water to make up the same volumes of diluted fertiliser to water his lettuces. He also used water without fertiliser.

He grew the lettuces in a greenhouse heated at 24 °C using a paraffin heater.

The results are shown in a bar chart.



13 Each time the farmer watered the lettuces, he used the same volume of solution.

Why was it important to use the same volume of solution each time?

Because the lettuces will be used to this amount and won't react

(1 mark)

LEAVE MARGIN BLANK

14 What was the reason for doing the experiments with no fertiliser?

to see if the fertilizer actually makes a difference - compare them

(1 mark)

15 Describe the effect of using increasing concentrations of fertiliser **B**.

The more fertilisers used, the less days there are before sold

(1 mark)

16 The result for fertiliser **C** at 0% concentration does not seem to fit the pattern of the other results for fertilisers at 0% concentration.

Suggest **one** reason for this.

It could be an error in the data - put it in wrong

(1 mark)

17 The farmer displayed the results of his fertiliser investigation as a bar chart.

Suggest why he chose a bar chart instead of a table.

The results are much clearer, and you can easily compare them with no confution

(1 mark)

18 (a) Which fertiliser would you recommend the farmer to use?

Put a tick (✓) in the box next to your choice.

Fertiliser **A** ☐ Fertiliser **B** ☑ Fertiliser **C** ☐

Explain your answer.

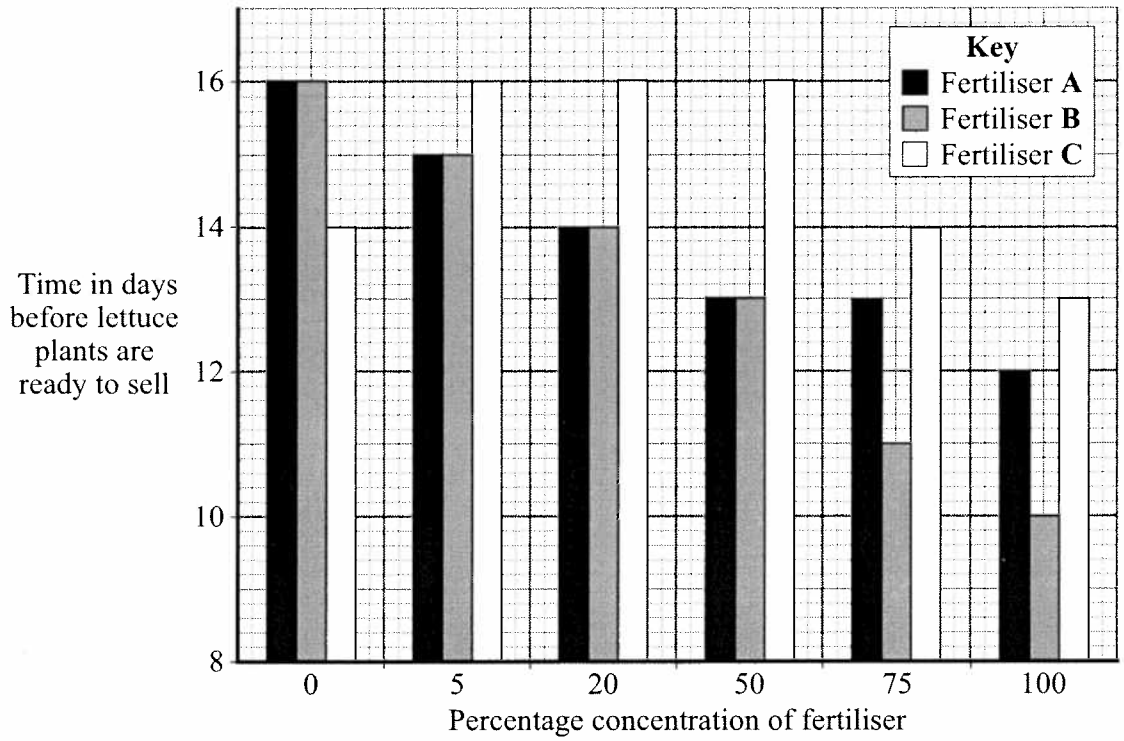
The more fertiliser B used, the quicker the lettuce is ready to be sold. It is the quickest fertiliser, therefore should be used.

(2 marks)

Question 18 continues on the next page

LEAVE MARGIN BLANK

To help you with this question, the bar chart is reprinted here.



(b) The manufacturer of fertiliser **A** guarantees that using fertiliser **A** will always reduce growing time for plants by four days.

Do the results in the bar chart support this claim?

Draw a ring around your answer. **Yes** / (**No**)

Explain the reasons for your answer.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Although the table shows that the time in which the lettuce can be sold goes down gradually, there isn't any proof that it goes down by four days each time. Therefore I disagree with the manufacturer's telling me it will reduce growing time by 4 days. As it is not clearly shown, there cannot be any errors in the table shown which leads me to say the manufacturer is definately wrong. *(3 marks)*

END OF QUESTIONS

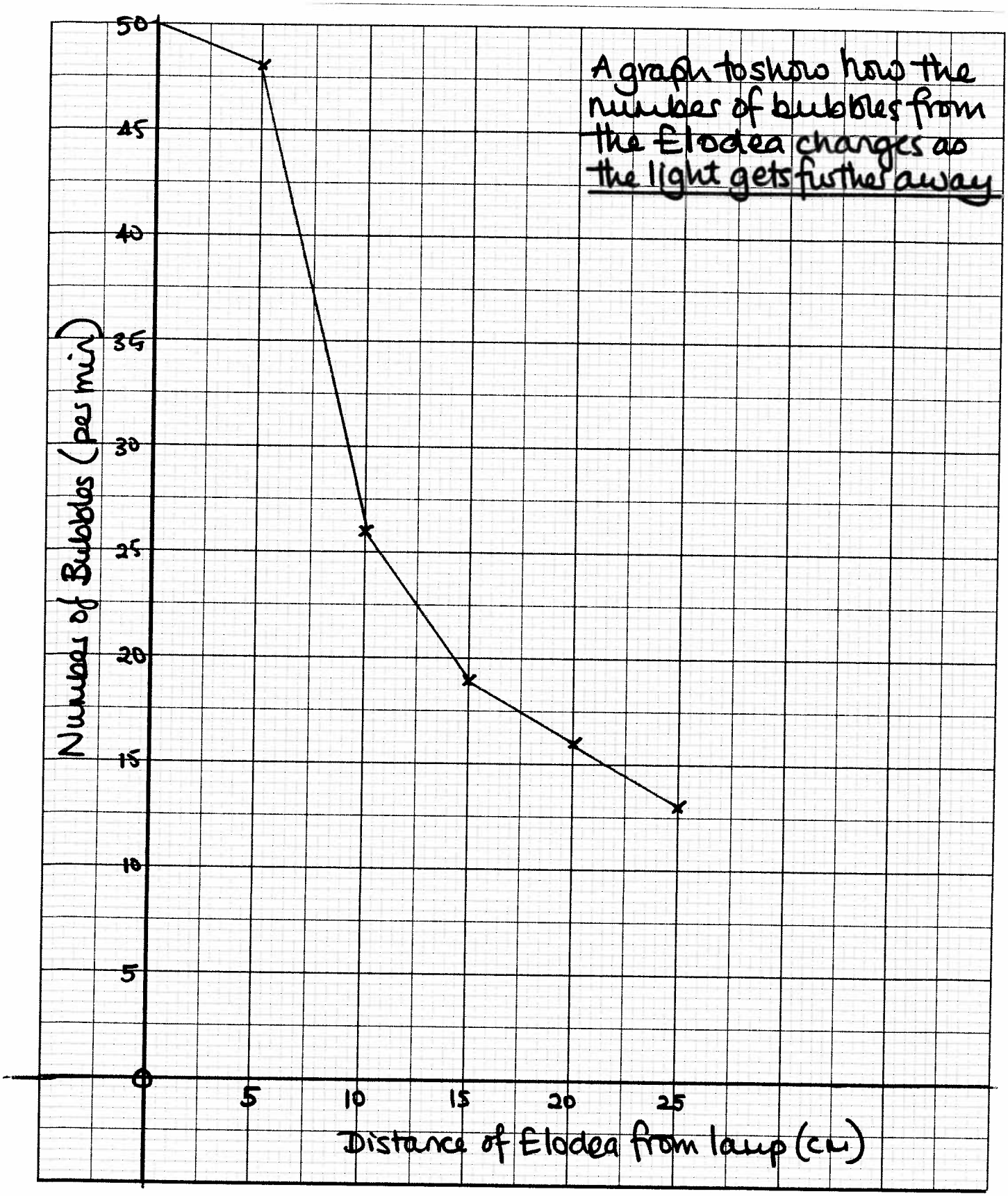
16

Results table

Aims :- to investigate the effect of light on the rate of photosynthesis of Elodea (pondweed)

Distance of the light from the Elodea (cm)	Amount of bubbles coming off the elodea (1, 2, 3, etc)		
	Test 1	Test 2	Test 3
0			
5			
10			
15			
20			
25			
30			

Distance of plant from lamp (cm)	No. of bubbles (per min) Trial 1	No. of bubbles (per min) Trial 2	No. of bubbles (per min) Trial 3	Mean number of bubbles (per min)
5	43	54	47	48
10	20	27	32	26
15	18	20	19	19
20	15	15	17	16
25	13	12	14	13


A graph to show how the number of bubbles from the Elodea changes as the light gets further away
Number of Bubbles (per min)
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
25
Distance of Elodea from lamp (cm)

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

ISA Explanation Sheet

to accompany each ISA
(You will need to fill in more than one of these sheets if different students have carried out different methods)

Centre Number						Date Practical Carried Out	October 2007.
ISA Code	B2.2					ISA Title	Photosynthesis
Name of Teacher							
Independent variable	Lamp Distance					Dependent variable	No. of bubbles/min

Did you make any changes to the suggested Method?

YES / (NO)

If Yes - give details of any changes you made to the suggested method, the equipment, chemicals etc. for this investigation.

Any other Information:

Candidates used a class results table – copy attached.

Teacher Signature:	**Please attach any experimental worksheet or outline used by the candidates to carry out the investigation if available.**

Surname	Smith	Other Names	John
Centre Number	1 2 3 4 5	Candidate Number	0 0 0 7
Candidate Signature		Date	April 09

Leave blank

General Certificate of Secondary Education
June 2008 / June 2009

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

SCIENCE / CHEMISTRY **SCYC/CHYC/C1.4**
ISA C1.4 Testing Emulsions

To be conducted before 4 May 2009
For submission in May 2008 or May 2009 or May 2010

For this paper you must have:
- results tables and charts or graphs from your own investigation.

You may use a calculator.

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	**YES / NO**

Signature of teacher marking this ISA ..... Date .....

LEAVE MARGIN BLANK

SECTION 1

These questions are about the investigation that **you** did.

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

1 What were you trying to find out in your investigation?

We were trying to find out how long oil separates from how many drops of egg

(2 marks)

2 In your investigation:

(a) state **one** variable that it was important to keep the same;

Amount of oil-the variable that stayed the same.

(1 mark)

(b) explain why it was important to keep this variable the same to make it a fair test.

We had to keep it the same amount of oil because it wouldn't be right when we change how many drops of egg we add.

(2 marks)

3 Which type of variable was your **independent** variable (the variable that you deliberately changed)?

Draw a ring around your answer.

categoric **continuous** **discrete** **ordered**

(1 mark)

LEAVE MARGIN BLANK

4 Which of the variables that you measured in your investigation would give the biggest source of error?

.....

Explain your answer.

The biggest source of error is the time of the egg to separate because we use the average time.

(2 marks)

5 How would you know if one of your repeated results was anomalous?

You would know because on the results there all big a only one is quite small to the other set of results

(1 mark)

6 Preliminary experiments are usually carried out before an investigation is started.

Suggest why it might be useful to carry out a preliminary experiment.

We practice first so when we do the experiment we won't make any mistakes

(1 mark)

7 What did you find out from your investigation?

I found out that it takes longer to separate when you put 3 drops of egg in, but the 0 egg didn't take long, so we found that 3 drops take longer than 0 drop of egg

(2 marks)

8 Make sure that **your** results tables and charts or graphs are handed in with this paper. You will be awarded up to 6 marks for these. *(6 marks)*

18

LEAVE MARGIN BLANK

SECTION 2

These questions are about an investigation that may be similar to the one that you did.

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

Ice cream is a frozen emulsion usually made from dairy products. A food company decided to make a new ice cream without using milk or cream.

The company's research department investigated different vegetable oils to see how easily they formed emulsions.

The scientists mixed oil and water in a bottle and added an emulsifier. They shook the bottles and checked to see whether a stable emulsion had formed. If the emulsion was still unstable, they added more emulsifier and repeated the shaking.

The total volume of the emulsifier needed to form a stable emulsion was recorded in **Table 1**.

Table 1

Oil	Volume of emulsifier needed to form a stable emulsion in cm^3			
	Test 1	Test 2	Test 3	Mean
olive	16	15	14	15
sunflower	41	39	52	40
sesame	17	19	24	18
peanut	39	42	36	39
coconut	28	26	26	26

28
26
26
80 ÷ 3 =
26

9 Which oil in **Table 1** gave the largest range of results?

Sunflower

(1 mark)

10 Use **Table 1** to calculate the mean volume of emulsifier needed to form a stable emulsion for coconut oil.

Show clearly how you work out your answer.

I added 28, 26, 26 together then ÷ 3 and worked the answer out

Write your answer, to the nearest whole number, into the table. *(2 marks)*

LEAVE MARGIN BLANK

11 Choose **one** result in **Table 1** that should have been checked and tested again.

Result: Oil ..Olive.. Test ..3..

Explain why you chose this result.

I think we should of checked test 3 because it seem that it has gone down and should be the same

(2 marks)

12 What would the scientists **see** in a test-bottle if the emulsion was stable?

You would see the emulsifier & the oil mixed together & would not separate

(1 mark)

13 Which **one** of the following would be the best way to present these results?
Put a tick (✓) in the box next to your choice.

Bar chart	✓
Line graph	
Pie chart	
Scattergram	

(1 mark)

14 The scientists measured the volumes of emulsifier and water using measuring cylinders.

(a) Suggest one other piece of equipment that they could use to make the measurement of volume more precise.

The burrant

(1 mark)

(b) Explain why you have chosen this piece of equipment.

The burrant is easy & quicker to measure liquids.

(1 mark)

LEAVE MARGIN BLANK

15 Every week, a new supply of oils is delivered to the food company and used to make ice cream.

The company expects each new supply of oils to behave in the same way as the oils used in its tests.

One week, the company had to throw away a complete batch of ice cream because the ice cream emulsion separated into oil and water before it could be frozen.

(a) How could the company have avoided this separation problem?

They could of added more emulsion so it would hopefully not separate

(1 mark)

(b) Explain why new supplies of oils may not give the same results as the company's original tests.

They might not give the same results because they might put more oil in or different time it would not separate.

(1 mark)

Table 2 shows a list of the ingredients for two ice creams. The 'Dairy Ice Cream' is made from dairy products and the 'New Ice Cream' is made from a mixture of all the vegetable oils listed in **Table 1**.

Table 2

Dairy Ice Cream	New Ice Cream
Fresh whole milk	Vegetable oils
Skimmed milk powder	Sugar
16 % double cream	
Sugar	Emulsifier E471
Eggs	Flavouring
	Stabilisers E410, E412, E415
	Colours E100, E106b
Contains no artificial colours or preservatives	Contains non-milk fats and peanut products
Energy content: 950 kJ/100 g	Energy content: 791 kJ/100 g

LEAVE MARGIN BLANK

Use the information in **Table 2** to answer questions 16 and 17.

16 In its advertising, the company claims that the vegetable oils used to make its new ice cream will be healthier for you and will not make you fat.

Discuss the claims made by the company. You should explain why you agree or disagree with the company's claims.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

I disagree because the variable has different and more stuff in and its not very healthy because theres alot of additives in, for example colouring, Enumbers etc and its not right.

(3 marks)

17 The company decides to call its new ice cream 'Traditional Farm Dairy Ice Cream'.

(a) Suggest **one** reason why the company wants to use this name.

The company uses this name so they bring more suppliers to buy it and try.

(1 mark)

(b) Suggest **one** reason why this would mislead consumers.

It sounds that there's something different in

(1 mark)

16

END OF QUESTIONS

J Smith.

Emulsion ISA

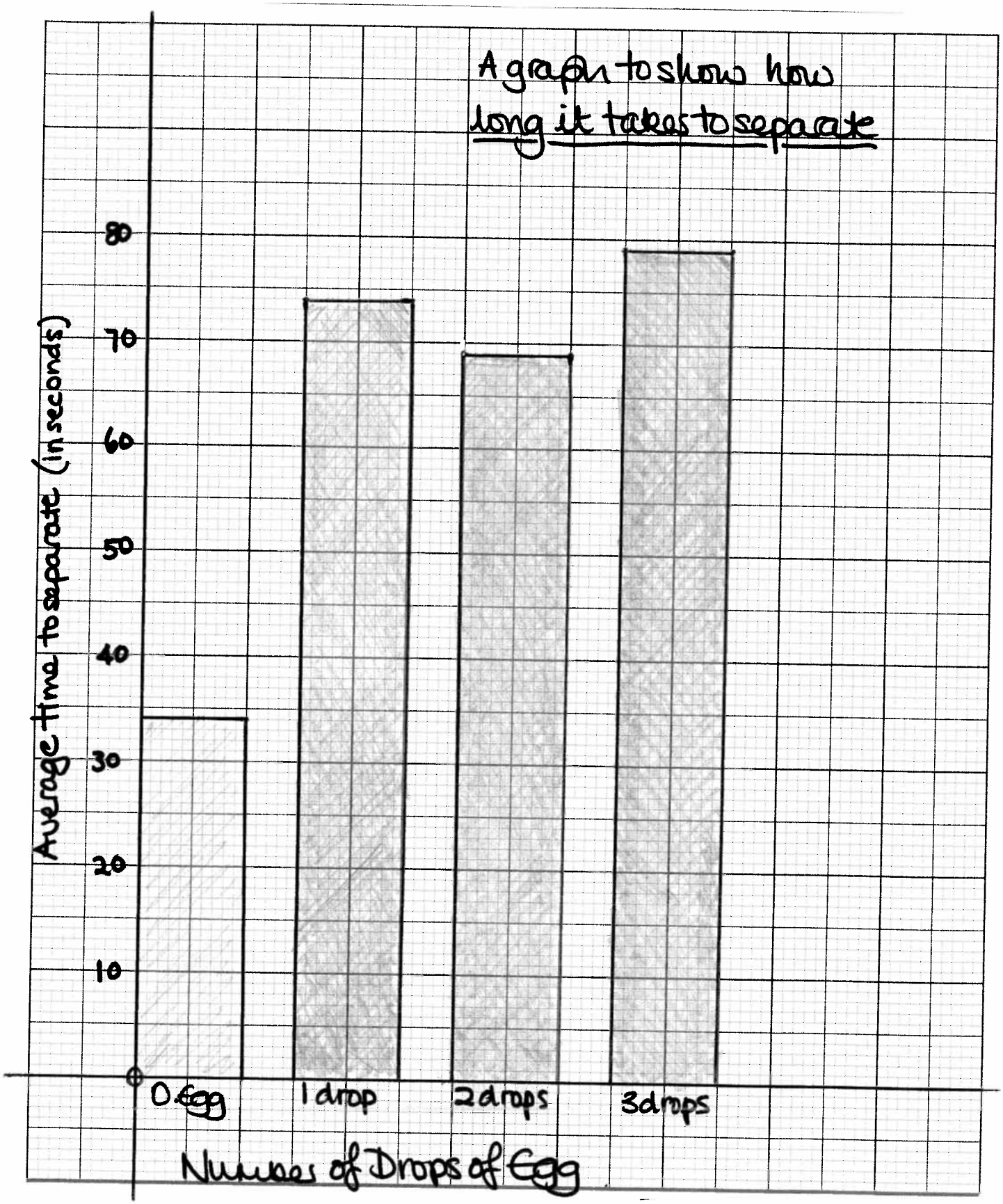
Number of Egg drops	Time Taken to Separate the Emulsion (seconds
0	
1 drop	
2 drops	
3 drops	

Class Results

Name: John Smith Class: 10P

ISA - The effects of emulsifiers
Results

Tube contents	Time for emulsion to separate to 1cm (in secs)			Average time taken (secs)
	Experiment 1	Experiment 2	Experiment 3	
No Egg	50	20	33	34
1 drop of egg	26	35	161	74
2 drops of egg	11	65	132	69
3 drops of egg	39	122	77	79


A graph to show how long it takes to separate
Average time to separate (in seconds)
80
70
60
50
40
30
20
10
0
0 Egg
1 drop
2 drops
3 drops
Number of Drops of Egg

ISA experiment

Name:

Investigating the effect of emulsifiers

This piece of work is part of your coursework. It makes up 25% of your GCSE grade. You must try your best with this activity.

Aim

To find out how the separation time of a mixture changes when different amounts of an emulsifier is added.

Apparatus

You will need the following things:

Vegetable oil
Water
Egg yolk
Boiling tubes marked 1cm from the bottom
Corks (for the tubes)
Test tube rack
250 cm^3 beaker
50 cm^3 beaker
25 cm^3 measuring cylinder
Plastic pipette
Stop clock

Method

Follow these instructions carefully. Record your results in a table.

1) Put 25 cm^3 of vegetable oil into each of four boiling tubes.
2) Add 15 cm^3 of water to each boiling tube.
3) Put a cork into one boiling tube.
4) Shake the tube gently for 15 seconds.
5) Put the tube into the rack and start the stop clock.
6) Stop the stop clock when the mixture has separated enough for the water to reach the 1 cm mark on the tube.
7) Record this time in your results table.
8) Repeat the experiment adding one drop of egg yolk before shaking.
9) Repeat the experiment adding two drops of egg yolk before shaking.
10) Repeat the experiment adding three drops of egg yolk before shaking.

- Make sure you have completed your results table
- Draw a graph of your results

Surname	Smith	Other Names	John
Centre Number	1 2 3 4 5	Candidate Number	1 0 0 0
Candidate Signature	S	Date	April 1st 2009.

Leave blank

General Certificate of Secondary Education
June 2008 / June 2009

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

ADDITIONAL SCIENCE/PHYSICS **ASCC/PHYC/P2.1**
ISA P2.1 Resistance

To be conducted before 4 May 2009
For submission in May 2008 or May 2009 or May 2010

For this paper you must have:
- results tables and charts or graphs from your own investigation.

You may use a calculator.

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	YES / NO

Signature of teacher marking this ISA ..... Date .....

LEAVE MARGIN BLANK

SECTION 1

These questions are about the investigation that **you** did.

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

1 What were you trying to find out in your investigation?

Whether the length of a wire has an effect on its resistance, and if so, in what way

(2 marks)

2 In your investigation there were variables that could have been measured – eg the current, the potential difference (voltage), the resistance.

(a) Write down **one** of the variables that you measured the resistance in the wire

Which term best describes this variable? Draw a ring around your answer.

categoric **control** **dependent** **independent**

(1 mark)

(b) Name the instrument that you used to **measure** this variable.

A voltmeter (V) and an ammeter (A)

(1 mark)

(c) You could have used an instrument which was more sensitive or had a smaller scale division.
What effect would this have had on the measurements?
Put a tick (✓) in the box next to your choice.

They would have been more precise. ☑

They would have been more reliable. ☐

They would have been more valid. ☐

(1 mark)

3 In your investigation, what was the **independent** variable?

The length of the wire

(1 mark)

LEAVE MARGIN BLANK

4 To make your investigation a fair test, you needed to control some variables.

(a) Name **one** of the variables that you needed to control.

The amount of cells used to power the circuit

(1 mark)

(b) Explain why you needed to control this variable.

If you had had different amounts of cells there would have been more or less power and therefore had an effect on the resistance. It would not have been a fair test. *(1 mark)*

5 In your investigation, did you notice anything that might have caused an error in your results?
Draw a ring around your answer. (Yes) / No
Explain your answer.

I did not stick the wire to the ruler and this may have made some of my measurements inaccurate and therefore unreliable. *(1 mark)*

6 Did you decide to check any of your readings?
Draw a ring around your answer. (Yes) / No
Give a reason for your answer.

I followed the readings I got each time and noticed a pattern. If the readings did not follow the pattern I tested it again and often it was due to human error. *(1 mark)*

7 What did you find out from your investigation?

I found out that the length of a wire does have an effect on the resistance of it. My results show that the longer a wire is the more resistance it has.

(2 marks)

8 Make sure that **your** results tables and charts or graphs are handed in with this paper.
You will be awarded up to 6 marks for these. *(6 marks)*

18

LEAVE MARGIN BLANK

SECTION 2

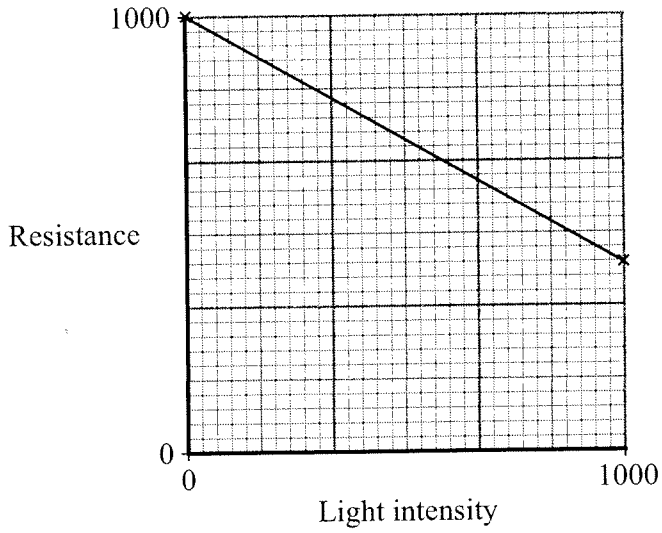
These questions are about an investigation that may be similar to the one that you did.

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

A company called 'LDR'S Unlimited' manufactures light-dependent resistors (LDRs). An LDR is a resistor whose resistance changes with light intensity. LDRs can be used to switch electric circuits on or off at different light intensities. For example, they could switch on a streetlight when it gets dark.

'LDR'S Unlimited' recently supplied a batch of these LDRs to 'Lighting for All'. This company uses them to make porch lights that come on automatically when it gets dark.

'Lighting for All' complained that it had received a batch of LDRs that did not work properly, and asked 'LDR'S Unlimited' to check them. Here is part of the report from 'LDR'S Unlimited'.

> We have checked one of the LDRs from the batch of 1000 that we recently supplied to you, and have found that it worked perfectly. We tested the LDR at two different light intensities, as shown on the graph. You require the LDR to operate at a light intensity in the middle of the range that we tested, so this should work well.
>
> 
>

9 What information is missing from the graph?

The units of the light intensity and resistance.
Also a title.

(1 mark)

LEAVE MARGIN BLANK

10 'LDR'S Unlimited' tested only one LDR from the batch.

(a) Why should the company have tested more than one?

So that they can get an average from more results and their results would be reliable

(1 mark)

(b) Suggest a suitable number that it should have tested. 3 LDRs.

(1 mark)

(c) If the company had tested more than one LDR, what effect would this have had on their findings?

Put a tick (✓) in the box next to your choice.

The results would have been more precise.	☐
The results would have been more reliable.	☑
The results would have been more reproducible.	☐

(1 mark)

(d) 'LDR'S Unlimited' tested the LDR at only two light intensities.

(i) Explain why this was not a good idea.

This could be on or off. They didn't do many and there could have been a faulty inbetween. It was not reliable evidence to represent the way they worked

(2 marks)

(ii) Suggest the **number** and **values** of light intensities that **should** also have been tested.

Number 5 Values 200, 400, 600, 800, 1000

Explain your answer.

You will clearly see whether the LDRs work at all light intensities as there are regular intervals at which you get a reading making the results more reliable as it is a fair test.

(2 marks)

LEAVE MARGIN BLANK

11 'Lighting for All' was not satisfied with the report. 'Lighting for All' decided to get a second opinion and asked another company to test the LDRs.

(a) Explain why asking another company to test the LDRs was a good idea.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Another company testing LDRs is a good idea as they would not be biased with their testing. LDRs may have been biased in testing and their instruments may not have been calibrated as they don't want problems with their customers or light LDRs. Lighting for all could have been biased in not telling the truth, but another company will do a fair test and show accurate results. *(3 marks)*

(b) This company tested more of the LDRs. It disagreed with the results of the test carried out by 'LDR'S Unlimited'. The company's report stated:

> It is a fact that all of the LDRs supplied to you were faulty.
>
> We also suspect that one of the measuring instruments used in the original test either was not calibrated correctly or had a zero error.

(i) Are the faults in the LDRs a matter of fact or opinion?

Draw a ring around your answer. **(Fact)** / **Opinion**

Give a reason for your answer.

The other company was testing fairly on an unbiased basis as they wouldn't gain or lose anything from the lights being faulty. *(1 mark)* They checked that their instruments were calibrated correctly and had no zero error which means their results are relied upon - fact.

LEAVE MARGIN BLANK

(ii) What is meant by the word *calibrated*?

Ensuring that instruments are set so that the measurements taken are correct according to a world wide level so that results are accurate.

(2 marks)

(iii) Suppose that the instrument that you used in your investigation (see Question 2(b)) had a *zero error*. There is no other instrument available, so you have to use this one.

Explain what you could do to take account of the zero error.

Count the units down or up that they are below or above from zero. Take these units away from or add them on to the reading from the instrument with zero error

(2 marks)

16

END OF QUESTIONS

Results table to show how the length of the wire in an electric circuit determines the resistance of it.

Length of wire (cm)	Volts (Voltmeter V)	Current (Ammeter A)	Resistance (Ohms) (Voltage/current)
100	3.40	0.32	10.65
90	3.20	0.34	9.41
80	3.10	0.37	8.38
70	2.90	0.40	7.25
60	2.90	0.46	6.31
50	2.80	0.52	5.38
40	2.60	0.59	4.40
30	2.30	0.70	3.29
20	1.90	0.86	2.21
10	1.30	1.20	1.08

If I have time I will do repeats of the experiment

Repeats (1)

Repeats (1)

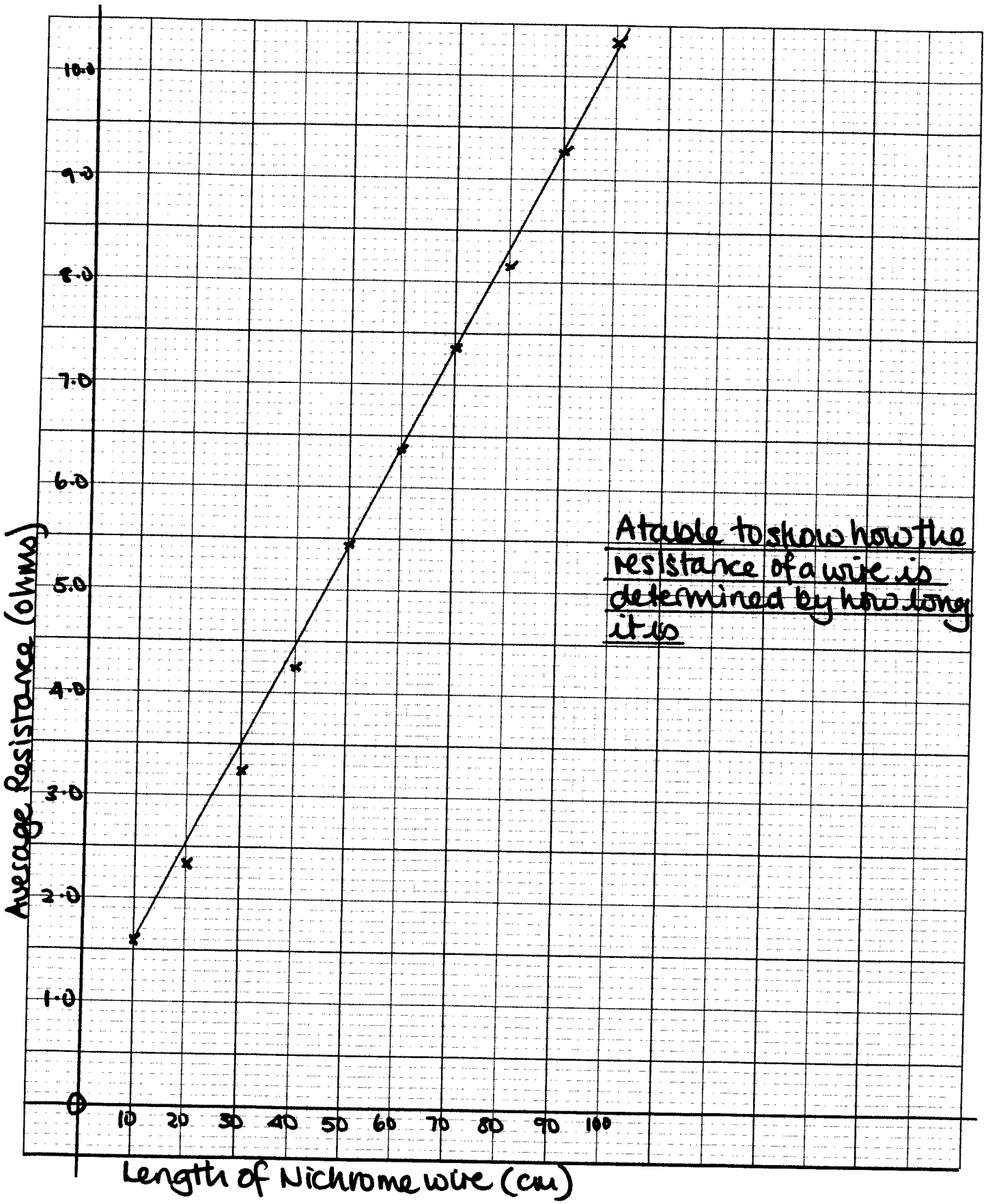
Length of wire (cm)	Volts (Voltmeter V)	Current (Ammeter A)	Resistance (Ohms) (Voltage/current)
100	3.20	0.31	10.32
90	3.10	0.34	9.12
80	3.10	0.39	7.95
70	3.00	0.40	7.50
60	2.90	0.45	6.44
50	2.80	0.51	5.49
40	2.40	0.59	4.06
30	2.20	0.70	3.14
20	2.00	0.82	2.44
10	1.30	1.25	1.04

Length of wire (cm)	Volts (Voltmeter V)	Current (Ammeter A)	Resistance (Ohms) (Voltage/current) AVERAGE
100			10.48
90			9.29
80			8.17
70			7.38
60			6.38
50			5.44
40			4.25
30			3.22
20			2.33
10			1.06

Repeats (2)

Repeats (2)

Length of wire (cm)	Volts (Voltmeter V)	Current (Ammeter A)	Resistance (Ohms) (Voltage/current)
100			
90			
80			
70			
60			
50			
40			
30			
20			
10			


Average Resistance (ohms)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
10
20
30
40
50
60
70
80
90
100
Length of Nichrome wire (cm)
A table to show how the resistance of a wire is determined by how long it is