Central South Consortium
Consortiwm Canolbarth y De
Joint Education Service
Gwasanaeth Addysg ar y Cyd

EAS
Education Achievement Service
for South East Wales
Gwasanaeth Cyflawni Addysg
i Dde Ddwyrain Cymru

ERW
Ein Rhanbarth ar Waith
Education through Regional Working
www.erw.org.uk

GwE
Tuag at Ragoriaeth
Towards Excellence

Teacher assessment

Key stages 2 and 3

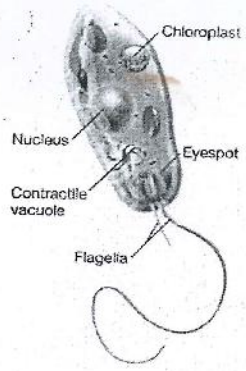
Science : learner profile

Level 6

Foreword

This profile is intended to help teachers see the type of evidence that can be used to take to a cluster meeting, in order to support the best-fit judgements made. It also clearly demonstrates that the evidence predominantly lies in a pupil's book and hence is what is already available to the teacher.

The profile also includes a detailed commentary which provides clarity on why the best-fit judgment was awarded. There is no suggestion or expectation that a learner profile is produced for every pupil in the cohort or that teachers write such an extensive commentary.



Science Assessed Task – Bodyworks – Developing Skills

Background

You have been studying the structure and function of different cells. You will be given a diagram of an organism called 'Euglena'. You need to answer the following question.

'Is Euglena a plant or an animal?'

Level	4	5	6	7
Communicate findings	Communicate your ideas using simple language	Communicate your ideas using scientific language ✓	Communicate your findings clearly and in a logical way.	
Explaining	Explain whether you think Euglena is a plant or animal.	Use your scientific knowledge of different types of cells to decide what Euglena is.	Use your scientific knowledge of different types of cells to explain whether Euglena is more like a plant or an animal. ✓	Use your scientific knowledge of plant and animal cells and the processes that take place in cells to justify your explanation.
Conclusions and decisions	Make a conclusion	Make a conclusion using correct scientific knowledge ✓	Make a conclusion using your previous and current scientific knowledge of plant and animal cells	Suggest what other information you would need to find out to make a final decision about Euglena.
Literacy - writing	*Structure and organisation* - Select and organise ideas and information to give a full account *Grammar, punctuation, spelling and handwriting* – Use punctuation accurately, spell scientific words correctly with clear and legible hand writing.			

Pupil Assessment

I have assessed my work as level 6- because ..... I have used detailed explanations and conclusions using my knowledge of cells and their organelles.

To move to the next level, I need to .... suggest the information I would need to make a final decision on the euglena. whether it is a plant or animal.

Teacher Assessment – Level awarded for this task - 6-

Comments – Science - Used Scientific knowledge of types of cells to explain whether Euglena is a plant or animal. - Justified reasons with Scientific theory.

Comments – Literacy Well Written with good spelling and set out in a logical way.

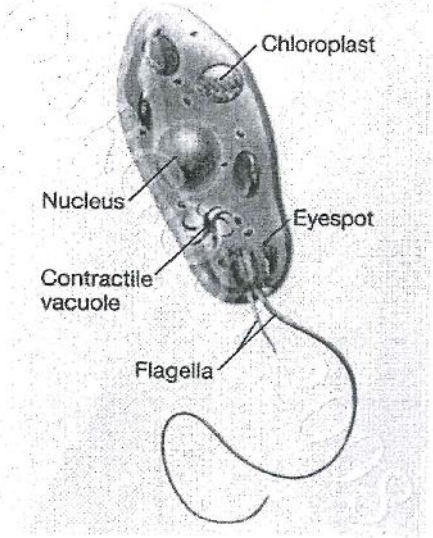
Target Setting – use the assessment information to help you to set targets

Science target – Next time: give ideas of information that would be needed to make a final decision, on whether the euglena is a plant or animal.

Literacy target – Continue to use correct literacy and grammar in my writing.

Bodyworks Core Task 1

20/09/13



Is the euglena a plant or an animal?

By looking at the diagram I can see that the euglena has many 'tell-tale' features which draw me to some interesting explanations. At first I am drawn to some organelles that I have seen before. These are the chloroplasts and nucleus. The nucleus is technically the 'brain' of the cell. This is ~~where~~ what controls the cell so it can function. This is not much use for answering the question as it is in both a plant and animal cell. Infact it is common in pretty much all cells. The other organelles the chloroplast suggests that this is a plant cell because it is the organelles which absorbs light to allow photosynthesis to go

(food)
-e- sugars to the cell. They are green-
ness. There is another thing that I hav
e noticed by looking at the labelled
diagram. A contractile vacuole. The
reason this stands out to me is be-
cause of my knowledge of 'vacuole'.
the vacuole, is permanent fixture
in a 'plant' cell filled with cell
sap. The give away word 'plant'
guides me toward thinking that
the euglena is a plant cell. But
the diagram states the word
'contractile' before the word vacuole
Also it is a funny shape unlike my
knowledge of the vacuole found in
plant cells. So it may be totally
different.

The next thing I noticed is what looks
like a tail. Or what is stated as a
'flagella'. This makes me think that
the 'euglena' swims or moves in
a certain way. I don't quite know
what to go with this, so I can't
judge that. The final organelles I see
is the 'eyespot'! I don't know what
this is but I am lead to thinking
the cell has a vision related feature
in order for it to function. ~~So spot...~~
I think that this part of 'euglena'
is meant to have vision. Again I
don't know whether this feature is
plant or animal but I do have enou
ghe evidence to draw some sort of

a conclusion.

In conclusion, I think ~~that~~ by analysing the ~~e~~ euglena's features, that there is a lot of useful and some un-useful pieces of information I have gathered. Firstly, I think that the chloroplast lead me into thinking it was plant related aswell as the contractile because of my previous knowledge. The nucleus didn't reall-y help as you find it in most c-ells. Then I looked into the eye spot and 'flagella'. These suggested to me the ~~felt~~ euglena swims and has some sort of vision. Overall I am lead to thinking that the euglena is a plant because of the features it has and it's shape. It is a plant.

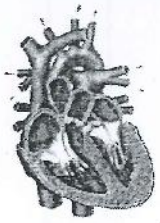
- Well written and "justified" reasons!

Euglena Class Survey

Number of pupils in class who thought it was a plant cell	Number of pupils in class who thought it was an animal cell	Number of pupils in class who thought it was not a plant or animal cell
19	9	4

Class survey supports my thinking and I agree it is more like a plant cell.

Science Assessed Task – Developing & Reflecting Skills



Background

You have been set a scientific investigation. Some primary school children want to know why their pulse rate increases when they are running around the playground. You will carry out an investigation on your pulse rate and then you will need to use the results to complete this task

Level	4	5	6	7
Recording my results	Record your results in a table	Draw a results table which includes headings and units, and record your results in the table. ✓	Draw a results table which will include headings, units and repeat readings and record your results in the table	
Displaying my results	Draw a bar graph with help	Draw a bar graph	Draw a bar graph using appropriate axes and scales to show the results effectively ✓	
Explaining my results	Explain the results using some scientific ideas	Explain the results using correct scientific ideas ✓	Explain the results using detailed and correct scientific ideas	Explain the results using detailed and correct scientific ideas and link to other body systems
Reviewing Success	Describe how the investigation was successful by referring to success criteria and how it could be improved	Look at the results from your investigation and begin to explain whether the experiment was successful by referring to success criteria. ✓	Look at the results from your investigation and explain clearly whether the experiment was successful by referring to success criteria.	Look at the results from your investigation and explain clearly whether the experiment was successful by referring to success criteria and suggest further success criteria
Literacy	*Structure and organisation - Select and organise ideas and information to give a full account Grammar, punctuation, spelling and handwriting – Use punctuation accurately, spell scientific words correctly with clear and legible hand writing.*			
Numeracy	*Developing numerical reasoning – represent and communicate – select and construct appropriate graphs with suitable scales*			

Pupil Assessment

I have assessed my work as level 6 because ..... I have drawn a results table and graph to a high quality standard and used detailed explanations to describe my results.

To move to the next level, I need to .... I need to use more detail when describing my results clearly explain whether it was successful and use appropriate units in the headings.

Teacher Assessment – Level awarded for this task - 5+

Comments – Science Good use of scientific ideas that are correct. Use more detail to justify what happened. Results table needs full headings.

Comments – Literacy careful with the type of words used to explain or describe things. Good spelling of keywords and proof checked.

Target Setting – use the assessment information to help you to set targets

Science target – Try to explain some of my points and views in more depth in order to justify what actually happened.

Literacy target Read over my writing to ensure the words used are most appropriate.

Bodyworks Core Task 2 02/10/13

Results Table:

Heart Rate (bpm) (in)

Activity/Exercise	Trial 1	Trial 2	Average
Sitting (Rest)	~~74~~ 80	74	77
Standing	86	86	86
Walking on spot 2 minutes	88	86	87
Jogging on spot 2 minutes	93	97	96

Resting heart rate = 80bpm

Success Criteria

- Collect a stop watch and have a results table ready for use.
- You will need to pick 4 activities in this case sitting, standing, walking and jogging (can be altered)
- Select your time of activity for example sit for 30 seconds and jog for 2 minutes (verify in results table and bar graph)
- First for 1 minutes count your bpm at rest (sitting).
- The begin with your 1st activity, do the activity for as long as you have selected and as soon as you have done the exercise/activ

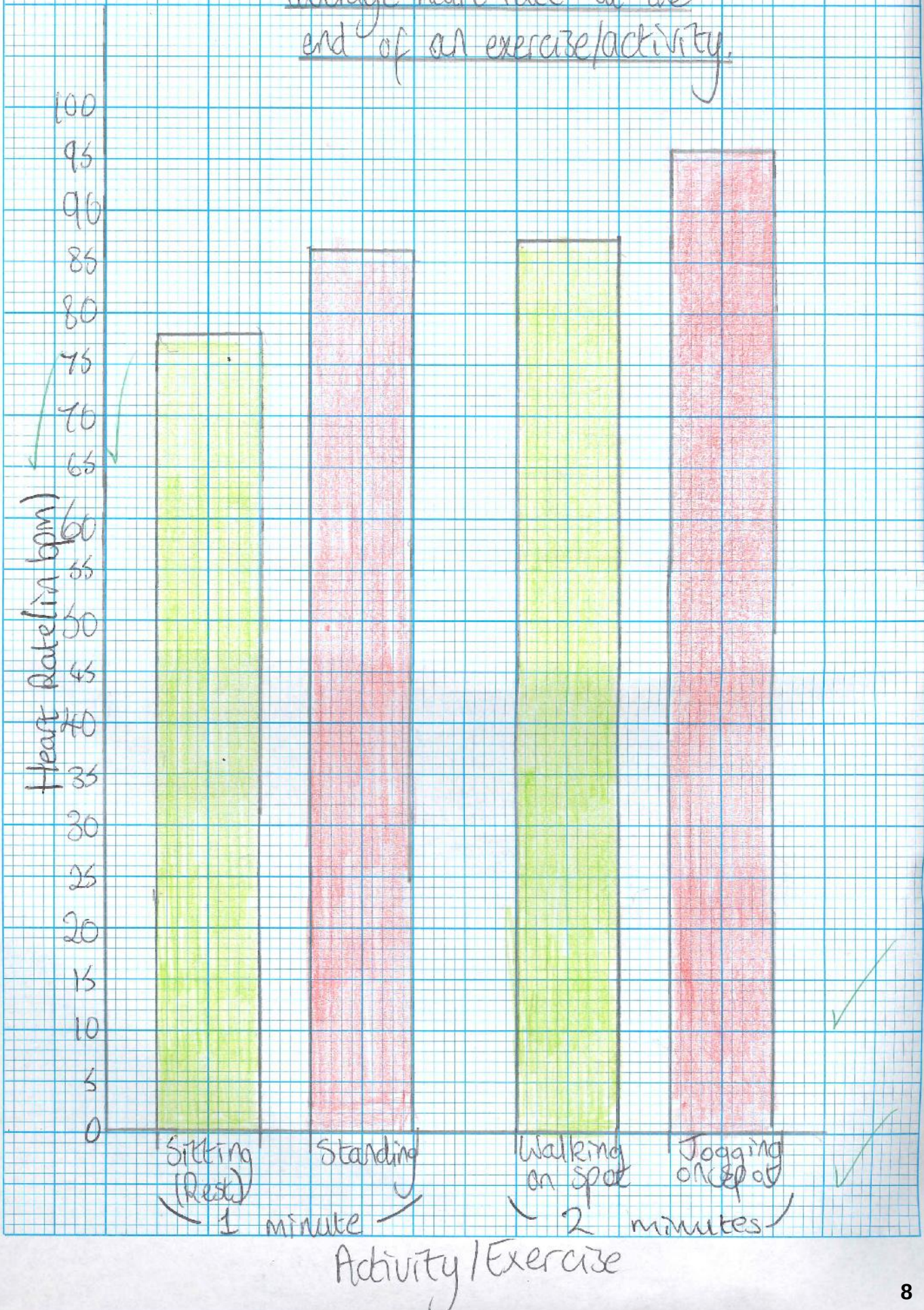
(Try to do outside) (not on spot)
Measure your pulse rate in bpm for 1 minute. This is your result for the activity you have done.
- Write result into table.
- Repeat this process for all activities.
- It is best to repeat all of the activities again so with the two trials you can get an average.
- Put your averages into a neat, labelled bar graph.

(REMEMBER TO REST FOR 1 MINUTE TO LOWER PULSE RATE BEFORE DOING EACH ACTIVITY)

Results Graph



A graph showing the average heart rate at the end of an exercise/activity.



My Results Show That....

From looking at My bar graph ~~Results~~ I can see that the bpm show lots of understandable and explanable results. The first activity which was ~~sitting~~ sitting was a resting (relaxed) heart rate at 78 bpm. Then standing the heart rate increased ~~to~~ to 86bpm. This shows that the heart pumped more blood when standing. I think this is because when you stand the heart has to work harder to pump blood around the body as you are straight but when you sit the heart doesn't have to work as hard so it pumps a little less. When the heart pumps blood it ~~carries~~ carries red blood cells through the circulatory system, which carry oxygen. If the heart pumps faster it shows that more oxygen is being carried in the blood so that we can keep breathing at a safe rate. Exercising is beneficial to the ~~heart~~ because ~~the~~ it helps to ~~get rid of~~ remove body and the heart carbon dioxide from the muscles and carry oxygen round the body quicker. The ~~two~~ two activities were walking and jogging on the spot. Walking on the spot left a heart rate of 87 bpm and jogging left a heart rate of 96 bpm. This shows a difference of 9 bpm. The reason ~~that~~ this is, I think

Careful with choice of words to explain

(Sp)

x carrys ✓ carries as

why is this the case?

because
~~that~~ jogging is a faster moving exercise activity so the heart works harder so oxygenated blood can be pumped faster around the body. So overall my results show ~~that~~ the harder the exercise the higher the bpm. (faster moving)

Was I successful in this investigation

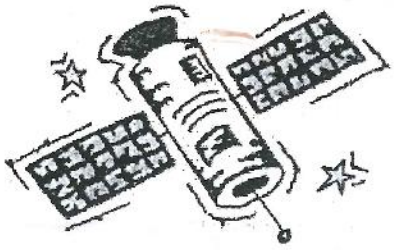
I do think that this was a successful investigation. I think this because we were concentrating ~~hard~~ in ~~our~~ the practical part of the investigation. This then allowed us to collect accurate results and readings. Also we followed the success criteria very well allowing us to do well and succeed when doing the practical. There is one thing I would have changed. This was the fact that we had to do the walking and jogging on the spot, as I think that if we'd done this outside we may've had more accurate heart rate readings as you move round rather than do it in one place.

Why does the various cells in the body need more oxygen when activity increases?

So they can work properly and do there job without ~~the~~ because a low a mount of

1 because you are resting and the blood doesn't have to travel vertically as much as when you stand up.

2 oxygen would affect how well they work.



Science Assessed Task – Life in the Stars – Planning Developing & Reflecting Skills

Background

You are an astronaut on a space station, you are keeping a diary. Write an entry for one day to explain the difficulties of living in space and the effects of space travel on your body

Level	4	5	6	7
Success criteria	Decide on your success criteria	Explain why you have chosen some of your success criteria	Explain clearly why you have chosen all of your success criteria	
Explaining	Identify the effects of being in space on you.	Use your scientific knowledge to describe what is happening to you in space	Use your scientific knowledge to explain in detail the effects of being in space	Use your scientific knowledge of different models and systems you explain what happens to you in space
Review success	Make a comment on how successful you were in this task by looking at your success criteria	Make a comment on how well you met your success criteria	Discuss in detail how well you met your success criteria	Make suggestions about how you would improve your success criteria
Evaluate Learning		Describe one thing that you did to complete this task – what worked best?	Identify the learning and thinking strategies that you used in this task	Review your learning and thinking strategies and suggest some different ones that you could use.
Literacy - writing	*Structure and organisation* Select, analyse and present ideas and information convincingly *Writing accurately* Use technical terms, language and expression consistent with the subject content Write with grammatical accuracy varying the length and structure of sentences to make meaning clear. Use the full range of punctuation in order to clarify meaning. Produce fluent and legible handwriting			

Pupil Assessment

I have assessed my work as level [6] because ..... I have clearly explained why I have chosen my success criteria and used scientific knowledge.

To move to the next level, I need to .... suggest how I could improve my success criteria and suggest other thinking strategies could use.

Teacher Assessment – Level awarded for this task - [6+]

Comments – Science

Very well written showing a great understanding of life in a daily routine in space. You could of included some new findings of things in your research.

Comments – Literacy

- Well structured and clear to read. Plenty of expression used in language. Just check some little words used so the sentences make sense and al

Target Setting – use the assessment information to help you to set targets

Science target – Try to use internet facilities for researching extra details on topic.

Literacy target Be careful with my word choice when writing sentences.

Life in the Stars Core Task 3
Planning, developing and reflecting skills

Success Criteria

1. I will think about the gravitational effects of space.
2. I will acknowledge the sensation of working and living in a space station.
3. I will write my diary in first person (as it should be)
4. I will include sympathetic language in my writing.
5. I will think about the inconvenience different methods of living may cause astronauts.
6. I will ensure my spelling, punctuation and grammar is correct.
7. I will use my scientific knowledge to explain why methods of living are different.

I have chosen my success criteria because... (reasons)

1. The gravitational forces affect living in space.
2. Living in space causes different sensations to the body.
3. A diary should be written in 1st person.

4. Astronauts may have different emotions in space (include in my diary)
5. Earths methods of living are in most cases easier than in space.
6. Correct english within writing is compulsery.
7. Reference to science helps to explain why methods of living are different in space.

Diary

NASA, 2013
USA
Florida
Space Report

Hello Diary,

I wake up in the morning in space and ofcourse I have to get ready. Only when I wake up in space, it's rather different to how you do on earth. You see, in space we are strapped to something to sleep because there is little gravity! I am strapped to hold myself still and to protect me from floating into one of the machines and causing injury to myself. It's also quite cold in the space station so it's not very easy to get to sleep. I wear earplugs as I'm not a very good sleeper.

Next, I shower, but very differently to how you do on earth. The micro-gravity effect means that we c- ant wash with water coming from a shower head. Therefore I cannot rinse shampoo off my head. So, we use rinseless shampoo. To ~~wash~~ clean the rest of our body we have use wat- and squirt it onto a towel so th- at we can wash ourselves. We hav- to squirt minimum water ~~so~~ that ~~it doesn't~~ go everywhere. Next I shave and brush my teeth. Obvious- sly I can't shave over a sink, tha- makes shaving in space greater in difficulty. I have to squirt water on my face and use a towel to clear the blade. I can also use space shav- cream and carefully spread it on my lower face. To clean my teeth just like you on earth I use toothpaste and a toothbrush. But as previously mentioned, ~~there~~ we can't use a sink to spit into. The- refore I spit into a ~~disposabot~~ dis- posable towel.

To finish my morning routine I ~~need~~ may need to have my hair trimmed or my nails clipped. ~~But~~ However there's a problem. Microgravity means nail cli- ppings and hair would go everywhe- and possibly damage machinery in the space station which is a safety

NSR. So, therefore another astronaut will use a hair shaver to trim my hair bu unlike the ones ~~on~~ on earth these hair ~~shaver~~ shavers collect the hair in a disposable bag/packet. When it comes to clipping nails they are done over an air vent which sucks them down, they are then disposed

Our clothes in space aren't changed or washed like on earth. We wear disposable clothing that lasts about three days. It stays rather clean whilst on earth as the space station is clean inside and our clothes don't come in contact with any 'space air' or in your terms 'outside'.

~~When~~ Eating in space is a challenge in comparison to earth. Food is a danger to the machinery in the space station so the types of food and the way you eat them is different. We can eat most foods you can on earth but we have to suck food out of a packet if it is not fully solidified. We use knifes, forks and spoons but they are magnetically attached to the eating surface to prevent their movement. All food is in either a pouch or a disposable packet and we

have a wide range of food to suit our tastebuds. We enjoy spicy foods when we have them because they pleasently flavour the mouth. When in space our ~~mouths~~ tounges don't taste as well as they do on earth therefore that is why we enjoy spicy foods. We drink very much like you on earth but we obviously make sure the cup/bottle is securely sealed to prevent soaking the space station and damaging machinery.

~~The~~ I go to the toilet in space very differently to how you do on earth. There are two seperate machines for the two waste disposal methods. The first being a small basin for faeces disposal the second being a long tube for urine disposal. Both take skill to use and are tightly vacuumed in order to prevent the waste travelling incorrectly through the space station. The waste collects in a special toiletery storage tank and is disposed off when the tank is full.

Finally, it is critical for an astronaut to exercise in space. This because of the effect space has on the muscles and bones in the body. The

microgravity effect. Therefore we have to use different equipment than you do on earth to exercise. A lot of the equipment involves being strapped down. We do exercise in similar and different ways as we have to ensure that spaces don't injure or damage us or force our bodies. An astronaut in space should exercise for 2 hours a day.

So overall living in space is different to on earth for many scientific reasons. It is ~~comfortable and~~ pleasent to be in the space station. The temperature is comfortable and it is quite peaceful.

Reviewing Success

I think that I have met my success criteria reasonably well and have followed the necessary points to write an accurate detailed, suitable diary. I have put on astronauts emotions and sensations in to consideration and described in great detail what it is like to live in space. I have compared the conditions of living. I have also used my scientific knowledge efficiently within this tas-

k, which has enabled me to write a factual, interesting diary.

Evaluating learning

In this task I have used many skil to enable me to write a good diary. I have applied past knowledge to new situations, written with empathy and understanding and persisted with my writings quality and detail. I have used strategies such as thinking of all possibilities and linking scien ific knowledge to methods of liv ing in space. All this has enabled me to write a quality diary, that I think is successful.

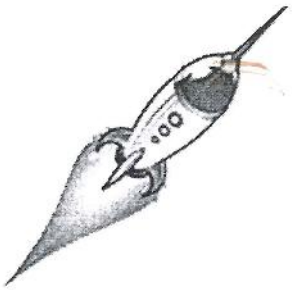
Very good well done!


Challenges for astronauts
Washing
Can't shower as of microgravity: Wet towels with warm water and wash
Can't wash their hair with water: Use rinse less shampoo
Eating
Can't keep food still as of microgravity: Eat food from pouches and disposable packets.
Using the toilet
Microgravity means that toiletry waste won't go correct ways: Use lightly vacuum like tube and basin for toiletry waste disposal
Exercising
Can't exercise like we do on Earth as of microgravity: Use special equipment
Clothing
Can't wash clothes as of microgravity: Wear disposable clothing.
Brushing teeth and shaving
Can't spit into sink e.t.c: Spit into towel and dispose after use
Can't use sink for water e.t.c: Squirt water/cream on face and shave
Hair and nails (Trimmings)
Can't control travel of hair due to microgravity: Use special hair shaver.
Can't control travel of nail trimmings: Nails trimmed over special air vent



Core Task Preparation

- Shaving
  - Squirt water on face
  - Use brush + toothpaste
  - Spit into towel
- Showering
  - Squirt water (warm) on towel
  - Soapy water
  - Wash face
- Hair
  - Rinseless Shampoo on head
- Toilet
  - Privacy curtain
  - The toilets have a little suction
  - Pee into funnel
  - Small basin for No. 2
  - Tube for No. 1
  - Into wastewater tank
  - Wipes, tissues gloves
- Cleaning Teeth
  - Like on earth
- Clothes
  - Clothes get very dirty
  - Wear clothes until unwearable
  - Go to resupply vehicle when not usable
  - In space suit for 24 hours
  - T-shirt worn
- Nails
  - Clip over air-vent
- Eating
  - Dehydrated food
  - Liquid form salt + pepper
  - 3 Meals a day
  - Disposable packages
- Exercising
  - 2 hours per day
  - Different equipment
- Hair cuts in space
  - International Space Salon



Science Assessed Task – Life in the Stars

Background

You have designed a rocket which you will launch and measure the time that it is in the air. You will need to set your success criteria for this task and make a prediction. Once you have collected your results, you need to write up your results and evaluate your investigation.

Level	4	5	6	7
Prediction	Make a prediction	Make a prediction using you scientific knowledge of forces and rockets	Make a prediction linking your knowledge of different forces acting on the rocket	Make a prediction linking your knowledge of different forces acting on the rocket and referring correctly to Newton's Third Law.
Recording my results	Record your results in a table	Draw a results table which includes headings and units, and record your results in the table.	Draw a results table which will include headings, units and repeat readings and record your results in the table	
Displaying my results	Draw a line graph with help	Draw a line graph	Draw a line graph using appropriate axes and scales to show the results effectively	
Reviewing Success	Describe how the investigation was successful by referring to success criteria and how it could be improved	Look at the results from your investigation and begin to explain whether the experiment was successful by referring to success criteria.	Look at the results from your investigation and explain clearly whether the experiment was successful by referring to success criteria.	Look at the results from your investigation and explain clearly whether the experiment was successful by referring to success criteria and suggest further success criteria
Review Findings	Identify trends and patterns in your results	Describe the relationship between the two variables in your investigation and comment on the repeatability of your results	Explain the relationship between the two variables in your investigation and comment on the repeatability and reproducibility of your results	Explain the relationship between the two variables in your investigation and make links to other factors. Comment on the repeatability and reproducibility of your results
Literacy	*Grammar, punctuation, spelling and handwriting – Use the full range of punctuation, write with grammatical accuracy, spell scientific words correctly with clear and legible hand writing.*			
Numeracy	*Using measuring skills- time – interpret fractions of a second appropriately* *Using data skills – present and analyse data, construct graphs, interpret graphs to compare data*			

Pupil Assessment

I have assessed my work as level 6+ because ..... I have made a prediction referring to Newtons third law. I have drawn an accurate results table.

To move to the next level, I need to ....

Teacher Assessment – Level awarded for this task - 7-

Comments – Science Well constructed prediction reasoned with Scientific theory. -Very good results table and graph. -With reviewing you have reflected by the results. Well done!

Comments – Literacy Well structured and good lay out. Good use of the proof reading assessment. Good use of proof reading assessment. Show this with the Symbols. Try using Comma to break up your sentences with a ~~full stop~~ pause.

Target Setting – use the assessment information to help you to set targets

Science target – Suggest further success criteria.

Literacy target - Use commas to break up sentences.

Life in the stars Core Task 4

Success Criteria

In order to ~~launch my rocket~~ succeed ~~complete my investigation~~, I will need to follow the below points to accurately and successfully complete the investigation.

Prediction:

- I will need to use scientific terminology to ~~accurately~~ explain what I think is going to happen and why.

So... reasons are that my prediction ~~is~~ understandable, and clearly explain why I think things will happen.

- I will need to justify my reasons

So....

that my prediction shows exactly what I think will happen

Recording results:

- I will accurately measure my results with the provided apparatus

So...

that my table contains data/ results that are as accurate as possible.

- I will use repeat readings in my results table

So...

that there is data that shows patterns or differences which can be compared. I can create an average.

- I will include headings in my results table.

So...

that the results/data in my table are understood.

- I will keep my units in the headings.

SO...

that my table is tidy/neat and shows the data correctly.

Displaying results:

- I will use approriate axes on my line graph.

so...

that my results are accurately shown.

- I will use appropriate scales to show data in my line graph.

so...

that my results are accurately, correctly and evenly shown in my line graph.

Review Findings:

- I will explain in detail the relationship between the two variables.

so...

that it is clear why the two variables may be different or

similar.

- I will comment on the reliability and reproducibility of my results

SO...

that I show an understanding of the quality and accuracy of my results.

End of Success Criteria

Prediction

I think that the weight, shape, balance, and volume of the rocket will effect the flight duration in many ways. Firstly a bottle filled with water to a high level, in my opinion would fly lowest. I think this because the space within the rocket would not be greate enough to hold enough air which would therefore prevent it from ejecting the water at a high rate of speed. Meaning the rocket wouldn't fly very high. However, I think that a bottle filled with little water wouldn't fly very long eith

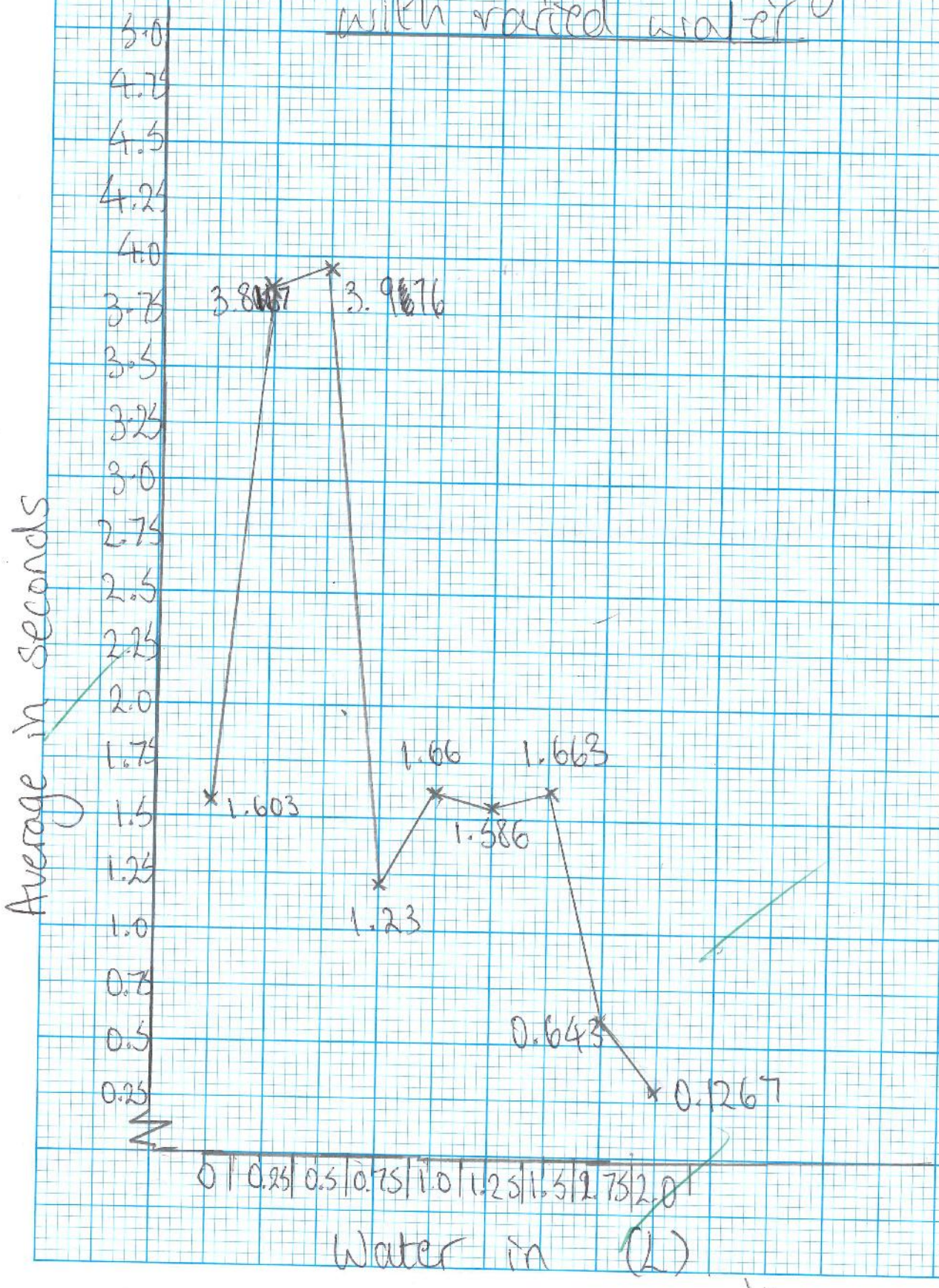
er as there wouldn't be an equal amount water and air for the rocket to fly high ~~enough~~. I think this because the water helps to thrust the rocket upwards because of the reaction force but too much air and too little water would mean that there would-n't be enough power/energy to push the rocket into the air. Therefore, I think that a rocket half-filled with water would fly highest because there would be an equal amount of air and water. I also think that a rocket with a good-shaped nose cone and fins/wings would fly highest because it would be able to cut through the air meaning it would have good aero-dynamics.

What is the reaction force?

A reaction force is the force that is opposite to the force caused eg gravity creates air resistance?

I can refer my reasons to Sir Newton Isaac's laws of ~~rockets~~ being a force is created by a reaction between two things, a reaction always has an opposite reaction and when a fish swims through water it is not the only thing moving the

A line Graph showing the average duration of rocket flight with varied water



Reviewing Success ~~and Investigation~~

By looking at my results from this experiment I can see that I had a fairly successful investigation. I can see this because my results have similar patterns throughout the 3 readings and there is not a large difference between any of the numbers. This tells me that I measured the flight duration accurately using the provided apparatus being the stopwatch. I also can see that I have drawn an accurate results table because I have followed my point being to include headings, units averages and repeat readings. Furthermore I have drawn an accurate graph. I have done this by labelling my axes and scales with suitable words including necessary units and using the scales to display numeric values evenly and accurately. I have also titled my graph to show what it is displaying. I have followed my success criteria to do this because my points were to use appropriate axes and scales ~~and to~~ in order

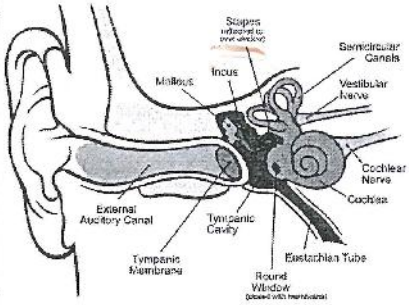
to show my results accurately. However, I could add extra points to my success criteria in order to improve it even further. This would be to measure as accurately as the apparatus allows during the experiment. I would do this so that my results were accurate and were most likely to be ~~correct~~ similar in repeat readings.

Review Findings

My results show me that the rocket flies longest when it is filled with 0.5 litres of water. My results also tell me that the rocket flies for the least amount of time when it is full to 2L litres (Full). The rocket flew for 3.976 seconds with 0.25 litres and an average of 3 seconds. This tells me that little water but more air pressure makes the rocket go much higher therefore making it fly longer. When the rocket was full with water it flew for the least amount of time and I think this was because the rocket was heavy and the air pressure didn't have a great affect on the water

therefore making the rocket fly for the lowest duration.

My results tell me that by adding 0.25 h of water to 0.5h of water has a large effect on the flight duration lowering it by almost 2 seconds. I think this may've been because of human error with measuring the water and correctly pumping the air.



Science Assessed Task – Science of Sound – Developing Skills

Background

*1. **Mrs Brown** is 85; when walking with her granddaughter she has discovered that she cannot hear the very high pitched sound that crickets make.*

*2. **Mr Green** is 23 and plays guitar in a rock band. He is worried because he has a ringing sound in his ears and finds it difficult to hear his friends if they speak quietly.*

*3. **Mrs White** is 56; she lives in the country, works in a library and has excellent hearing.*

Use your knowledge of sound, the ear, hearing and noise levels to explain the differences in hearing levels of these three people. You can include diagrams in your answer.

Level	4	5	6	7
Communicate findings	Communicate your ideas using simple language	Communicate your ideas using scientific language	Communicate your findings clearly and in a logical way. ✓	
Explaining	Explain simply the effect of sound on hearing	Use your scientific knowledge to explain the effect of sound on hearing	Use your scientific knowledge of different models e.g. particles/vibrations/hairs/ pitch to explain the effect of sound on hearing	Use your scientific knowledge of different models e.g. particles/vibrations/hairs/ pitch to explain in detail the effect of sound on hearing and show links between processes ✓
Conclusions and decisions	Make a conclusion	Make a conclusion using correct scientific knowledge	Make a conclusion using your knowledge of different models ✓	
Literacy - writing	*Structure and organisation* - Select and organise ideas and information to give a full account *Grammar, punctuation, spelling and handwriting* – Use punctuation accurately, spell scientific words correctly with clear and legible hand writing.			

Pupil Assessment

I have assessed my work as level 7- because ..... I have communicated my findings in a clear and logical way. I have used scientific knowledge and understanding.

To move to the next level, I need to .... Continue to use my scientific knowledge and understanding.

Teacher Assessment – Level awarded for this task - 7-

Comments – Science

A very informative piece of writing. Plenty of good Scientific theories and ideas used. Well done! A great effort.

Comments – Literacy

Legible writing with good structure. Well written with good sentences and use of language!

Target Setting – use the assessment information to help you to set targets

Science target – Continue to link the science with the situation using complex sentences.

Literacy target Continue to proof read my work to ensure it flows and is correct.

Science of Sound Core Task 5

Mrs Brown, Mr Green and Mrs White clearly are different ages and each have different lifestyles. Each expose their ears to different levels and types of sounds, therefore suggesting that this affects the sounds they can hear.

I hope to explain why they each hear differently and what the effects of sounds are doing within their ears.

Mrs Brown:

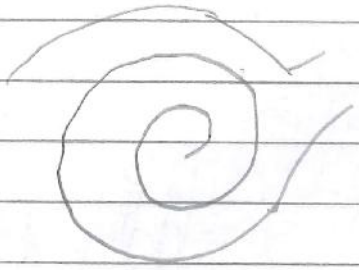
Issue: Discovered she can't here high pitched sounds, such as the noises crickets make.

Age: 85

Explanation: Mrs Brown is at an old age in her life and it is true that everybody's hearing gets worse as they go through their lives.

Why? because inside our ear there are lots of special tissues, nerves and bones that transport the compressions (sounds) ~~to our brain~~.

One of these is the Cochlea. This plays a major role in allowing us hou hear.



← looks almost like a spiral/shell

Inside the cochlea are tiny, infact microscopic hairs which move when the cochlea produces a fluid. When the hairs move they send electrical impulses to the brain via the auditory nerve/cochlea nerve. Now as we go through our lives we lose these hairs because of exposing the to sound. When we lose these hairs they don't grow back. losing these hairs means that we can lose the ability to be able to hear certain sounds.

Fact: Our hearing is best when we're under 10 years old!



← Hairs in the Cochlea

Crickets make a high pitch sound which has a high frequency. Frequency is measured in Hertz which is compressions per second. The loss of these hairs has most likely caused Mrs Brown to lose her ability to hear sounds of a high frequency. (noise a cricket makes).

Mr Green:

Issue: Has a ringing sound in his ears, finds it difficult to hear his friends when they talk quietly.

Age: 23

Explanation: Mr Green is at a fairly young age and he plays in a rock band. Playing in a rock band means that Mr Green exposes his ears to sounds of a high amplitude (loud). This suggest that he has damaged hairs within his cochlea. Damaging these hairs is bad for your hearing as it makes it challenging to hear sounds that have high and low frequencies. It also means that the sound has to be of a certain amplitude for Mr Green to here it. This makes Mr Green's hearing worse and restricts him.

Compare it to:

Pasta + Sauce = Flavour

Bland Flavour

Whisper + Speaker = Hear

Can't hear loud

Mr Green's ear are used to loud sounds. Of which a guitar or drum would create in a rock band. This is because he has damaged his hearing, by not protecting his ears and exposing them to sounds of high dB (decibals). It is ideal for someone who plays in a rock band/listens to loud sounds to wear ear protection if they commonly expose their ears.

Mrs White

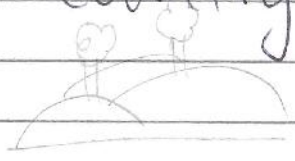
Issue: None, has excellent hearing (lives in country, works in

Age: 56

Mrs White has excellent hearing al

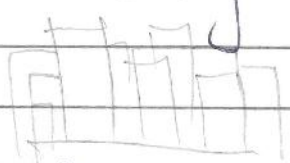
because of her job, where she lives and how she looks after her ears. Firstly she lives in the country living in the country means that it is a quiet place where no damaging sounds are common; such as which a traffic jam, taxing jumbo jet would make. By living in the country she exposes her ears to low amplitude/ dB (decibal) sounds which means that her hair cells aren't damaged to the extent that they would be if she lived in a town or city. Furthermore she works in a library where it is normally very quiet as of the rules. Therefore Mrs White has excellent hearing as she lives a quiet life.

Country



or

City



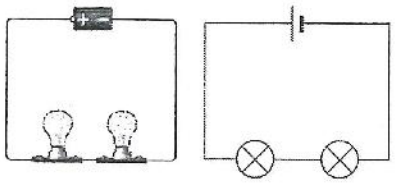
Quiet

Noisy

Conclusion

Overall, I conclude that Mrs White has the best hearing. This is because the hair cells within her cochlea are in very good condition and she protects her ears

by living and working in places that are of a low amplitude, such as the library and the country. However in great contrast Mr Green plays in a rock band exposing his ears to loud sounds such as guitars and drums. As he wears no ear protection he has damaged his hair cells causing him to lose the ability to hear quiet/low amplitudes sounds without difficulty. Mrs Brown can't hear sounds of a high frequency, ~~without~~ such as crickets, although it is common with people at an age of such to be limited with their hearing, as of lifetime damage to the hairs.



Science Assessed Task – Electric current – Planning Skills

Background - Plan an experiment to find out what happens to the electric current in a series circuit as you add more bulbs

Level	4	5	6	7
Planning	Find and use information from research. Use scientific knowledge to plan the experiment.	Find and use information from research. Make a clear and detailed plan using scientific knowledge.		
Prediction	Make a simple prediction.	Make predictions based on scientific knowledge.	Make predictions based on detailed scientific knowledge.	Make predictions based on detailed scientific knowledge gained from a variety of sources.
Fair testing	Identify which variables to change, measure and control.	Identify independent, dependent and control variables.	State values of the independent variable to be used, plan how to control variables.	Identify variables that may not be easy to control, explaining why.
Success criteria	Decide upon success criteria.	Explain the success criteria.	Justify the success criteria decided upon.	
Literacy - writing	*Structure and organisation - Select and organise ideas and information to give a full account* *Grammar, punctuation, spelling and handwriting – Use punctuation accurately, spell scientific words correctly with clear and legible hand writing.*			

Pupil Assessment

I have assessed my work as level 6+ because ..... I have made a prediction with knowledge from a variety of sources.

To move to the next level, I need to .... Using knowledge from a variety of sources

Teacher Assessment – Level awarded for this task - 6

Comments – Science

Good use of Scientific knowledge for reasons (volts measure voltage, amps measures current.)

Comments – Literacy

- Good Structure with good use of the proof reading assessment. Try to use comas to break up your sentences.

Target Setting – use the assessment information to help you to set targets

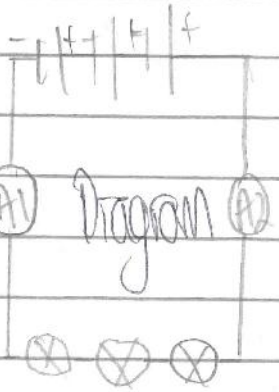
Science target – Use a variety of sources in my prediction.

Literacy target – Use comas to break up sentences.

Science of Sound- Circuits CT3

Planning

- Circuit Board (1)
- Light Bulbs (4)
- Wires (Any amount)
- Crocodile Clips (Any amount)
- Batteries (3)
- Ammeters (2)



I will use the circuit board to create a series circuit. I will place the batteries into the holders providing, in this case, 1.5 volts each. I will use the wires to allow electricity to flow through the circuit. I will place the bulbs around the circuit and connect them with the wires. I will use the crocodile clips to grip the components to the wires. I will place the ammeters in front of the things I am measuring.

Prediction

I predict that the electrons travelling through the circuit will lose amps ~~watts~~ as they travel through each light bulb. I predict this because I think that there is

resistance in the circuit as a series circuit doesn't work like a parallel circuit which equally divides the volts between two wires. Instead the series circuit uses all the power through one wire causing more resistance meaning there aren't enough volts to force the electrons through the wire at speed, after they travel through the bulbs. This would mean that the bulbs wouldn't have enough voltage to have equal brightness with the previous bulb therefore predict the lights will not have an equal voltage so, they will be different in brightness. Furthermore a parallel circuit is the best for bulbs as if one component fails the rest of the circuit will not work this means that parallel circuit is better for bulbs. (same brightness for each bulb)

- Volts relates to voltage force to push.
- Amps relates to current the flow of electrons.

Fair Testing

Member.

IV: The amount of bulbs in the circuit so that I can see how

the current flows differently with a different amount of bulbs.

DV: I will be measuring the voltage (amps) in the circuit with different amounts of bulbs by using an ammeter. I will do this so that I can see how the bulbs affect the flow of the current.

CV: The things I will keep the same are:

- The wires used - so that there is a correct (even) current travelling through the circuit.
- The type of bulb used - so that they have the same capabilities of giving light.
- The batteries used - so they provide the same (or equal) voltage.
- The way I connect the wires to the components - so that the flow of the current is equal and that the volts travel through the components in the same way each time.
- I will try to keep everything the same except my indepen

dent variable so that the experiment is fair.

However, some variables are difficult to control so we have to do our best to make them fair. This would be things like the voltage in the batteries. This is because batteries lose their voltage and may have to be replaced during the experiment. Therefore we should ensure that the batteries are at the same voltage before doing each test with the circuits and the light bulbs. Sp

Sp bulbs bulbs bulbs

I will keep my controlled variables the same by following their guidance, for example: Sp

I will use the same wires and bulbs. use

Sp ther

Success Criteria

- Use the necessary apparatus for the experiment ???Sp?

that everything needed is available and that the experiment will be fair. sp

- Follow my fair test so that I keep my variables how they are meant to be and I collect accurate results.

- Follow my plan so that I do the experiments correctly and this will allow me to achieve results that are reliable.

*2

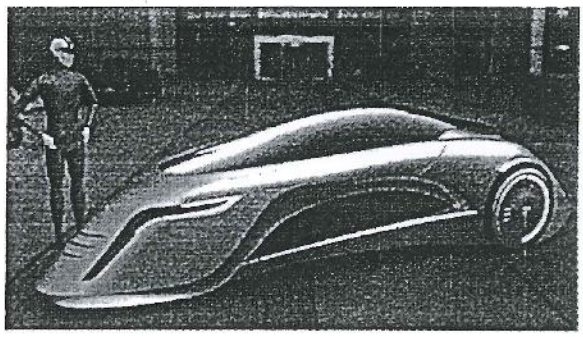
If I follow my success criteria my experiment will be as successful as possible.

*1 I will use the ammeters by measuring the currents voltage and noting this down. I will add one light bulb at a time to the circuit measuring the before adding another bulb voltage so that I have a result for each bulb added.

*2 - I will ensure that my ammeter readings are correct by checking the values on these screens so that I have correct, explainable results.

Proof Read

Science of Motion - Car Design CT6



Science Assessed Task – Science of Motion – Planning Developing & Reflecting Skills

Background

You are a car designer. You have been asked to write a piece for a scientific magazine explaining the features of your 'Car of the Future' design.

Level	4	5	6	7
Success criteria	Decide on your success criteria.	Explain why you have chosen some of your success criteria.	Explain clearly why you have chosen all of your success criteria.	
Explaining	Identify the features of your design and for at least 1 suggest reasons why it is needed.	Use your scientific knowledge to describe the key features of the design and give reasons why they are needed.	Use your scientific knowledge to explain in detail the reasons for your design (e.g. link feature to correctly explained science).	Use your scientific knowledge of different models and systems to explain the reasons for your design (could include issues with burning fuels, how it is energy efficient, materials, forces).
Review success	Make a comment on how successful you were in this task by looking at your success criteria.	Make a comment on how well you met your success criteria.	Discuss in detail how well you met your success criteria.	Make suggestions about how you would improve your success criteria.
Evaluate Learning		Describe one thing that you did to complete this task – what worked best?	Identify the learning and thinking strategies that you used in this task.	Review your learning and thinking strategies and suggest some different ones that you could use.
Literacy - writing	*Structure and organisation* Select, analyse and present ideas and information convincingly. *Writing accurately* Use technical terms, language and expression consistent with the subject content. Write with grammatical accuracy varying the length and structure of sentences to make meaning clear. Use the full range of punctuation in order to clarify meaning. Produce fluent and legible handwriting.			

Pupil Assessment

I have assessed my work as level [6+/7-] because ..... I have explained my success criteria and used scientific terminology in my descriptions.

To move to the next level, I need to ....

Make suggestions on how I would improve my success criteria.

Teacher Assessment – Level awarded for this task - [7-]

Comments – Science – Clear and detailed success criteria. Very good reasoning for your design using Scientific theory and ideas to explain. Well done!

Comments – Literacy Good Structure. Fluent and legible handwriting. Plenty of technical terms and language used. Try using Commas to break up your sentences.

Target Setting – use the assessment information to help you to set targets

Science target – Continue using scientific theory.

Literacy target - Use Commas.

Success Criteria

- I will explain the reason I have chosen ~~the~~ each feature in my car so that my car is clear and understandable.

- I will talk about why some of my cars features are environmentally friendly... so that it is a demonstration on how future cars will/can be better for our planet. *

and to attract eco-friendly buyers.

- I will be innovative and think about features that will make my car more futuristic... so that my car will show advanced technology and show how we can improve current cars. Furthermore it will attract buyers who wanting to own the cars as they may show an interest in the features.

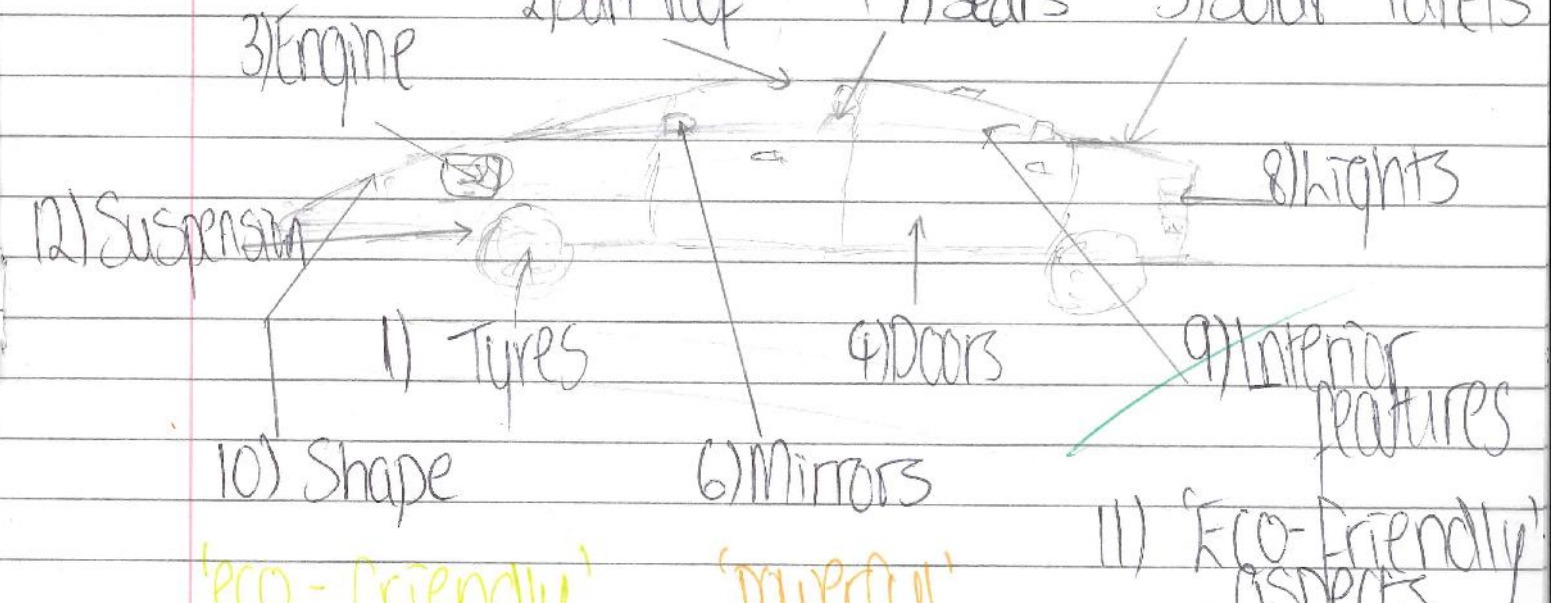
- I will consider how I can make my car more efficient with fuel... so that I can show that less fossil fuels can be used to move cars and to improve the cost of travelling by car.

- I will show how a modern, futuristic car will be more comfortable and enjoyable to travel in... so that people can see how features in the car can improve comfort when travelling.

- I will talk about the materials I use in my car... so that people understand what their car is made of and how it may look and feel.
- I will mention how my car will be aerodynamic ... so that I show how my car will further fuel extent.
- I will review my learning and thinking strategies ... so that I understand what I did well and how I can improve my work.

Explaining

PRESENTING ... the Chevrolet concept vehicle 'the car of the future'



'eco-friendly'

'comfortable'

'powerful'

'capable'

'clever'

'fuel efficient'

1) Tyres:

The car will include round tyres that will create friction to grip to the road surface. The car will be safe in slippery conditions such as slush, ice, rain and snow. However the car will be able to move at speed should the driver wish to get from place to place at reasonable speed. Pics of the tyres special shape and design It will be capable for a variety of uses. Racing, everyday driving, offroad driving will all be possible.

2) Sun roof:

The sun roof will be just one of many comfortable features in this car. ~~Both~~ ~~retractable~~ You can open it or close it using the electronic control panel. Perfect for a hot summers day or clear ~~steel~~ night so you can look up to the stars.

3) Engine:

This car has a special ~~energy~~ engine so you can travel using fuel or electricity. This engine makes the most of your fuel so less fuel is needed in your tank. Use electricity however and enjoy the idea that your car is releasing no carbon

into the air. You are playing your part to help the environment and traveling like you would with fuel. An overnight charge is all that's required. However if you are a driver who likes to live life on the fast line then the power of this car shouldn't disappoint. This car has 280 horse power so if power is what you want put this car into consideration.

(1) Doors.

you

We are taking ~~this car~~ into a new world of technology should you buy this car the doors of the car use special technology such as sensors and unique locks. If your key is at the bottom of your bag just pull the handle and the door will open. ~~and~~ similar to the boot which will open in the same way. Are your hands full? Don't worry just say open boot and the boot will open. (keys must be in range)

WOW! Keys used radio frequency technology so just link your keys to the Chevrolet app and find there location! Never lose them again.

Say 'lock doors' and the doors will lock. You can say this either inside or outside the car.

For more information visit 'chevrolet.us' today.

5) Solar panels:

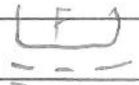
The solar panels that are designed to blend in with the vehicles colour and shape will actually power 10% of your journey so your saving money & fuel. (sun must have contacted panels for 1hr or more)

6) Mirrors:

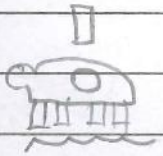
The mirrors use state of the art technology to make you aware of nearby vehicles and dangerous cars near to your vehicle. Indicating symbols will help keep your journey safe.



Dangerous vehicle nearby



Object near front/back (close)



Animal near

You can also electronically open or close the mirrors using voice commands or buttons on the control pan-

e).

7) Seats:

Adjust your seat position with the electronic controls.

Adjust your headrest in the same way.

Heat your seat (3 settings)

Cool your seat (3 settings)

Listen to the car audio through the headrests speakers and adjust volume.

All seats are leather.

8) Lights:

The cars lights are bright and effective once you start the engine they will automatically come on if it is dark. Furthermore, special lights stay on for 20 seconds after you lock the car if it is dark so you can safely walk to your destination (should it be near) with piece of mind.

FOR MORE INFORMATION ON THE CAR AND THE RISE OF THE FEATURES SHOWN IN THE DIAGRAM VISIT:

Chevrolet.us for everything.

Or

www.chevrolet/conceptcar.us for more information on this car.

Review Success

I think that I have met my success criteria well because I have followed most of the key points that I had written. However I didn't talk about how my car will be aerodynamic or talk about the cars materials, therefore I didn't fully meet my criteria. To improve my success criteria I think that I could include further points such as:

- using scientific terminology
- explaining the environmental impact of current cars

If I'd have included these I could of made my work more successful and more descriptive as well as more professional.

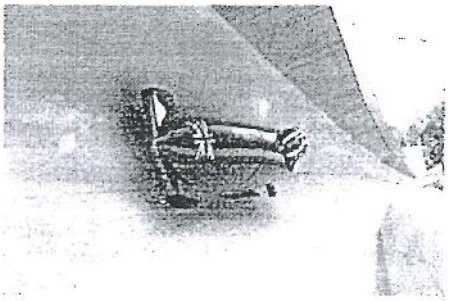
Evaluating learning

I successfully used many strategies and skills in my work to make it interesting and to make sure it was of a certain quality. These were:

- Applying past knowledge to new situations (features of previous cars, engine features)
- Improving (making features better than they how have been)
- Persisting (thinking about how it can be bettered have
- Planning for accuracy (including good features that already exist to make vehicle accurate)
- Research (looking at previous cars and their design, shape and features)

I could also have used ~~...~~ showing understanding by looking at views that people have on current cars.

Science Assessed Task – Bob Sleigh



Background

Using the apparatus you have been shown, plan and carry out an experiment to test how the height of the ramp affects the speed of the bob sleigh.

Hint – think about how changing the height chang[illegible] otential energy the bob sleigh stores, the energy transfe[illegible]u the speed the bob sleigh reaches.

Level	4	5	6	7
Planning	Use scientific knowledge to plan	Make a clear and detailed plan		Make some justification of the method (e.g. considering accuracy, repeatability)
Prediction	Make a simple prediction	Make predictions based on scientific knowledge, linking potential energy and speed.	Make predictions based on detailed science which includes reference to energy transfer from potential to kinetic	Make predictions based on detailed scientific knowledge including numerical link between kinetic energy and speed
Fair testing	Recognise , with support, which variable to change and which to control	Identify independent, dependent and control variables	State values of the independent variable to be used, plan how to control variables	Identify variables that may not be easy to control, explaining why
Observe and measure	Use standard equipment and measure results with units	Select instruments that allow you to make a series of accurate measurements	Make a series of precise and accurate measurements	Systematically observe and measure
Monitor progress		Make amendments to the method if necessary	Begin to justify any improvements made to the method	Justify amendments made to the method
Recording results Displaying results	Make a simple table of results and plot a graph	Draw a results table which includes headings and units Plot a line graph	Draw a results table which will include headings, units and repeat readings and speed calculations Draw a line graph using appropriate axes and scales to show the results effectively (graph line should be more than half of the graph paper in both directions)	Include line or curve of best fit on the graph
Explaining and concluding	Use some scientific knowledge to explain the results.	Describe the relationship between the variables. Discuss if the results are repeatable. Explain the results using correct scientific ideas	Describe the numerical relationship between the variables. Discuss if the results are repeatable. Explain the results using detailed and correct scientific ideas	Explain the results using detailed and correct scientific ideas and link to energy transfers. Correctly discuss if the results are repeatable and valid

Draft 1

Pupil Assessment

I have assessed my work as level 7- because ..... I have made a prediction using scientific knowledge including numerical links. I have also included a line of best fit on my graph.

To move to the next level, I need to ....

include full readings on axis.
make full amendments to method.

Teacher Assessment – Level awarded for this task - 6+

Comments –

- Good structure and well presented.
- Good identification of the IV, DV and CV.
- Well constructed results table and line graph.
- Good use of Scientific theory and ideas.

Target Setting – use the assessment information to help you to set targets

Science target –

- Ensure the columns of your results table and graph axis have full headings. (Explain what each section is about.)

Draft 2

Teacher Assessment – Level awarded for this task -

Comments –

Science Assessed Task - Bob Sleigh

Wednesday 18th June

Prediction:

I predict that the bobsleigh will descend quicker when the ramp is raised higher. I think this because the ~~know~~ ~~that~~ if the potential energy is higher then the transfer to kinetic energy will be greater. I know that a steeper ramp creates a more potential energy so this makes the bobsleigh travel faster down the ramp. I think that the speed will increase as I raise the ramp higher in cm and this will be able to tell this by dividing the distance the bobsleigh has travelled by the time it has taken to travel that distance. I can then relate this to the kinetic energy ~~created~~ when the bobsleigh travels down the ramp to the speed it has travelled (cms) so by comparing the joules to the speed it will also be able to ~~find our~~ result.

(There is more kinetic energy) * therefore ø2 energy.

Fair testing:

Independent variable:

The independent variable will be the

height of the ramp so that I can see whether increasing the height in cm increases the potential or kinetic energy and speed. I will raise the ramp in the following stages:

~~10 cm~~ 40 cm
~~20 cm~~ 50 cm
30 cm 60 cm

I will ensure that I jumps in equal stages.

Dependent variable:

My dependent variable is the time it takes for the bobsleigh to travel down the ramp in seconds. This will show me how the height of the ramp affects the speed at which the bobsleigh travels. (cm/s)

Controlled variables:

- I will ensure that I keep the distance of the ramp the same so that the results are fair and reliable. I will do this by using the same ramp for each reading.

- I will ensure that I keep the weight of the bobsleigh the same so that it doesn't affect the speed at which the bobsleigh travels down the ramp. I will do this by using the same bobsleigh for each reading.

- I will ensure that I keep the surface of the ramp and bobsleigh the same because changing the surface may affect the friction created when the bobsleigh travels down the ramp. I will keep this the same by using the same ramp and bobsleigh for each reading.

- I will ensure that ~~the results~~ I measure the speed that the bobsleigh travels in equal height stages so that I collect accurate and explainable results. I will do this by measuring the height of the ramp with a ruler and checking whether the height is correct.

- I will ensure that the same person measures the time for each reading so that it prevents response errors/ human error and the results are more accurate and reliable. I will do this by ensuring each person has their own roles ~~to play~~ during the experiment.

Some variables are difficult to control such as the height of the ramp because it's not always easy to ensure it is exactly correct and human error may ~~be~~ take place during the practical.

- What else will be hard to control?
- the time because recording of the bobsleigh reaction time may effect

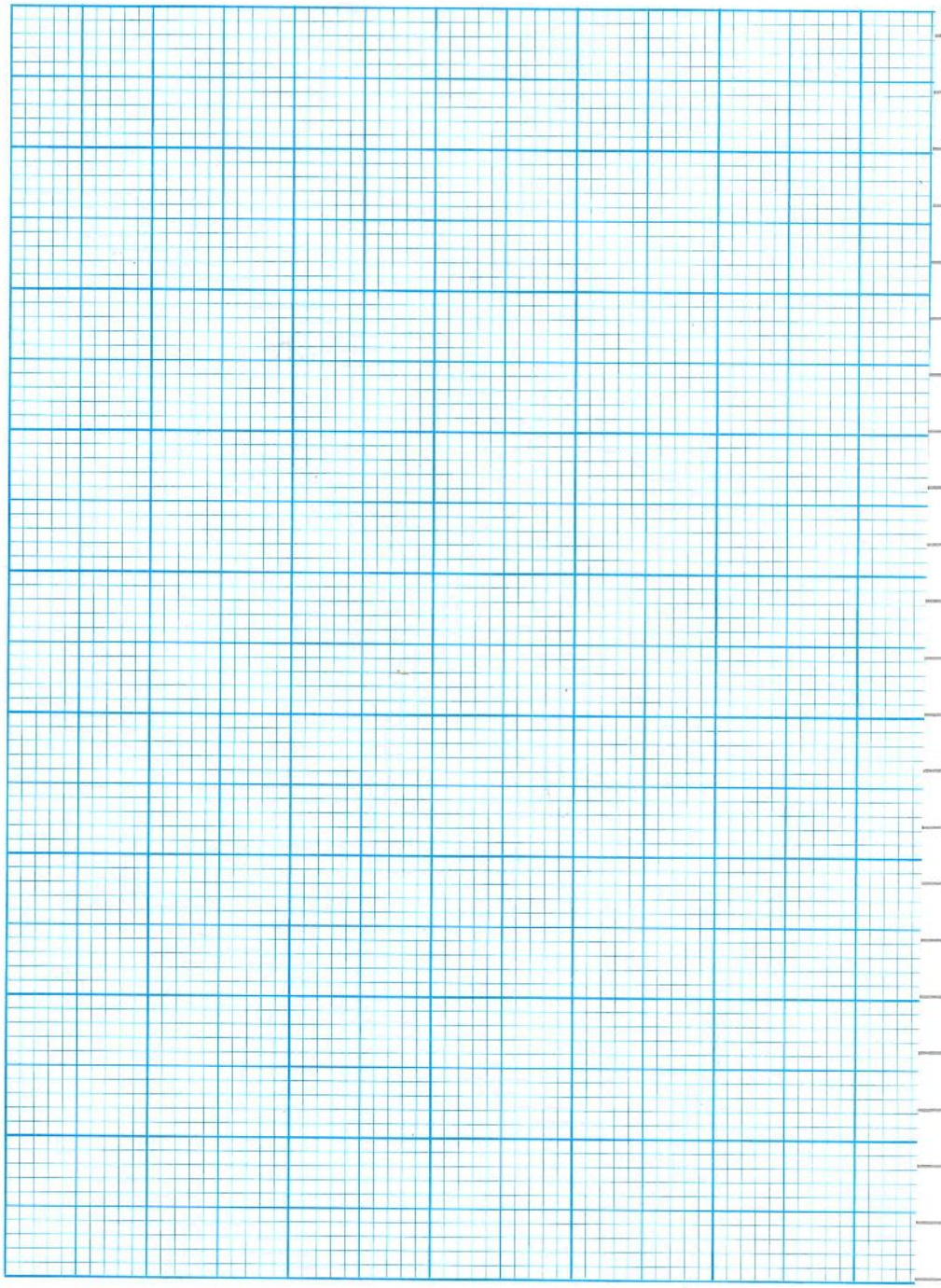
Height of ramp (cm)	Time (seconds) Bobsleigh takes to travel				Speed of Bobsleigh (cm/s)	Potential Energy (J)	Kinetic Energy (J)
	1	2	3	Average			
30cm	4.36	3.68	3.85	3.79	34.3	16800	117649
40cm	1.45	1.47	1.75	1.55	83.87	22400	703417
50cm	1.16	1.41	1.22	1.26	103.17	28000	1064206
60cm	0.88	0.72	0.95	0.85	152.94	33600	2339064
70cm	0.92	0.99	0.89	0.93	139.78	39200	1953844

Method

1. Collect the apparatus needed for the experiment. (e.g. clamp stand, bobsleigh)
2. Attach the clamp stand to the ramp and using a ruler to measure the height, lock your ramp at the first stage being 30 cm
3. Place the bobsleigh at the top of the ramp.
4. Start the stopwatch and release ~~the~~ the bobsleigh so that it descends down the ramp. (as soon as the bobsleigh stops, stop the stopwatch)
5. Record the time in your results table.
6. Repeat process 4-5 two more times (so there is a total of 3 readings)
7. Create an average from your data.
8. Repeat this process for each height stage so that you have all your results.
9. Fill in the rest of your table:
   - Find the potential energy- mass x grams x height (joules)
   - Find the kinetic energy- ½ x mass x velocity² (joules)
   - Find speed- distance ÷ time

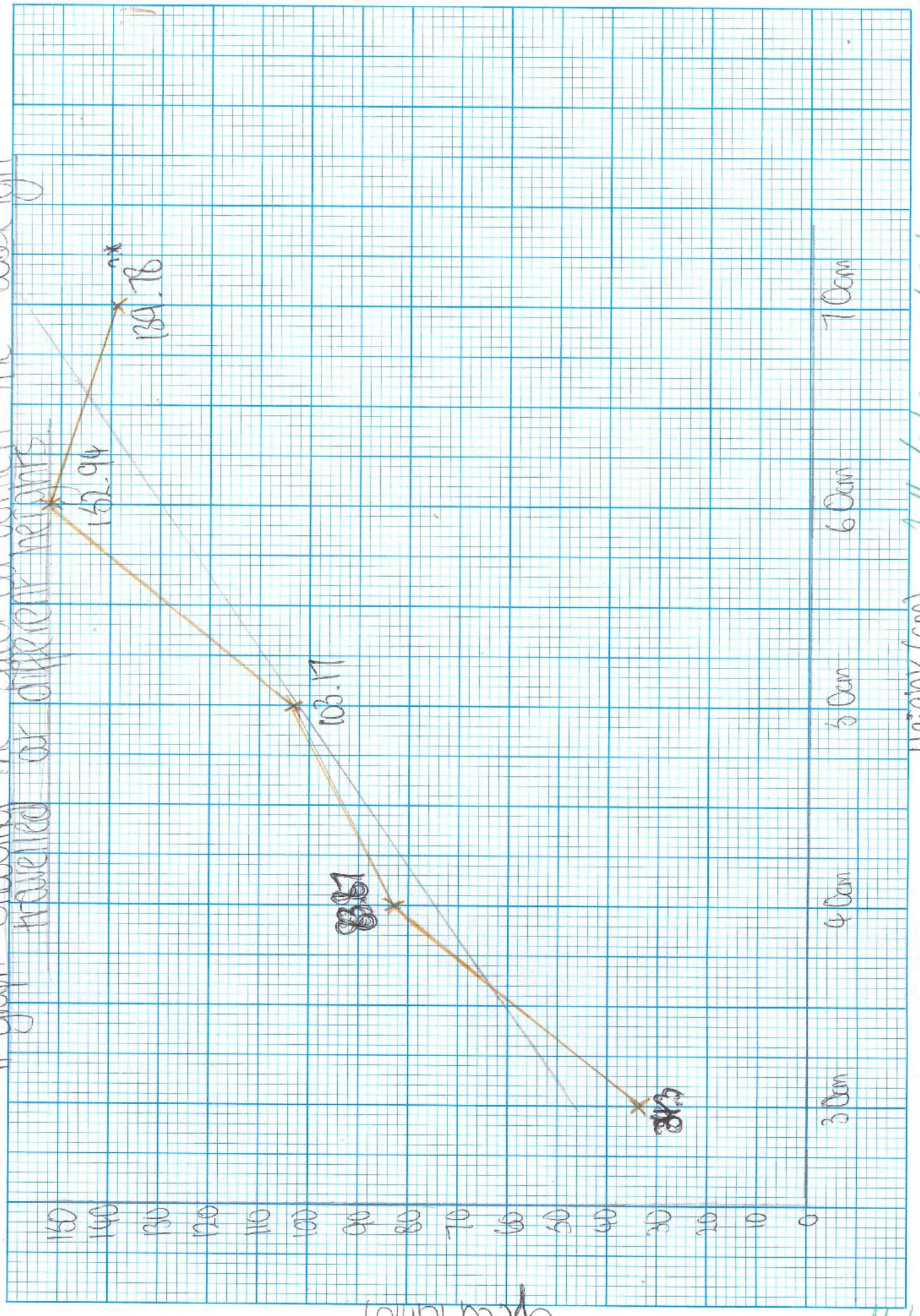
(I have not changed my method)

Line Graph



However I could consider ~~changing~~ adding points on ensuring you follow your fair test, and using data to create a line graph.

A graph showing the speed at which the bobbin travelled at different heights.



Need a full heading!

Full heading needed!

at what bobbin height travels.

Conclusion

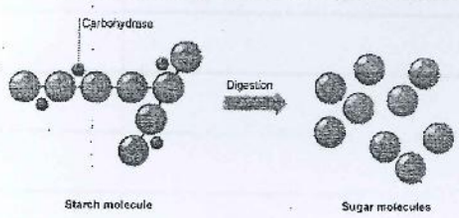
To conclude this investigation I have found out that increasing the height of the ramp makes the skateboard travel at a faster speed my results show than increasing the ramp from 30-60cm makes the skateboard travel at a higher rate of speed. This is because increasing the height creates more potential energy and this means that the ~~energy~~ converted into kinetic energy will be greater therefore ~~making~~ the skateboard travels faster. At 30cm the speed is 343 cm/s at 40cm it is 83.87 cm/s, at 50cm it is 103.1 and at 60cm it is 152.94 cm/s. This shows a definite increase in speed meaning an increase in both potential and kinetic energy. whilst these results are accurate for the laws of science the speed at 40cm is incorrectly different instead of it being higher than the previous speed it was lower this means that an error was made during the experiment. It could be that it was marked for 40cm instead of 60cm or an error was made with recording the time or calculating the speed. My results therefore are not consistent. To ensure they are consistent and repeatable I need to ensure that I measure all results as accur

or 139.78 cm/s

arely as possible and measurements are accurately observed by all members of the group. I think that an error had been made during the practical and the speed increased as the height increased for each reading then the results would've been correct and repeatable had we've done the experiment again.

I believe I achieved a level 7 as I have made a detailed prediction and referred to things such as kinetic theory.

Year 9 Science Assessed Task – Planning and Developing Skills



Background

*You have been set a scientific investigation. An enzyme responsible for the digestion of starch (a carbohydrate) molecules in the body is known as **amylase** (a carbohydrase enzyme). You need to plan, carry out and write up an investigation to determine how temperature affects how well this enzyme works.*

Level	5	6	7	8+ *(EP)*
Success Criteria	Explain what needs to be done to be successful	Justify/explain in detail what needs to be done to be successful.		
Find evidence, information and ideas	Research specific information from a variety of sources and select from this, information that will help you with the task.	Carry out detailed research on a topic from different sources, stating the sources used.		
Predictions	Make a prediction and explain it giving a simple explanation of a scientific idea linking temperature with time taken for the starch to be digested	Make a prediction and explain it giving a detailed explanation of a scientific idea including kinetic energy, collisions between the enzyme and substrate	Make a prediction and explain it using more than one scientific idea or knowledge and understanding gained from a variety of sources e.g. kinetic theory, enzyme/substrate complexes, enzyme denaturing	Make a quantitative prediction e.g. when the temperature doubles where appropriate, using detailed scientific knowledge of abstract ideas. e.g. kinetic theory, enzyme/substrate complexes, enzyme denaturing. *Multiple links between scientific models*
Method	Plan your experiment in detail.	Plan your experiment suggesting different ways of carrying out the investigation.	Plan your experiment on your own and explain why you are using the method in your plan	Justify your methods taking into account the reliability of the results you will gather and the accuracy of the equipment you will use. Identify any possible problems with my method. *Multiple links between scientific models, theories and systems*
Fair Testing	Identify independent variables and dependent variables and those that need to be kept the same.	Plan how to control the variables that need to be kept the same. State the range and values of the independent variable.	Identify variables that may not be easily controlled and explain why this is so.	
Communicate findings	Draw a results table which includes headings and units Plot a line graph	Draw a results table which will include headings, units and repeat readings and speed calculations Draw a line graph using appropriate axes and scales to show the results effectively	Include line or curve of best fit on the graph	
Explaining and concluding	Describe the relationship between the variables. Discuss if the results are repeatable. Explain the results using correct scientific ideas	Describe the numerical relationship between the variables. Discuss if the results are repeatable. Explain the results using detailed and correct scientific ideas	Explain the results using detailed and correct scientific ideas and link to enzyme kinetics Correctly discuss if the results are repeatable(compare repeats) and reproducible (compare with other groups)	Explain in detail whether your results agree with your initial ideas e.g. particle theory, enzyme kinetics, lock and key hypothesis *Use complex abstract ideas or combinatio0ns of models to explain your results*
Literacy	Use a wide range of technical terms, language and expression consistent with the subject content Write simple, compound and complex sentences with grammatical accuracy in their writing Use a variety of strategies and resources to spell familiar and unfamiliar vocabulary and science specific words correctly			
Numeracy	Construct and interpret graphs and diagrams Examine results critically, select and justify choice of statistics, recognising the limitations of any assumptions and their effect on the conclusions drawn			

Success Criteria

For my prediction:

- Consider multiple ideas and possibilities in order to widen my view.
- Justify views with correct scientific facts and information.
- Show knowledge of kinetic theory, enzyme denaturing and enzyme/substrate complexes in order to show understanding.
- Make links between scientific models to show how different factors affect eachother.

For my method:

- Write my method with step-by-step instructions so that it is easy to follow.
- Make simple and specific points so that my method is understandable.
- Plan my experiment in detail and justify my methods to achieve a higher level.
- Take reliability of the results in to account and make logical decisions on a method to ensure it is accurate.
- Ensure I change the temperatures to collect different results and find evidence of change.
- Include units of measurement, again, to make my method easy to follow.

For my fair testing:

- Indentify an independent variable and explain why it has been chosen to display knowl-

ledge.
- Identify a dependent variable and justify the reason why I have chosen it to show understanding.
- Include units in the dependent variable to make it clear what I am measuring.
- Identify controlled variables in order to show how I will keep my experiment as accurate as possible.
- State how I will control the variables I need to keep the same with explanations.
- Ensure I state the range and values of my independent variable so it is evident how I will change the factor.
- Identify and explain why some variables may be difficult to control to show factors that may affect the reliability of the experiment.

My results table and graph:

- Include headings and units to make it evident what the data is showing.
- Include repeat readings in my table to achieve more accurate results.
- Use appropriate graphs and scales to show my results effectively.
- Include a line/curve of best fit on the graph.
- Plot a line graph.
- Include speed calculations (time / d) in my data. (results & table / line graph)

Explaining and concluding:

- Describe the numerical relationship between the

variables to show whether or not there is a trend in the data.
- Explain the results using detailed and correct scientific ideas and terminology to show knowledge and understanding.
- Correctly discuss if the results are repeatable by comparing repeats to show this.
- Correctly discuss if the results are reproducible by comparing my results with other groups to show this. great!

Prediction → Can you state your source from the research? # BBC Bitesize

I predict that increasing the temperature of the mixture (amylase and starch) up to a certain point will increase the rate of reaction therefore making the speed of the reaction faster. As amylase is a digestive enzyme it functions in the human body and is found in saliva. It is needed to catalyse carbohydrates such as starch. After being catalysed by amalyse, starch becomes the product of maltose, which is a sugar. When the starch is fully catalysed, the iodine should appear brown. When starch is still present the iodine should appear a black / dark blue. Considering the information, I predict that the amylase will catalyse the starch fastest at 37 °C because this is the human body temperature. At 37°C I believe the amylase will have the most kinetic energy as it is the optimum temperature. Furthermore, I belie

good

great

ve that the reaction will be slower after the optimum temperature because as *2 the amylase would gradually lose shape become denatured. This would mean that the active sites of the amylase enzymes would lose shape, stopping the substrate (starch) being catalysed as it wouldn't fit. When the amylase enzymes are denatured, the iodine wouldn't appear brown as the starch would still be present.

*2 the temperature increases, the more energy the molecules have

Fantastic Prediction!

Method

- equipment

SC

1) Firstly, collect your equipment together: 2 test tubes, a dimple tray, iodine, starch, amylase, a timer / stopwatch, a pipette, 3 beakers, 2 measuring cylinders, a thermometer, a kettle, a (power) source, a water source.

Part 1)

2) Fill the kettle with water from your water source. (Fill at least 1/2 of the kettle)
3) Plug the kettle into the power source and boil the water until finished.
4) Pour the water into one of the beakers filling it about halfway.
5) Measure the temperature of the water in the beaker using the thermometer.
6) You will now need to refer to your allocated temperature e.g. 50°C *
7) If the temperature reading of the water is too high, slowly add cold water and let the temperature adjust

until it is correct. If the temperature is too low, add more hot water to the beaker. (you may need to reheat the kettle water if the temperature is not increasing)

* Preferably the first two stages of the method should be done at the same time to increase accuracy and reliability. (multiple people) * good.

Part 2)

1) Measure 5cm^3 of amylase and starch with two seperate measuring cylinders.
2) Hold a test tube and pour both the starch and amylase into the test tube. (NOT into THE MEASURING CYLINERS)
3) Place this test tube into the beaker with the water (with allocated temperature) so it is 'bathing'.

* Please note the water should not be touching the amylase/starch mixture, it should be surrounding the test tube containing the mixture *

Part 3) START THE STOPWATCH / TIMER

Before mixing the amylase and starch, the * dimple tray should have two drops of * iodine in each dimple.

---

1) Every 30 seconds take the pipette and add two drops of the amylase / starch mixture to one dimple.

2) CLEAR THE PIPETTE.

* Ensure you are monitoring the colour of the mixture in each dimple, you are waiting for a brown colour. *

3) Once adding drops of the amylase/ starch mixture to the dimple will makes the colour of the mixture brown, starch is no longer present.

4) STOP the timer and note the time in your results table. (rest 1)

Now empty and wash all equipment excluding the seperate two beakers holding the amylase and starch.

REPEAT this process TWICE more so that you have three times.

If you wanted to you could do this for each temperature, (10°C, 20°C, 35°C etc) - state required temps :-> # 20°C, 35°C, 40°C, 50°C, 60°C
Otherwise, allocate other groups with other temperatures as this would save time.

To ensure results are reliable, try to make

sure groups have individual roles such as using the pipette, mixing the starch and amylase and heating the water.

Consider the temperature of the environment and how this may affect the ~~reading~~ ~~collected~~ water temperature e.g. hot environment, allow for water temperature to increase. ✓ This may be difficult ✓ to control.

I am using this method as the steps are helpful and believe that clear. Furthermore, I believe that the method would provide reliable results as the steps are specific. good.

Fair Testing

My independent variable is the temperature of the water in °C. ✓ This is changed to see how it affects enzyme activity.

My dependent variable is the time the amylase takes to catalyse the starch. ✓ Measuring the time will allow me to see whether temperature affects amylase activity and to highlight other trends such as ~~the affect~~ enzyme denaturing.

My controlled variables are:

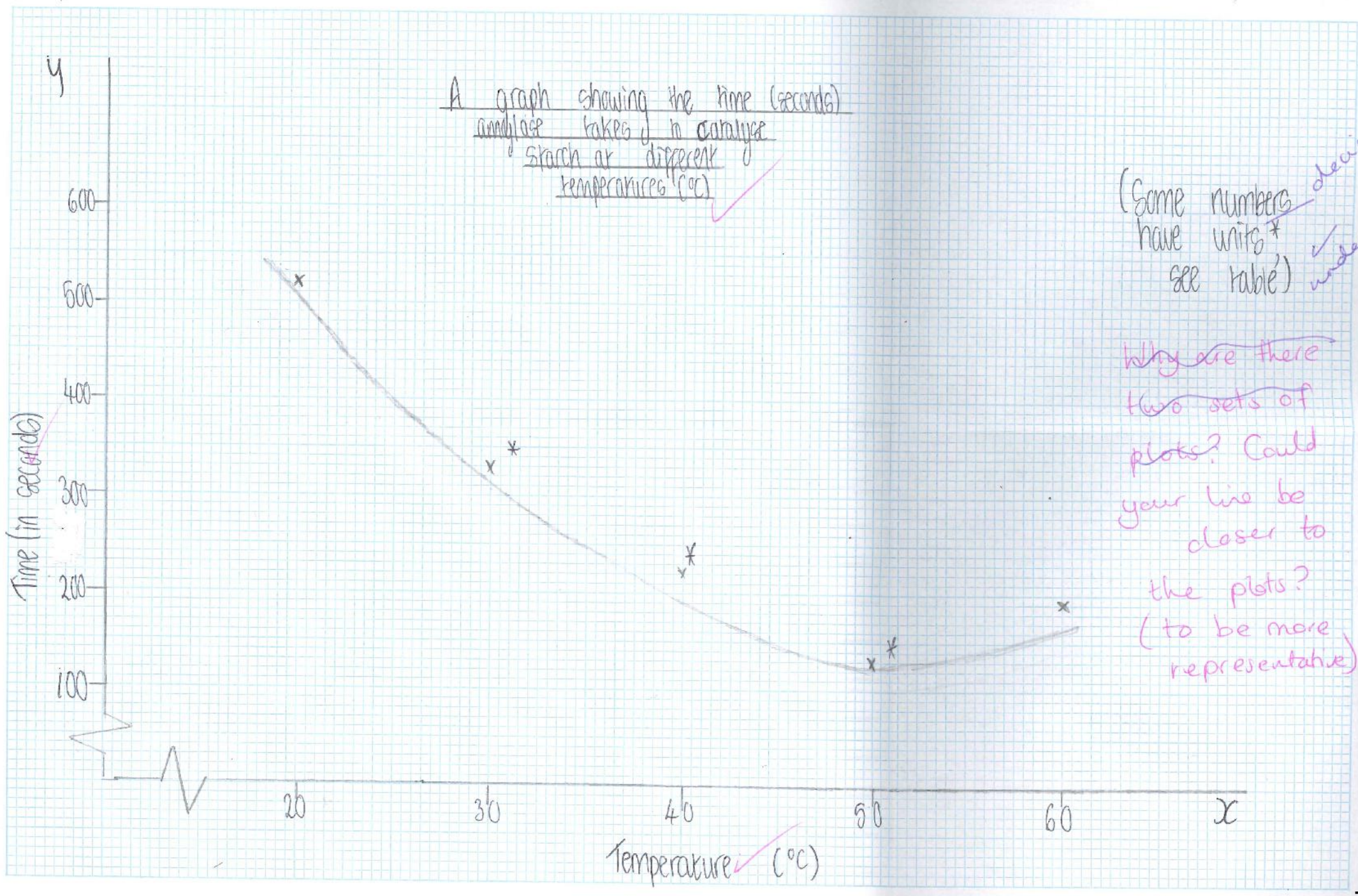
- The ~~amount~~ volume of starch and amylase ($5cm^3$) so that ✓ the experiment is ~~reliable~~. correct
- The equipment used such as the pipette and beakers so that my results are all valid.
- The roles of individuals (e.g. timer) so that my results are not ✓ biased. ✓

Communicating findings

Great!

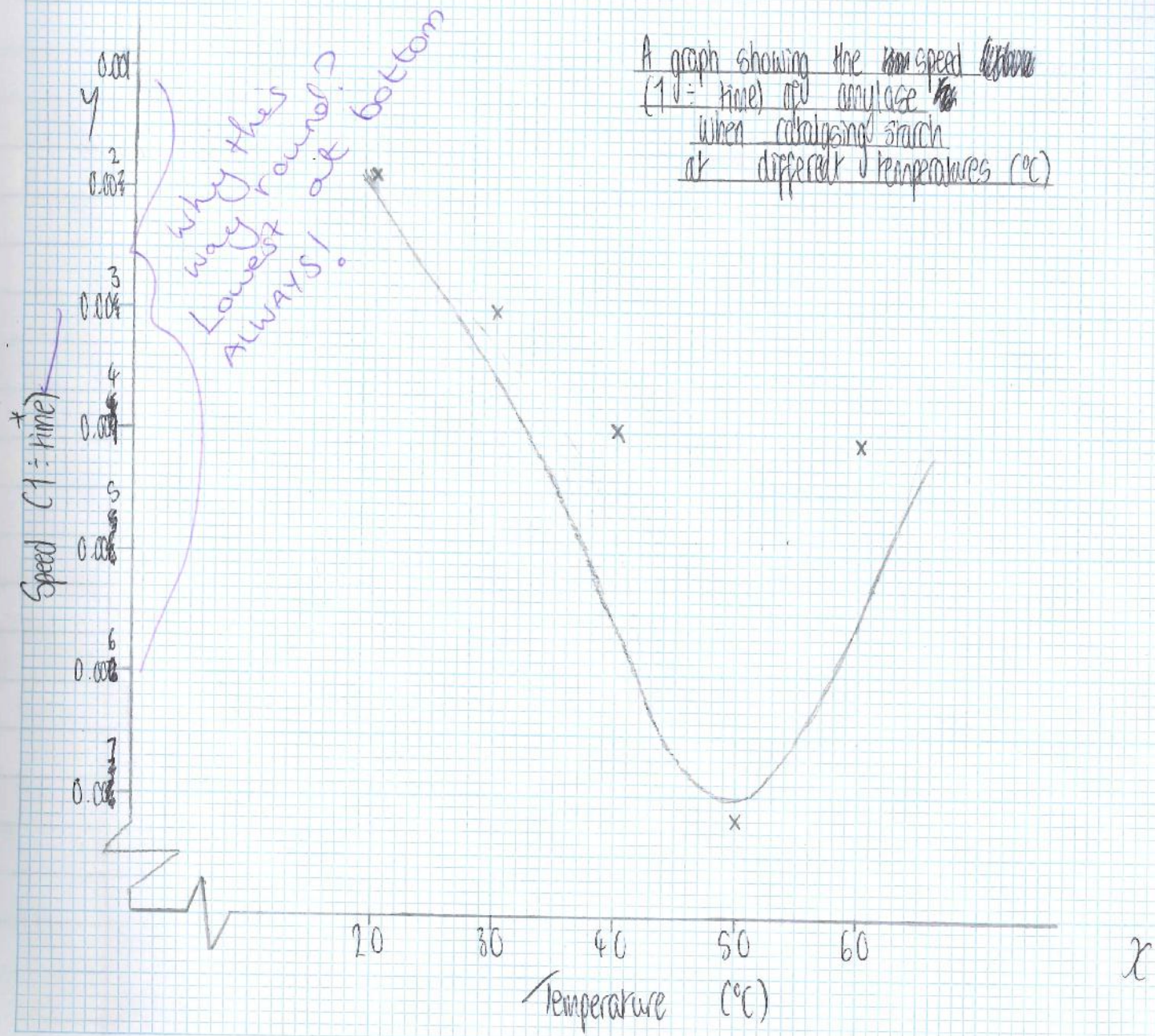
Results Table:

Temperature (°C) of the water	Time (in seconds) for amylase to catalyse the starch.			
	1	2	3	Average
20	540	540	480	520
30	333	330	330	331
40	240	210	225	225
50	150	120	140	137 (3 sf)
60	180	300	240	240



(Some numbers have units * see table) ✓ decimals! ✓ understood!

~~Why are there two sets of plots?~~ Could your line be closer to the plots? (to be more representative)


A graph showing the speed (1 ÷ time) of amylase when catalysing starch at different temperatures (°C)
why this way round? Lowest at bottom ALWAYS!
Speed (1 ÷ time)*
y
0.001
2
0.002
3
0.003
4
0.004
5
0.005
6
0.006
7
0.007
20
30
40
50
60
Temperature (°C)
x

* in seconds

Conclusion

To conclude, the results show that increasing the temperature to a certain point (50°C) increases the speed at which amylase catalyses the starch. Therefore, 50°C appears to have been the optimum temperature. After 50°C, the speed decreasing meaning that the reaction took longer. an average of

At 20°C, the amalyse took 520 seconds to catalyse the starch which is the longest time of all the results. This took the longest as the amylase enzymes had little kinetic energy meaning that there were few collisions with the starch molecules.

amylase

At 50°C, the enzymes had the most kinetic energy meaning that there were lots of collisions with the starch molecules. maltose products were created faster.

When the temperature increased up to 60°C, the amylase lost kinetic energy so the rate of reaction decreased meaning that the enzymes took longer to catalyse the starch molecules into maltose products.

Shortly after this temperature, the enzymes would have lost shape becoming denatured. At this point the

active sites of the amylase enzymes would have lost shape. This would mean that the starch molecules could not have binded to the active site of the enzymes and the product would not have been formed.

My results somewhat agree with my initial ideas as I predicted that the speed of the reaction would increase up to the optimum temperature, and decrease afterwards. I also stated that after the optimum temperature, the enzyme would loose shape becoming denatured.

However, the results do not agree with my hypothesis as I believed the optimum temperature would be 37°C (human body temperature) when infact, in this experiment it appeared to be 60°C.

good

Therefore, I believe the initial theory was correct and thus the results from this experiment are less valid. This leads me to believe that some experimental sections were carried our unreliably affecting the results. I also believe that some groups did not maintain some of the controlled variables.

The results appear to be, on the whole, quite repeatable as most readings were quite close, excluding the readings at 60°C where the difference was 120 seconds.

If the experiment was carried out with more accuracy, the results would have been more repeatable. good.

I also believe that the results are quite reproducible as they are not hugely unreliable and these results are valid in the sense that the time decreases up to a certain temperature before increasing after. (after optimum)

Steffan, this task is great. Could you use the improvement time to work out the rate of reaction. + plot a graph?

Science Assessed Task – Y9 Chemistry – Developing Skills

To complete this task you will need to use your knowledge on the action of antacid tablets on stomach acid.



Record the following information into an appropriate table, draw a graph to display the findings and explain which antacid tablet was the most effective. Consider if the data is biased, how reliable it is and how valid the data is.

In the experiment pupils noted the calcium carbonate content of 6 different antacid tablets. They then added one of each type of the tablets to 20 cm^3 of hydrochloric acid and using an indicator they timed how long each one took to neutralise the acid. They repeated the experiment for each tablet. Their results were as follows:

Calcium carbonate contents:	Acid –Away=100mg; Alkalife= 400mg; Fizzease=50mg; Heart-cool= 800mg; Staciscon= 600mg; Neutratime= 200mg.
Results for each tablet:	Acid-Away: 56s; Alkalife: 13s; Fizzease: 75s; Heart-cool: 4s; Staciscon: 8s; Neutatime: 37s.
Repeat 2:	Acid-Away: 60s; Alkalife: 23s; Fizzease: 83s; Heart-cool: 6s; Staciscon: 16s; Neutratime: 39s.

Level	4	5	6	7	
Recording Results	Draw a results table to record the data in.	Draw a results table including headings and units to record the data in.	Draw a results table which includes headings units and repeat readings. Communicate the findings in a way fit for purpose.	.	
Displaying Results as a graph	Display results as a bar chart or line graph using axes and scales given to you by your teacher.	Draw an appropriate graph or chart for the data being displayed.	Draw an appropriate graph using appropriate axes and scales to show the data effectively.	Draw lines of best fit (straight line or curve as appropriate) on a line graph.	
Explaining	Identify patterns and trends in the results. Explain these using scientific words.	Use your scientific knowledge of neutralisation to begin to explain what the findings show you.	Use your scientific knowledge of neutralisation to explain in detail what the findings show. Identify why the pattern/trend occurred.	Use your scientific knowledge of neutralisation to explain in detail what the findings show. Explain using scientific ideas why the pattern/trend occurred.	**Level 8:** Explain using scientific ideas why the pattern/ trend occurred. Explain how this affected the neutralisation taking place.
Bias and reliability	Comment on whether the data has been presented in a biased way.	Start to consider whether the evidence is reliable.	Describe in detail if the findings are reliable.	Begin to evaluate the evidence in order to gauge reliability and validity.	**Level 8:** Confidently evaluate the evidence in order to gauge reliability and validity.
Literacy – Reading/ writing	*Response and analysis* – Synthesise and analyse information effectively. *Organising ideas* – Select, interpret and evaluate information objectively. *Language* – Use technical terms, language and expression consistent with the subject and content.				

Pupil Assessment

I have assessed my work as level ....7a because ..... I have included a curved line of best fit on my graph and I have used my scientific knowledge to explain neutralisation in detail. I have also evaluated evidence beginning to gauge reliability and validity.

To move to the next level, I need to ....

Teacher Assessment – Level awarded for this task - 7a

Comments – Science Well done Steffan, an excellent piece of work. To gain the L8 in 'bias and reliability' it would be good to see both sides of the argument (for + against how good the experiment was.)

Comments – Literacy

Well written with good use of Science terms.

Proof-reading clearly improved your work - well done!

Target Setting – use the assessment information to help you to set targets

Science target –

Literacy target –

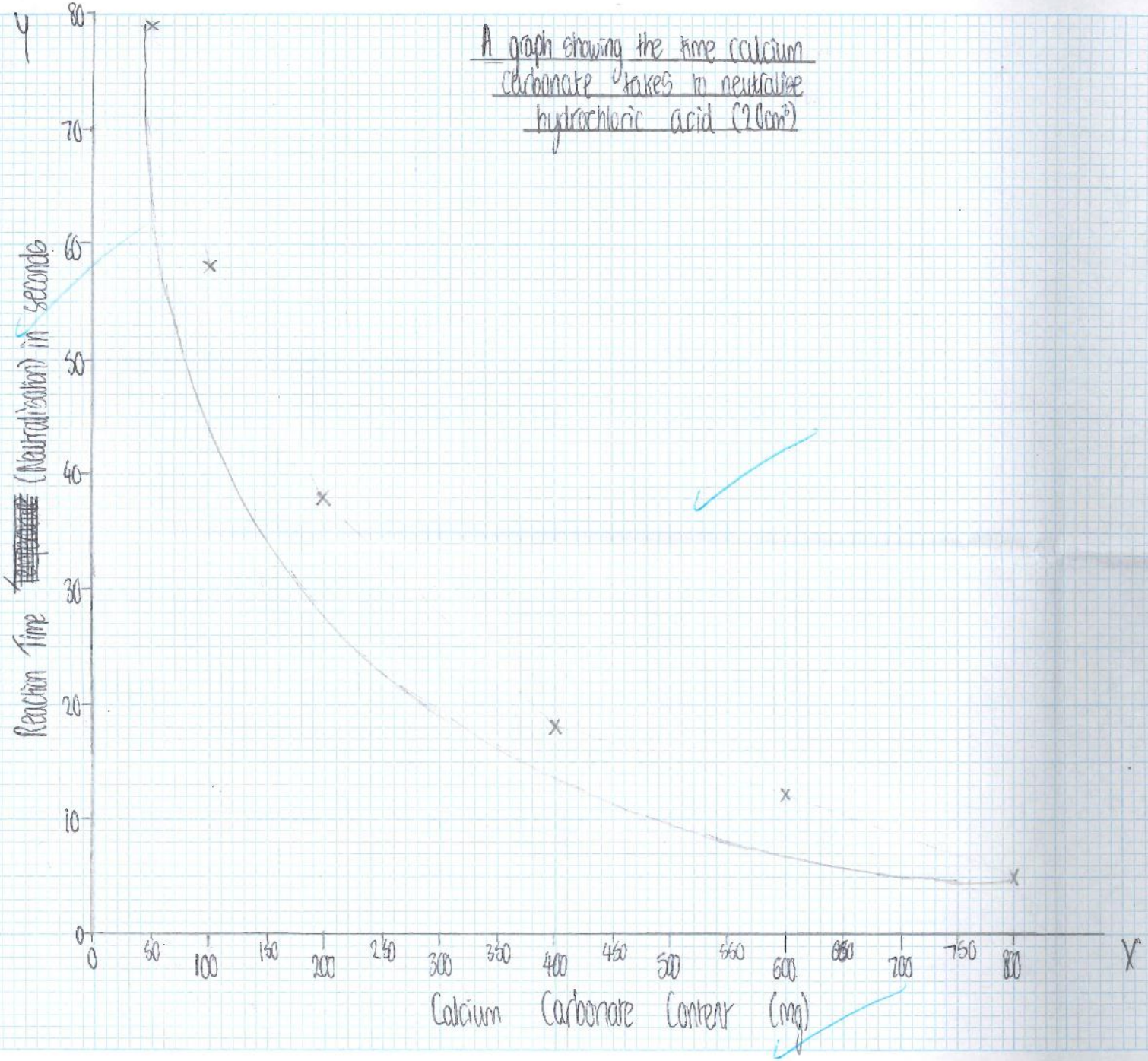
23/01/15 Assessed Task - 4g Chemistry - Developing Skills

Recording Results

*¹ (Antacid)

Tablet*¹ and calcium carbonate content (mg)	Reaction time (neutralisation)*² in seconds		
	1	2	Average
Acid - Away (100)	56	60	58
Alkalife (400)	13	23	18
Fizzease (50)	75	83	79
Heart - Cool (800)	4	6	5
Stacisan (600)	8	16	12
Neutralime (200)	37	39	38

*² with 20cm³ of hydrochloric acid.



Displaying Results as a graph

Does your line of best fit accurately line up with your points?

The curve is good.

Explaining (H+ = hydrogen ions)

The results show that increasing the calcium carbonate content (mg) increases the rate of neutralisation (time). This ~~matches~~ the theory that increasing the amount of ~~alkali~~ ~~that~~ is added to an acid makes ~~neutralisation~~ faster. Neutralisation is the reaction between an acid and a base where the number of H+ and OH- ions equalise. This makes the solution neutral which is pH 7. The purpose of the antacid tablets is to neutralise excessive hydrochloric acid in the stomach which relieves pains such as indigestion. Calcium carbonate is a base which neutralises hydrochloric acid. If it is mixed with the acid. The content of calcium carbonate in the tablet is high there is a high concentration which means that there are lots of OH- ions present in the tablet. If there are more OH- ions, the reaction of neutralisation is faster as they react with the H+ ions quicker (higher quantity) making the pH raise.

When there was 400mg of calcium carbonate, the reaction took 79 seconds where as when there was 800mg, the reaction took only 5 seconds. ~~When~~ ~~there~~ ~~was~~ ~~reaction~~ ~~took~~ ~~seconds~~ ~~This~~ ~~shows~~ ~~that~~ ~~more~~ ~~matches~~ ~~the~~ ~~idea~~ ~~of~~ ~~faster~~ ~~OH~~ ~~ions~~ ~~added~~ ~~increasing~~ ~~the~~ ~~rate~~ ~~of~~ ~~neutralisation~~ ~~when~~ ~~added~~ ~~to~~ ~~hydrochloric~~ ~~acid~~ ~~with~~ ~~H+~~ ~~ions~~.

*2 Acids like hydrochloric acid have H+ ions.

*3 Adding the calcium carbonate to hydrochloric acid increases the pH.

P.T.O

When 50mg of calcium carbonate was added to the hydrochloric acid, there were few OH^- ions so this meant that the mixture took longest to neutralise as there were lots of H^+ ions that were highly concentrated. This meant that the pH took longer to rise.

In contrast, when 800mg of calcium carbonate was added to the hydrochloric acid, there were lots of OH^- ions which meant that the mixture was fastest to neutralise as the quantity of ions was more equal making the pH quicker to rise.

Therefore, the trend of the reaction was a curve as when the calcium carbonate content increased, the rate of reaction increased making the mixture neutralise faster.

The word equation for this neutralisation reaction is:

Hydrochloric acid + calcium carbonate → Calcium chloride + water + carbon dioxide

neutral

good. Proof Read

Bias and reliability:

I believe that some of the results in this experiment are ~~unreliable~~ as the pattern seems slightly incorrect around the higher quantities of accurate calcium carbonate.

* unreliable

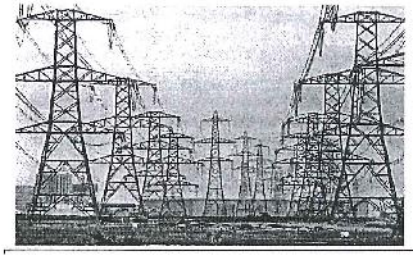
The results from 400mg to 800mg seem to be within a very close time frame (18 - 5 seconds) where as results from 50mg to 400mg are within a larger time frame (79 - 18 seconds). unreliable

This appears unreliable as there should be more equal differences in reaction time. When 50mg took 79 seconds, 100mg of calcium carbonate took 58 seconds which is a large difference (21 seconds) when there is only 50mg more calcium carbonate content.
→ It is double the concentration?

In contrast, 400mg of calcium carbonate took 18 seconds while 600mg took 12 seconds to neutralise the hydrochloric acid showing that there do not appear to be smaller differences.

The first two results therefore do not appear to be very valid as the time difference between larger quantities of calcium carbonate is smaller than that of smaller quantities of calcium carbonate.
i'm not sure are valid

Furthermore, the results as the tablets could contain other components which help to relieve pain which for comfort, is important. Many leading brands



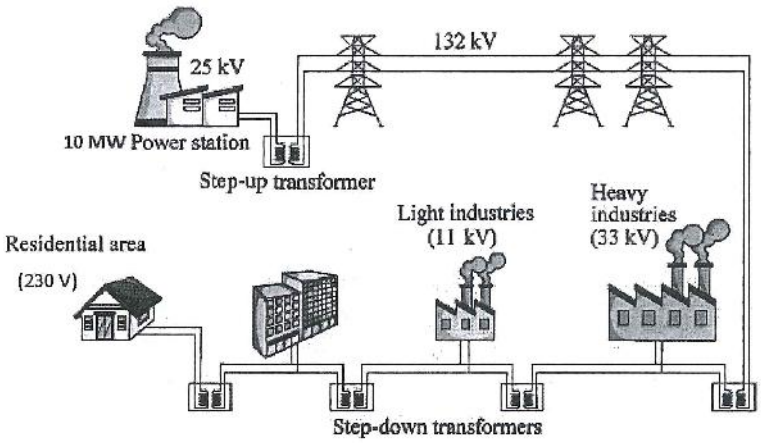
Physics Assessed Task – The National Grid –Developing & Reflecting Skills

Background - The National Grid is the system of pylons and cables that link power stations with users of electricity. In this task you are going to describe why we have a National Grid and give detail about how it works. Your teacher will give you a diagram to stick into your book to help you.

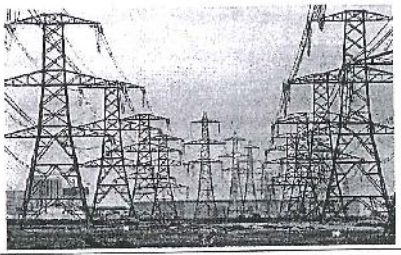
Describe the job of the National Grid.
Explain how the National Grid does this job.
Explain why step-up and step-down transformers are used in the National Grid.
Calculate the current in the wires at the power station and the current in the wires in the grid where the voltage is [redacted] *132 kV*

The National Grid

Note: 1 KV = 1000 V, 1 MW = 1 x 10^6 W



- *Describe the job of the National Grid.*
- *Explain how the National Grid does this job.*
- *Explain why step-up and step-down transformers are used in the National Grid.*
- *Calculate the current in the wires at the power station and the current in the wires in the grid where the voltage is 132 kV.*



Physics Assessed Task – The National Grid –Developing & Reflecting Skills

Background - The National Grid is the system of pylons and cables that link power stations with users of electricity. In this task you are going to describe why we have a National Grid and give detail about how it works. Your teacher will give you a diagram to stick into your book to help you.

Describe the job of the National Grid.
Explain how the National Grid does this job.
Explain why step-up and step-down transformers are used in the National Grid.
Calculate the current in the wires at the power station and the current in the wires in the grid where the voltage is ~~[illegible]~~ 132 kV

Level	5	6	7	8
Explaining	Use scientific knowledge to explain the job of the national grid and what transformers do.	Use detailed scientific knowledge to explain what transformers do linking to energy transfer.	Use detailed scientific knowledge to explain what transformers do linking current to energy transfer and efficiency of transmission. ✓	Use detailed scientific knowledge to explain what transformers do linking current to energy transfer and efficiency of transmission. ✓
Communicate findings	Attempt to use P = IV with some evidence of correct selection of values	Attempt to use P = IV with correct substitution.	Use of the formulae P = IV with correct algebra and units. ✓	Use of the formulae P = IV with correct transformations of units, correct algebra and link the answers obtained to transmission efficiency.
Link learning	Link learning to dissimilar but familiar situations such as another example where electricity is transmitted from generator to user.	Link learning to unfamiliar situations, e.g. link to the distance the electricity has to travel in the Grid.	Link learning to abstract situations, e.g. link to the resistance of the wires.	Make further predictions about the learning, e.g. suggest advantages and disadvantages of using thicker wires in the grid. N/A
Literacy	*Structure and organisation* Select, analyse and present ideas and information convincingly *Writing accurately* Use technical terms, language and expression consistent with the subject content			

Pupil Assessment
I have assessed my work as level [7a] because ..... I have given detailed descriptions on the National Grid.
To move to the next level, I need to ....

Teacher Assessment – Level awarded for this task - [8-]

Comments – Science Excellent work!
* You have clearly described the job of the National Grid + have correctly completed both calculations.

Comments – Literacy
→ Link the calculations to transmission efficiency.

Target Setting – use the assessment information to help you to set targets

Science target –

Literacy target –

The National Grid is the United Kingdom's network of electricity. Power stations are connected to sub-stations, transformers and homes / businesses with cables carried by pylons or underground tunnels. The National Grid ensures homes / businesses / schools have a supply of electricity and this makes the role of the National Grid very important.

Should there be a breakdown, a surge, or a problem, the National Grid must respond.

Power stations produce a voltage of approximately 25,000 V which is increased to meet demand with step-up transformers.

Step-up transformers increase the voltage to anywhere between 132,000 V and 400,000 V. When the ~~current~~ voltage is increased however, the current decreases.

As the electricity travels through the ~~wires~~ pylons with a low current (and a high voltage) there ~~is~~ ~~of~~ ~~charge~~ ~~flowing~~ is less heat (energy) lost through the wires as the ~~it~~ electricity is travelling slower. This makes the transportation through the pylons more efficient. The outer layers of mains cables often use ~~the~~ flexible, insulating materials such as plastic to reduce heat loss also. (with inner layers made from materials like copper - good conductors)

When the pylons reach businesses and areas where electricity is needed (e.g. town),

step - down transformers reduce the voltage to make it safer for people to use.

The decrease in voltage, means that the current increases. This means that the electricity flows to where it is needed quickly.

To reduce the risk of electric shocks, plugs and fuse systems are installed in homes / businesses where people are living and working.

The National Grid is constantly monitoring the frequency indicators to ensure the reading is as close to 50 hertz as possible.

In the event of a break-down power will have to be diverted or other sources may have to be used.

Hydro - electric power plants such as the one in Dinorwig are on-hand to provide much-needed electricity quickly. They use pumped-storage.

In the evening, water is pumped from a lower up to a higher - reservoir using cheap electricity (to ensure it is efficient). To generate electricity, water is released after building up potential - energy from the upper reservoir.

(cont.)

Gravitational energy sends the water down a slope and the water flows thr-

rough and consequently rotates turbines. The kinetic energy from the drives the turbines a generator and produces lots of electrical energy. This can be used to ensure everyone is supplied with electricity, even when there is high demand.

Another option is oversea links, for example France. The National Grid can ask if they are able to provide any electricity to ensure enough is available in the United Kingdom.

Other issues that can occur are electrical surges. These occur when there is more demand than there is electricity. The National Grid are monitoring availibality and demand and they have to predict when surges may occur.

Examples of possible surges are the end of popular programmes such as EastEnders or in the mornings during breakfast.

To prevent surges, the National Grid use sources such as those stated previously. (hydro-electric, over sea links)

Not only do the National Grid have to ensure there is enough available electricity, they have to ensure the future is sustainable with more renewable sources and designs such as the new pylons ->

a) Power Station:

Steffan Hobbes

P ÷ V = I

Power ÷ Voltage = Current

= Current in the wires.
= 400 Amps (amperes)

Power = 10 MW
Voltage = 25 kV

(1 kV = 1000 V

25 x 1000 = 25,000 V)

(1 MW = 1 x 10^6 W

OR

10 MW = 10 x 10^6 W
10 MW = 10,000,000 W)

△

1-10

10^6 $10^{6+1} = 10^7$ 1×10^7 = 10,000,000

with Standard form *

P ÷ V = I

$$\frac{10,000,000\ W}{25,000\ V} = 400\ A \text{ (amps)}$$

b) Wires in grid where voltage is 132 kV:

(1 kV = 1000V

132 kV = 132,000 V)

△ 10,000,000 W

$$\frac{10,000,000\ W}{132,000\ V} = 76\ A\ (amps)$$ (2 sf)

↑

Less than the power station as higher voltage = lower current (after step-up transformer)

Science KS3 Core Task Tracker

Year 8

Name : Steffan ..... Target KS3 Level 7

Core Task Title	Main Skill Area	Teacher assessed level
Bodyworks - Euglena	*Developing*	6-
Bodyworks – Pulse rate	*Developing & Reflecting*	5+
Life in the Stars – Astronaut Diary	*Planning, Developing & Reflecting*	6+
Life in the Stars – Rocket Investigation	*Developing and Reflecting*	7-
Science of Sound - Hearing	*Developing*	7-
Science of Sound - Circuits	*Developing*	6
Science of Motion - Car Design	*Planning, Developing & Reflecting*	7-
Science of Motion - ~~Rollercoaster~~ Bobsleigh	*Planning & Developing*	6+
Science & the World ***ASDAN investigation***	*Outline your investigation in the space below* Compare the health care/ other problem in a developing and developed country. (Air Pollution - China / India)	
End of Year 8 Level from core tasks		
End of Year 8 written assessment result		

Level 6: Learner profile

The materials in this folder consist of a learner profile which is judged to show the characteristics of a learner's standards of attainment which, overall, are at level 6. The commentary should enable the reader to see why the learner profile has been given a best-fit level 6.

The level of detail exemplified here in the commentary is intended to give a good sense of how a best-fit level can be fully justified, in the case of learner profiles. For in-school awarding of best-fit levels at the end of a key stage and in-school moderation, it is still necessary for the teacher to justify that the range of work required is covered and the appropriate standard reached to award a best-fit level. How this is demonstrated is for each school to determine.

A learner profile will typically contain the work of one pupil from across the range of the subject and provide sufficient evidence to enable a judgement to be made on the level which best fits the standard represented in the profile. A learner profile should be as straightforward as the pupil's book or books which show evidence of the characteristics of levels and relevant attainment target(s). Other work which would give the complete picture of a pupil's standards might include a theme/topic book, audio visual recordings, reading record. A commentary on the learner profile will make clear how, on balance, the best fit judgement has been reached and why it is not at the level above or below if it is borderline. The commentary will signpost where the evidence of achievement at a particular level can be seen in the exercise book or other original material produced in the year.

Science: Learner profile

Level 6

This evidence is drawn from eleven tasks that are contained within the learner's science book. Mostly they have been selected from 'How things work' although work from across a wider range would have been preferable. Ideally the whole topic book would be made available as evidence at a moderation or verification event.

Comment *(all comments reflect attainment at level 6 unless indicated otherwise)*	**Source**	**Reference**
Planning The pupil conducted a class survey and researched cell organelle features, then used the evidence in their presentation, which is characteristic of level 5 performance when finding evidence and information. Developing The pupil has drawn a conclusion which is consistent with the evidence he gathered and considered the opinions of others which has helped shape the conclusion. This evidence is characteristic of level 6 when drawing conclusions and making decisions. In the same piece of work, the pupil used simple models and scientific language to explain his findings. This is characteristic of level 5 performance when explaining.	Task 1 Is Euglena a plant or an animal?	pp 1-4
Planning The plan covered all steps necessary to allow data to be collected. This is characteristic of performance at level 5 when planning methods and strategies. Developing The pupil used a stopwatch to record the time for each activity. This provides some evidence that is characteristic of level 5 performance when observing and measuring. In the same piece of work, the pupil presented results as a table and a graph. The table includes appropriate headings and some SI units such as minutes for time (bpm should be recorded as beats/min). The type of graph selected is appropriate to the data collected, the axis and scale allowed findings to be clearly displayed but the x axis is incorrectly labelled. Overall, this is characteristic of level 5 when communicating findings although some calculations and use of conceptual ideas indicate some movement towards a higher level. Reflecting The pupil began to evaluate how successfully the investigation	Task 2 Heart rate investigation (Developing and reflecting skills)	pp 5-10

was completed, which is characteristic of level 5 when reviewing success.		
Planning The pupil has selected and justified the use of the success criteria needed to evaluate his work. This is characteristic of performance at level 5 when determining success criteria. Developing There is evidence that the pupil used scientific knowledge and understanding, including abstract ideas, to explain what life in space might be like. This is characteristic of level 6 when explaining. Reflecting The pupil has reviewed how successfully the task has been completed. This is characteristic of performance at level 5 when reviewing success. Also in this piece of work the pupil has identified the learning strategies that were used in the completion of the task which is characteristic of level 6 when evaluating learning.	Task 3 Life in the stars	pp 11-19
Planning The pupil makes a valid prediction and uses scientific terms and ideas, including some abstract scientific ideas to explain his own ideas. Developing The pupil's use of stopwatch and various measuring cylinders is characteristic of level 6 when observing and measuring. The pupil then produced a table of results with appropriate headings and units and a graph with appropriate scales and labels. Although the y axis of the graph would benefit from improved labelling, this work is characteristic of level 6 when communicating findings. The pupil has also identified the relationship displayed in the results table and graph and has begun to question reliability and to suggest explanations for results that don't appear to reflect expected outcomes. Reflecting The pupil has begun to evaluate some of his success criteria, which is characteristic of level 5 when reviewing success.	Task 4 Rocket launch.	pp 20-29
Developing The pupil used abstract scientific knowledge to explain his findings and to make links between processes and systems. This indicates some progress towards a higher level of performance, but the pupil did not make further predictions as a result of his research or explain to what extent the findings were consistent with scientific knowledge. Overall, this is characteristic of level 6 when giving an explanation.	Task 5 Science of sound (Hearing)	pp 30-36

Planning The pupil predicts that the brightness of the bulbs will decrease as more bulbs are added. He explains this by indicating that the voltage across each bulb decreases and so less current flows. This is characteristic of level 6 when making predictions, although there is a lack of clarity in accounting for resistance. The pupil then identified independent and dependent variables correctly (current identified following teacher/pupil discussion), and a number of appropriate control variables. The pupil identified ways to control variables that needed to be kept the same and also identified an appropriate number of bulbs for the independent variable; this is characteristic of level 6 when conducting fair tests. The pupil has produced a clear plan for the investigation, apart from a slight lack of clarity about how to measure voltage. Overall this is characteristic of level 5 when planning methods and strategies	Task 6 Science of sound (Electric circuits)	pp 37-42
Planning The pupil justified the use of specific success criteria, which is characteristic of level 6 when determining success criteria. Reflecting The pupil has begun to evaluate how far success criteria were met and considered improvements, which is characteristic of level 5 when reviewing success.	Task 7 Science of motion (Car of the year)	pp 43-51
Planning The pupil made a prediction based on scientific terms and ideas, including abstract ideas, which linked potential energy to speed and kinetic energy. In the same task, the pupil correctly identified the dependent and independent variables, offered a range for their readings and explained which variables needed to be controlled. They then continued to explain which variables are difficult to control, but failed to explain clearly why this is so. This is characteristic of level 6 when conducting fair tests (While the identification of some variables that are difficult to control indicates some progress towards a higher level, level 6 best describes the pupil's ability to control variables overall). The pupil produced a systematic plan for this investigation, which is characteristic of level 5 when planning methods and strategies. Developing The pupil selected appropriate equipment for the task that would allow accurate measurements to be made. The pupil ensures the height of the ramp is the same for each repeat as it is clamped in place and the repeat times recorded in their results table indicate a level of accuracy appropriate for this task. The	Task 8 Bobsleigh	pp 52-61

pupil systematically observes and measures, ensuring that the method for measuring the ramp height was consistent, and they refined the experimental procedure to ensure the stopwatch was started and stopped at the same point for each attempt. This is characteristic of level 7 when making observations and measurements. In the same piece of work, the pupil presented results in a table labelled with the correct SI units and also in a graph where a line of best fit (which could be improved upon) has been attempted. In the conclusion he made quantitative statements based on the calculations made. This is characteristic of level 7 when communicating findings. The pupil has begun to evaluate findings, considers the reliability of their evidence, and offering explanations for results that do not fit the expected pattern. This is characteristic of level 6 when reviewing findings. The pupil went on to use abstract scientific knowledge to explain his findings, including to what extent the findings were consistent with scientific knowledge. While this last part shows progress towards a higher level, the pupil did not make predictions or link processes. Overall this part of the work is characteristic of level 6 when explaining.		
<u>Planning</u> The pupil found and used relevant information from BBC Bitesize; this is characteristic of level 5 when using evidence, information and ideas and he also selected and justified the use of specific success criteria, which is characteristic of level 6 when determining success criteria. The pupil also produced a systematic plan for the method to be used, which is characteristic of level 5 when determining methods and strategies and made an appropriate prediction using scientific understanding and knowledge. He used abstract ideas, explaining the enzyme would be denatured at higher temperatures. The pupil attempted to make links with other scientific knowledge when discussing kinetic energy but failed to explain this fully and then contradicted his initial ideas on the effect of temperature on kinetic energy. This is characteristic of level 6 when making prediction, although the attempt to link ideas about enzyme action and kinetic energy indicate some progress towards a higher level. The pupil planned for a fair test, and has identified the dependent and independent variables and some control variables. They have planned how to control these variables and have commented upon the range of readings for the independent variable in their plan. <u>Developing</u> The pupil selected and used equipment with fine division, systematically recording data and controlling appropriate variables to ensure the data collected is reliable. This is	Task 9 Life in a cell (Amylase)	pp 62-73

characteristic of level 7 when observing and measuring. The pupil then used this data to perform calculations and attempted a curve of best fit on their temperature/time graph. While the pupil has not plotted all points on this graph accurately, the axes were labelled and constructed correctly. On the temperature/rate of reaction graph, the y axis has not been constructed correctly, but the pupil has plotted the points accurately. While some of this work indicates progress towards a higher level, overall this is characteristic of level 6 when communicating findings. The pupil considered the reliability of results and began to offer explanations for results that did not fit the expected pattern which is characteristic of level 6 when reviewing findings. The pupil used abstract models and scientific ideas to explain findings, linking ideas about the lock and key hypothesis and kinetic theory. However, understanding was a little muddled and no further predictions were made. Overall this is characteristic of level 6 when explaining.		
<u>Developing</u> The results were displayed in a table with clear headings and correct units, and then displayed in a graph with appropriate axes. The pupil made quantitative comments in his conclusion. The pupil then began to consider reliability and made links between the two variables. This is characteristic of level 5 when reviewing findings.	Task 10 Antacid	pp 74-80
<u>Planning</u> The pupil has researched the task and used relevant information, which is characteristic of level 5 when using evidence, information and ideas. <u>Developing</u> The pupil used scientific ideas and knowledge to explain the function of transformers and linked this to heat, energy losses. While the pupil performed some calculations which indicate some progress towards a higher level, the work is characteristic of level 6 when explaining.	Task 11 The National Grid	pp 81-86

Best-fit level: Summary

Planning

The pupil has repeatedly made predictions using abstract scientific ideas (Rocket launch/ Science of sound - Electric circuits/ Bobsleigh). They identify key variables in their investigations and suggest how to control variables and proposed suitable ranges for the independent variable (Science of sound - Electric circuits/ Bobsleigh/ Life in a cell - Amylase). The pupil has justified their success criteria (Life in a cell – Amylase/ Science of motion - Car of the year) and carried out research to gather relevant information (The National Grid). In a number of investigations (Life in a cell – Amylase/ Bobsleigh/Science of Sound) the pupil has systematically planned their enquiry.

Developing

The pupil can recognise the need to select measuring instruments that would enable them to make precise observations and accurate measurements using equipment with fine divisions (Rocket launch), and in some cases built upon this to systematically record accurate data (Life in a cell - Amylase/Bobsleigh). The pupil has drawn a conclusion which is consistent with the evidence they gathered and considered the opinions of others (Is Euglena a plant or an animal? / Life in the stars/ Science of sound - Hearing). The pupil organises and communicates their findings appropriately and constructs graphs suitable to represent their findings (Antacid / Rocket launch). They begin to consider reliability and anomalies (Life in a cell – Amylase / Rocket launch). Abstract models and scientific ideas are used to explain their experimental findings or research (Bobsleigh / Science of sound - Hearing).

Reflecting

The pupil has identified the learning strategies used that enabled them to complete the task (Life in the stars), and has begun to evaluate their success criteria.

Overall summary

While some of the evidence is characteristic of performance at levels 5 and 7, most of the evidence, on balance, is characteristic of performance at Level 6. Where the pupil has produced work at level 7 this has not always been repeated for that particular skill. We therefore cannot say the pupil is secure at that level for that skill. In the Reflecting section the pupil demonstrates characteristics of Level 6 in Evaluate learning only. There is a lack of evidence at Level 6 in Link Learning and Review success. However overall, there is sufficient evidence in Planning, Development, and Reflecting to indicate that this pupil is working at Level 6, and the pupil has had numerous opportunities to reflect on their work (Reviewing Success - Heart rate investigation / Life in the stars / Science of motion - Car of the year) to ensuring there is sufficient coverage of Reflecting.

Best-fit level awarded: 6