

Teacher assessment

Key stages 2 and 3

Science : learner profile

Level 5

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.

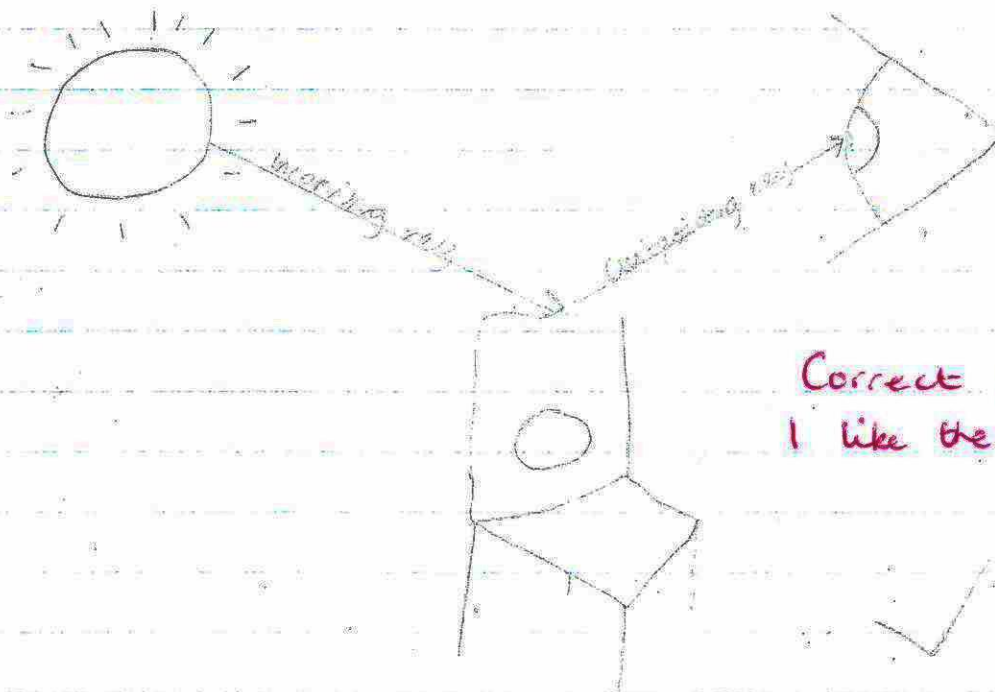
The profile also includes a detailed commentary which provides clarity on why the best-fit judgment was awarded. There is no suggestion or expectation that a learner profile is produced for every pupil in the cohort or that teachers write such an extensive commentary.

Task 1

1. Annotated diagram of how we see.

Wednesday

October 1st



The incoming ray from the light source is reflected off the chair and bounces into the eye.

Task 2

2. Coin swing investigation.

Monday

November 3rd

Note: To practice carrying out an investigation.

The variables that affect how many times a coin swings are: the length of string, the size of the coin, the amount of ~~to~~ back, the air pressure, weather, the angle at which you drop it, swinging hands, pattern on the coin, thickness of the coin, thickness of string.

Does the length of string affect the number of times a coin swings?

Independent variable - one we change.

We will change the length of string.

Dependent variable - one we measure

We will measure the number of times the coin swings.

Prediction

I predict that a coin on a long string will swing the most times because the added momentum will be greater than the decreased aerodynamic efficiency.

What a prediction.
Great vocabulary.

Equipment

Scissors, coins, hands, blutack

Ruler Stopwatch String Pen.

Method

Discussed

Results

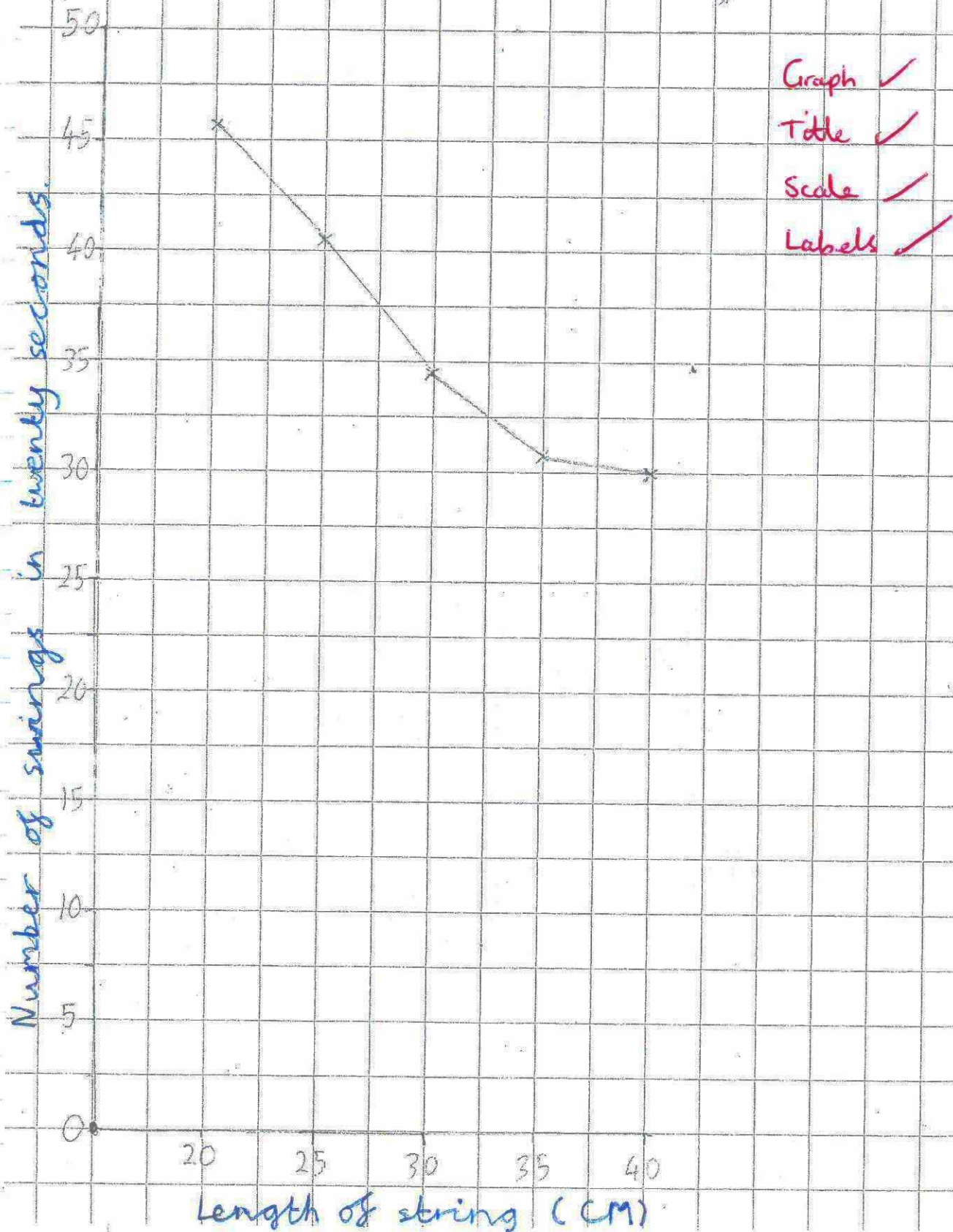
Length of string	Number of swings			Average
	1 st	2 nd	3 rd	
40 cm	30	30	30	30
35 cm	31	33	31	31.6
30 cm	34	34	34	34
25 cm	37	39	46	40.6
20 cm	40	52	46	46

Graph next.

Tuesday

November 4th

A graph to show how the length of a string affects how many times a coin swings.



P.T.O



Conclusion

I have extrapolated data from the graph to discover that a coin on a short string (the shortest in our experiment was 20 cm) will swing many more times than a long string.

The 20 cm string in our experiment swung 16 more times in 20 seconds than the longest string, which was 40 cm

in length. There were two possible reasons for this: either it was an unfair test, or the marginally greater aerodynamic efficiency affected our results. I do not believe it was the latter, as I have previously observed that something must ideally be larger / thicker than string to make a difference in terms of air resistance. ✓ Used prior knowledge.

However, the test was both accurate and reliable because we swung the coin three times with each length of string and used a stopwatch. ✓

This makes my initial hypothesis incorrect. ✓

I'm extremely pleased with this conclusion. You've used all the elements we discussed to write a level 5 conclusion.

3. Best light insulator.

WednesdayNovember 26th

Our Success criteria Suggestions for planning an investigation:

- Method needs to be clear.
- Method needs to be in order.
- ~~A correct choice~~ Correct choice for independent and dependent variable.
- Correct choice of graph.
- Maybe use Scientific language. ✓ Fantastic suggestions.

Nod: To plan our investigation correctly.

We will discuss and decide together what our success criteria will be.

Llew Llwyddiant (LI.LI):

- Must begin with a question that needs answering.
- Use the correct headings and layout.
- The method must be 'melon proof.'
- Use correct scientific vocabulary. To explain our reasons in detail.
- Correct choice of graph.

Q. Which material is the best light insulator?These are the variables that I could think of.

- Colour of material.
- Distance between the material and the data-logger.
- Type of material.
- Weight of material.
- Type of light.
- Size of light.
- Brightness of light.
- Distance between light and data-logger.
- Distance between light and material.
- Amount of material.

✓ You're really thinking hard about these.

Independent variable (what we are going to change)

I have chosen to change the type of material, For my investigation ✓

Dependent variable (what we are going to measure)

We are going to measure light in Lux, using a data-logger. We are using the data-logger to make it more accurate. ✓ Spot on.

Prediction (what I think will happen and why.)

I think card or a whiteboard will be the best light insulator, because they are both thick and the light won't be strong enough to 'go through' the card or whiteboard. ✓

I think tissue paper will be the worst light insulator because it is translucent and it might not be strong enough and thick enough to block the light from getting through. ✓ You've explained both ends of the scale.

27.11.14

Equipment (what we need)

- Materials/objects.
- Data-logger
- Light source/torch
- Soft/flat Surface.
- Pen
- Table ✓

Method

First, you get all your equipment. Find a flat surface so we can carry out our investigation.

Secondly, we turn on the data-logger and place it on the surface. We use a data-logger to make it more accurate. We measure the light in Lux.

Thirdly, we check our torch is working. If it is working place the torch 30cm away from the data-logger. We have to keep the same distance between the torch and the data-logger to make it a fair test. Also we need to keep the same amount of light in the room to make it a fair test.

Next, we have to turn the torch on and see how many Lux is the light with no insulator there.

After that we put our first material/object inbetween the light and the data-logger. We do this 3 times for each material/object, this makes the investigation more reliable.

Then, we add all our results up for one material and divide it by 3. Then we shall find our average. We do this for every material/object.

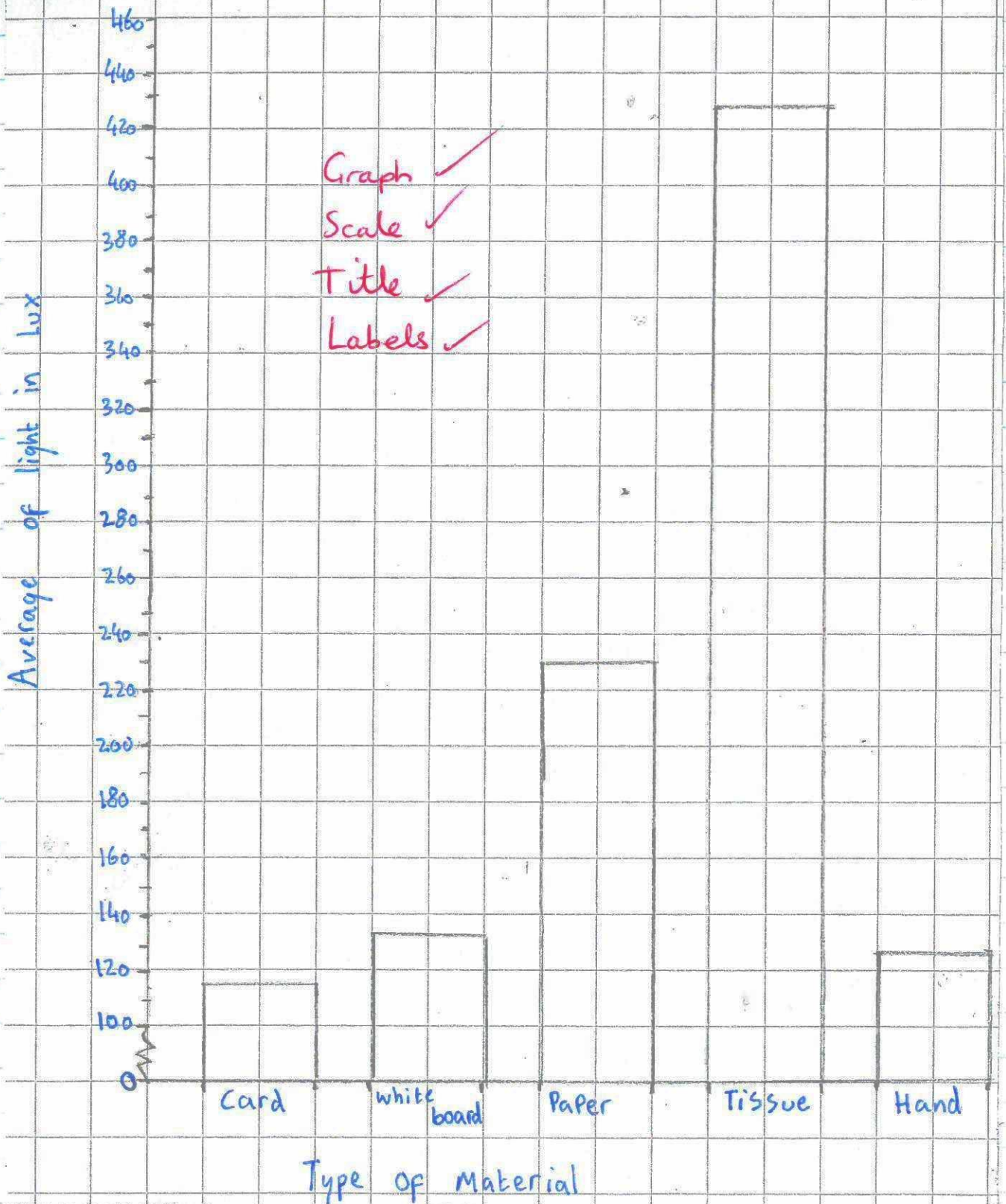
once we have worked out all the averages we extrapolate data and make a graph. Lemon/Melon/Orange proof!

Type of Material	Light in Test 1	Test 2	Lux Test 3	Average Lux
Card	124 Lux	113 Lux	111 Lux	116 Lux
Whiteboard	167 Lux	111 Lux	113 Lux	130.3 Lux
Paper	271 Lux	212 Lux	204 Lux	229 Lux
Tissue	429 Lux	470 Lux	379 Lux	426 Lux
Hand	95 Lux	140 Lux	144 Lux	126.3 Lux

Clear.
Tidy.

With no insulator it was way over 1000 Lux. ✓

A graph to show which material is the best sound insulator?



Conclusion:

The best light insulator is card. Because if you extrapolate data from my bar graph shows that the card only let through 116 Lux of light. The tissue let through 426 Lux of light. ✓

I don't think the test was fair because there ^{were} was other people doing the test around us so that could of affected the amount of Lux. ✓

My prediction was absolutely correct because I predicted that the card would be the best light insulator and Tissue ^{Tissue} would be the worst. ✓

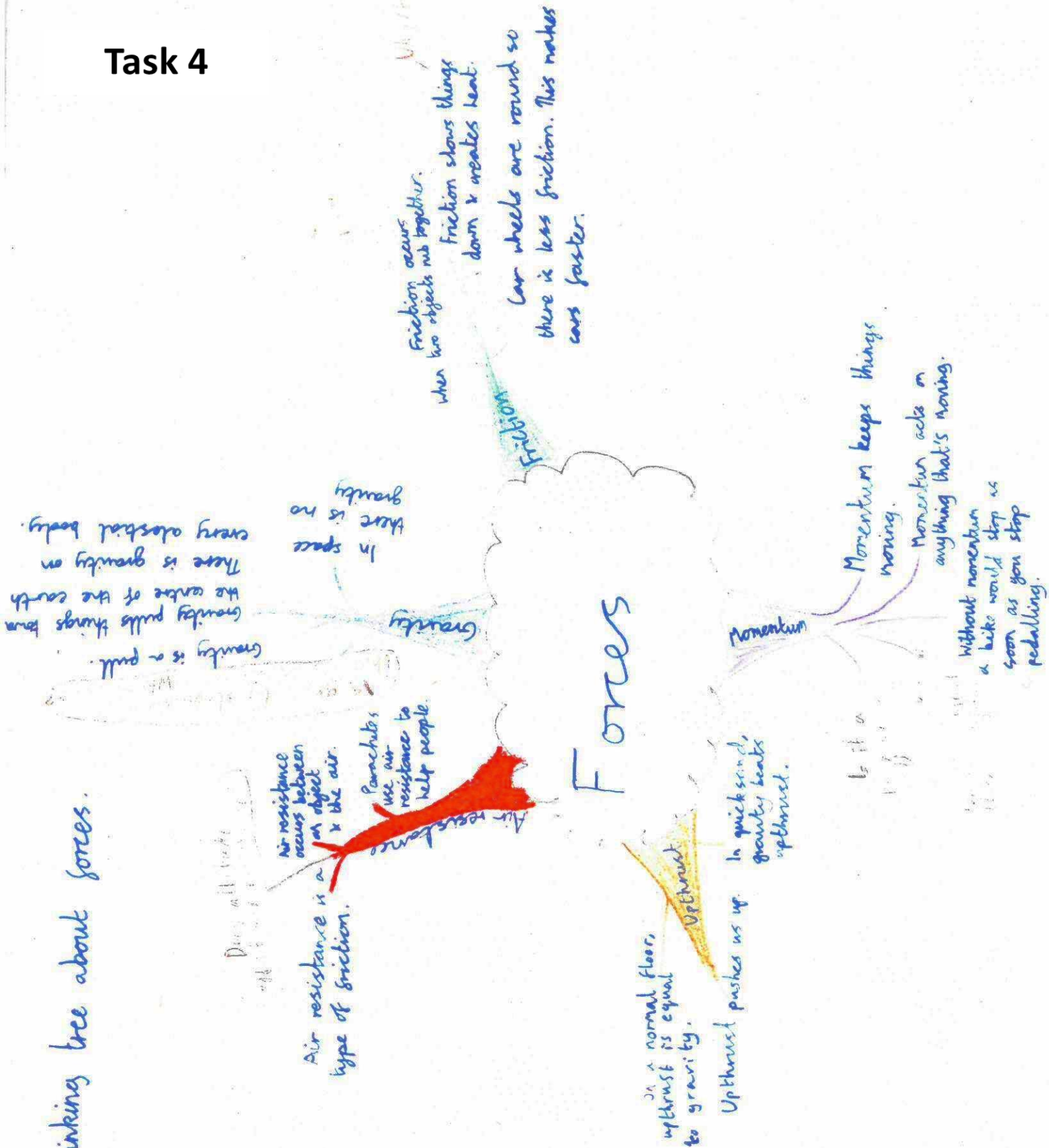
★ Everything is clearly and thoughtfully explained.

★ Lots of correct use of scientific vocabulary.

✿ To attempt an explanation of your findings. Why? Because...

Task 4

Not: To create a thinking tree about forces.



4. Forces test.

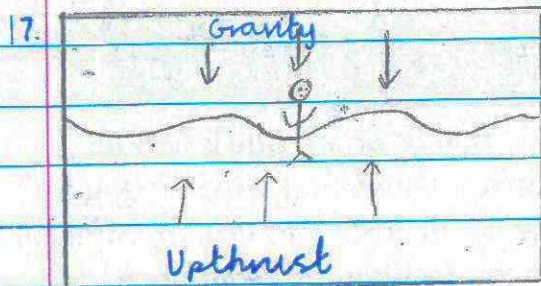
Wednesday

January 14th

Not To try our first attempt at a science ^{test} investigation.

1. Pushing and pulling. ✓
2. Slow down, fall, rise, move.

3. Newtons.
4. Newton meter ✓
5. The force of objects rubbing together. It creates heat and slows ~~objects~~ down.
6. A smooth surface ✓
7. Friction.
8. To stop us slipping.
9. A rough surface like gravel.
10. Friction ✓
11. It is the force created by an object moving through the air ✓
12. It should be an aerodynamic shape because they do this the ~~best~~.
13. A parachute achieves this by having a large surface area, but not much weight.
14. Gravity. You don't feel it in a tornado because there is a lot of upthrust. ✓
15. Birds have large, lightweight wings ~~to~~ which create enough upthrust to stay up. They have a very light skeleton too. ✓
16. The floor must have enough upthrust to balance with gravity. The forces must be equal. ✓



18. 'Upthrust' means a force that is pushing (thrusting) something upwards.

19. Because the boat is spreading the weight across a larger area.

20. Because the upthrust is approximately the same as the gravity acting upon the boat.

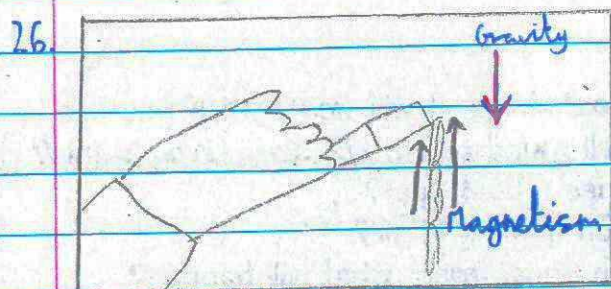
21. Upthrust and gravity ✓

22. They will stay in the same place. Neither will win.

23. It's dangerous because the ~~gravity~~ is much stronger than the upthrust, and you will fall very fast.

24. When the same poles face each other.

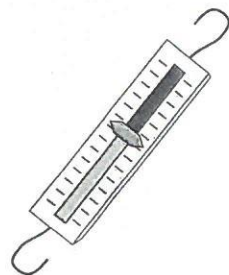
25. When the poles ^{facing each other} are opposite. ✓



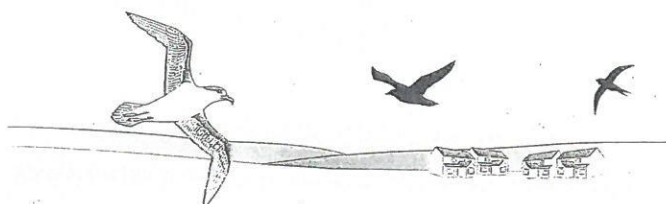
Excellent. A
Your work at home
is helping here.

Summary Questions For Section Ten

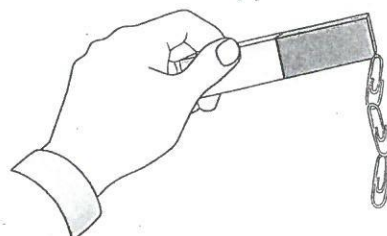
Well, here it is, the page you've all been waiting for. This is where you'll find out just how well you *know* your *forces*. Some of these questions may *stretch* you a bit... You'll have to be able to apply what you know about forces to lots of different situations. You'll definitely need to know these forces: friction, air resistance, gravity and upthrust. It's a good idea to be able to spell them too, so that the exam marker will know what you're talking about.



- 1) What *two* ways do forces work?
- 2) What are the *four* things that forces can *cause* objects to do?
- 3) What are the *units* of force?
- 4) What *instrument* would you use to measure force?
- 5) What is *friction*?
- 6) What sort of *surface* should a *slide* have so that you could go down it really fast?
- 7) What is the *name* of the force that gives us *grip*?
- 8) Why do we have good *grips* on our shoes?
- 9) What sort of *surface* should a slope have to *prevent* slipping?
- 10) What will be made when two surfaces *rub* together?
- 11) What is *air resistance*?
- 12) What *shape* should an object be in order to travel *faster* through the air?
- 13) Name something that needs to travel *slowly* through air. *How* does it manage this?
- 14) What is the *name* of the force that pulls objects *down* towards the centre of the Earth? Is there anywhere on Earth where you *don't* feel the effect of this force?



- 15) How do birds *overcome* the force of gravity and stay up in the air?
- 16) To stop a table in your classroom falling through the floor, what must the *floor* do against the force of gravity pulling the table down?
- 17) What *two* forces are acting on an object *floating* in water? Draw a diagram and show the forces on it.
- 18) What does the word "*upthrust*" mean?
- 19) If you use some plasticine to make a large *boat* shape, it will *float*, but if you use the same amount of plasticine to make a small round *ball*, it will *sink*. *Why* is this?
- 20) In terms of the *forces* acting upon it, why does a boat float?
- 21) What *two* forces are acting on a helium balloon floating in air?
- 22) In a tug-of-war, if both teams are pulling with *equal* force, what will happen?
- 23) Why is it dangerous to jump off a tall building?
Explain this in terms of the forces acting on you...
- 24) When do two magnets *repel* one another?
- 25) When do two magnets *attract* one another?
- 26) Draw arrows to show the forces acting on the paper clips in the diagram opposite.



5. Paper spinner investigation (iPad)

Task 5

Does the size of a paper spinner affect how fast it falls?

What are the variables?

Weather

Force it is pushed down with

Humidity

The amount of paper clips

Thickness of paper.

Weight of paper

Wingspan.

Position of paper clips

Height it's dropped from.

Material of clips and paper

People talking

Does the wingspan of a paper spinner affect how fast it falls?

Method:

Firstly, we will gather all our equipment together; a paper spinner, a paperclip to put on the bottom to add weight and stability, scissors to cut off the ends of the spinner and make the wings shorter; stopwatch to make time measuring accurate; and an iPad to record footage and data.

Then we will make a spinner that has an 8cm base and a wingspan of 18cm.

After this, we will need to make sure it is a fair test by keeping all the other variables the same, e.g dropping the spinner from the same height.

Thirdly, we will record the spinner falling, and us measuring its fall time using the iPad to record the data.

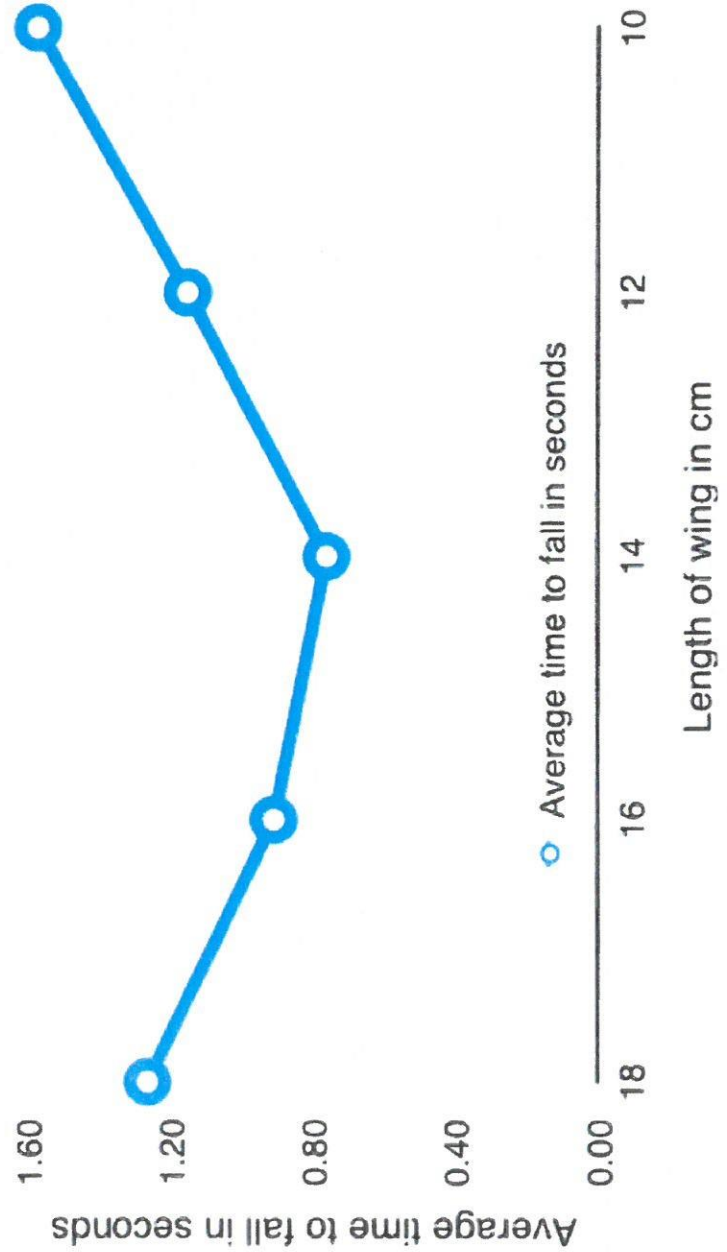
We cut off two centimetres from each wing and test how quickly it falls three times with every length of wing to make the test more reliable and then work out the average time it took to fall.

We will then record the results in Numbers, with a table and a line graph. All of this is to make sure that it's a reliable, fair and accurate test.

Here are the results from our experiment:

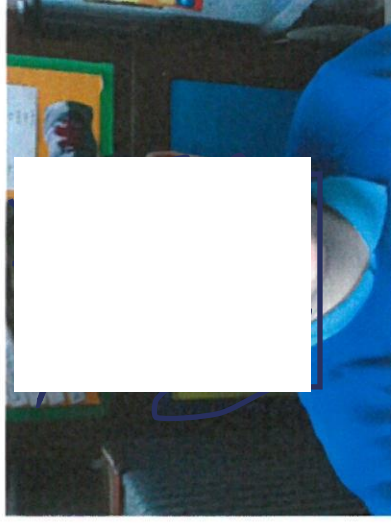
Length of wing in cm	Time to fall in seconds 1	Time to fall in seconds 2	Time to fall in seconds 3	Average time to fall in seconds
18	0.95	1.28	1.55	1.26
16	1.11	0.79	0.82	0.91
14	0.66	0.82	0.80	0.76
12	1.55	0.98	0.92	1.15
10	1.51	1.41	1.79	1.57

A graph to show how the length of the wings on a paper spinner affect how fast it falls



Reflection:

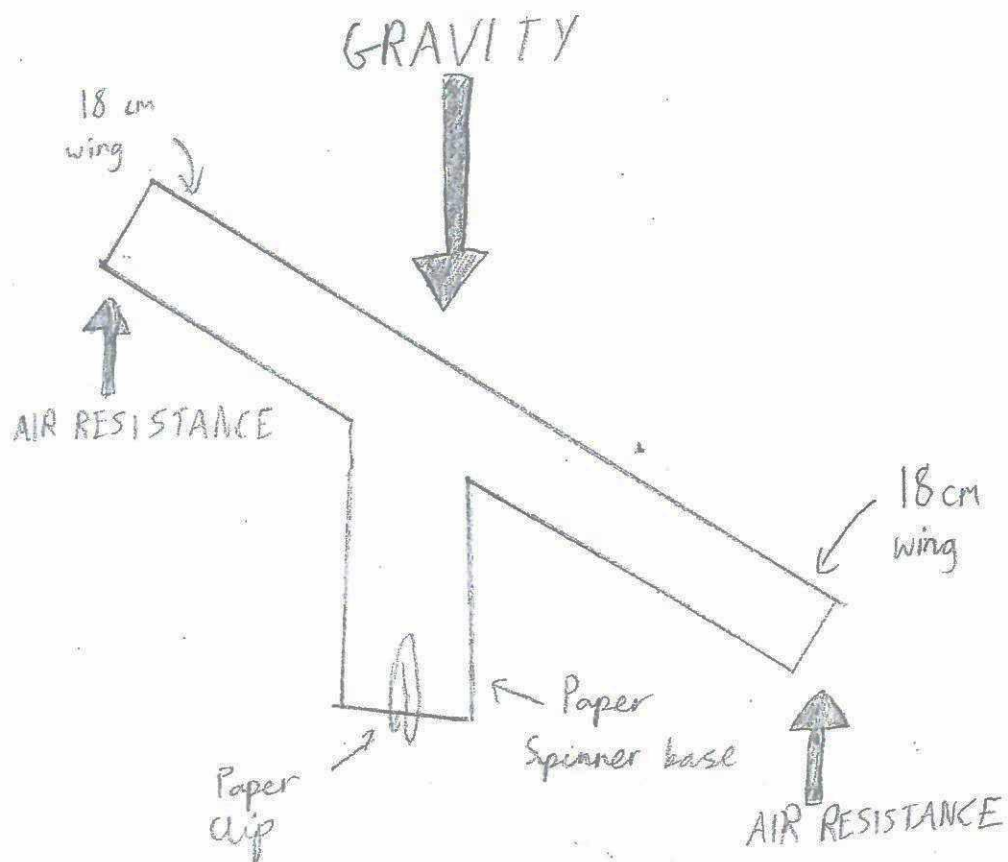
Because the spinner did not spin properly at first, it fell more slowly once it spun properly with shorter wings. This resulted in a blip in our graph. We could try to make a better spinner with card or an extra paper clip to make it more stable next time to solve this.



Tuesday

January 27th

Mod: To complete a science investigation using iPads.



Clearly annotated
and arrows
show force strength.

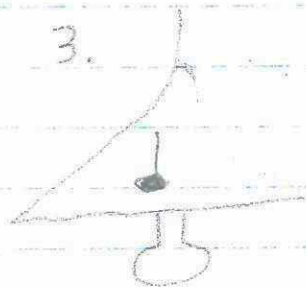
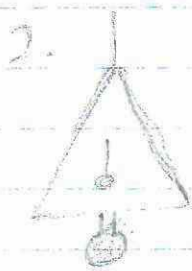
My work is on iPad 16 in Explain Everything

Tuesday

March 11th

Note: to explore & explain what I know about sound.

1. Sound is simply objects vibrating, making the air around vibrate. ✓
2. Sound can travel through many things, e.g. solids, liquids & gases. It travels through solids the quickest. ✓
3. When something vibrates, the molecule next to it vibrates, then the molecules next to that, and so on, spreading across a wide area. ✓
4. We hear something when the vibrations from it make our ear drum vibrate. ✓
5. Bigger objects, like ~~the~~^a bass drum, have a lower ^{pitch} ~~pitch~~. Smaller things, like ~~the~~ first bell (see picture) will have a higher ^{pitch}. ✓



6. • Very loud sounds, like a rocket taking off, can partially, or totally deafen people.
- We speak by making our vocal chords vibrate.
- Sound is measured in decibels. ✓

7. I would like to try an investigation using measuring jugs & water. E.g., Pouring water in & seeing how the ~~pitch~~ pitch changes. This can be done with glass (carefully) with the same effect.

6. Best sound insulator.

Wednesday

April 2nd

Goal: To write a detailed plan for our investigation.

Which material is the best sound insulator?

What are the variables?

- Any gaps/cracks in the insulator could affect it. ✓ Detailed observations
- Distance between the person and the insulator.
- The type of material.
- The shape and size of the insulator.
- The strength of the insulator.
- The temperature, or even colour of the insulator.
- The ^{amount of} layers of the insulator.
- The material the insulator is placed on. ✓

What's our independent variable?

~~We have decided.~~

We have chosen to have the type of material as our independent variable. We will change it each time. (Change the type of material). We'll keep the other variables the same ^{to make it a fair test.}

What will ~~be our~~ we measure? (Dependent variable)

We will use a Data logger to measure ^{the loudness in} decibels so that our measurements are accurate. ✓

How we will carry out the investigation. (Method.)

Firstly, we will gather everything ~~we~~ ^{you} need - A Data logger, to measure accurately, a speaker, or, materials (insulators), a steady, consistent sound e.g. a long tone with no pitch or noise volume changes and a pen & paper, to create a table and record the results. ✓

Once a table has been created, showing the type of material and the number of decibels, place the speaker and Data Logger on a flat surface a short distance away from each other.

Play your tone and record place the insulator in between the Data Logger and the speaker. Next, play the tone and record the number of decibels. Do this 3 times to make your results more reliable. ✓ You've covered the correct vocabulary.

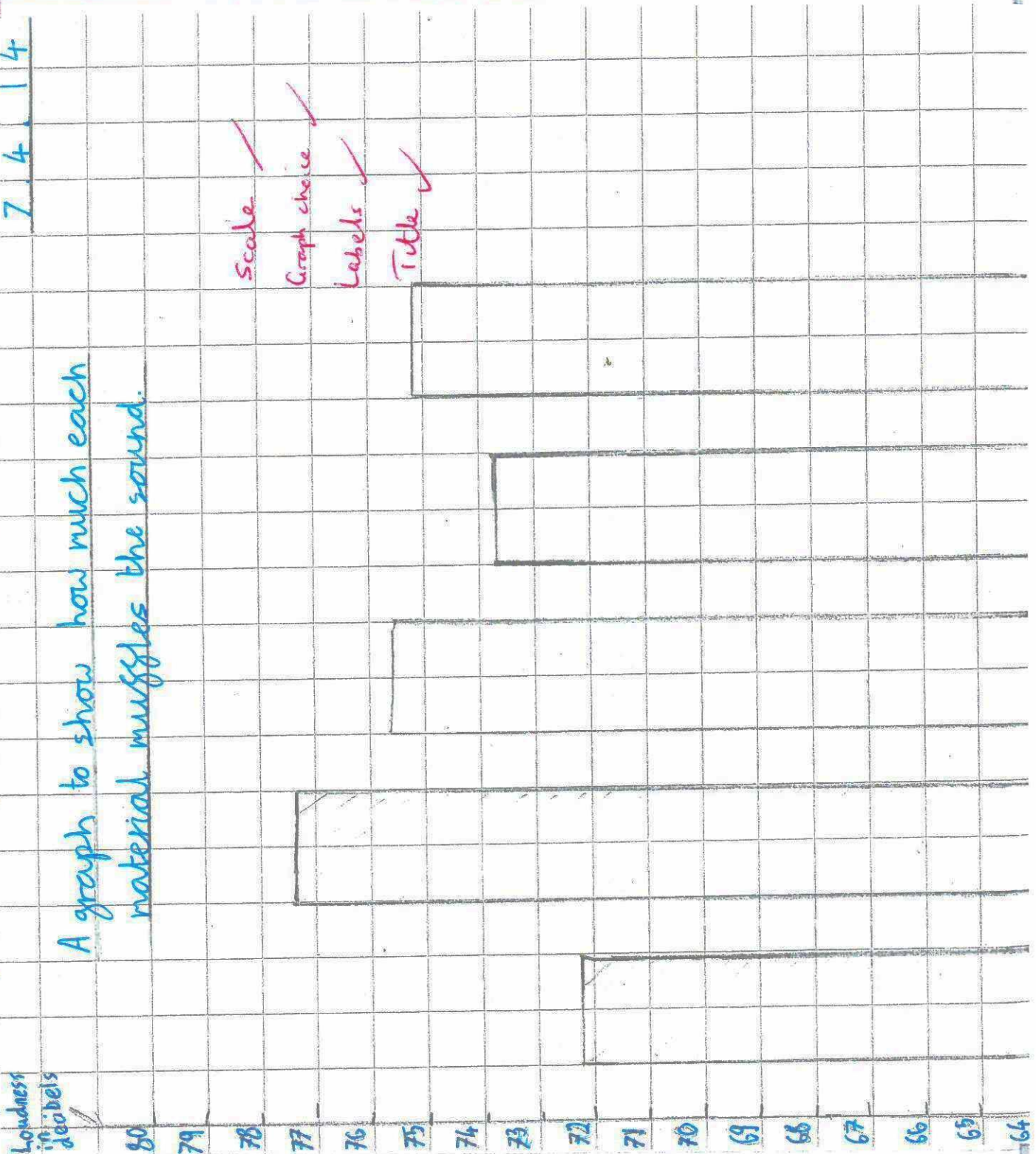
Prediction: ~~I think that~~ I think that the jumper will be the best insulator because a solid, like the whiteboard will make the sound louder, tissue paper is too thin and softer materials make better insulators (generally). ✓

Material	Test 1 (dB)	Test 2 (dB)	Test 3 (dB)	mean Average (dB)
Whiteboard	72.4	70.9	73.00	72.1
Jumper	77.7	76.6	78.0	77.1
Book	70.1	72.8	84.1	75.6
Ball	74.9	71.0	72.2	72.7
Tissue	75.5	75.5	74.4	75.1

1 Decimal place.

No insulator = 77.5 dB

I extrapolated the data from the table on the previous page to make this graph:



Loudness
in
decibels

7.4.14

A graph to show how much each
material muffles the sound.

80
79
78
77
76
75
74
73
72
71
70
69
68
67
66
65
64
63
62
61
60

Scale ✓

Graph choice ✓

Labels ✓

Title ✓

Whiteboard

Timper

Book

Ball

Tissue

Type of
Insulator

Apologies if my graph is untidy. I did not have a lot of time, as I was in a MAT group at the time we made them.

Don't panic

Monday

April 7th

Not: to write a detailed conclusion using all that we have learnt.

In conclusion, as the graph shows, the whiteboard was the best sound insulator, because it muffled the sound down from 77.5 dB to 72.1 dB. The jumper was the worst insulator, as it only made the sound quieter by 0.1 dB. However, there are two reasons why I believe it was an unfair test: firstly, there were several variables that we could not keep the same. I.e. colour, layers and size of material. Excellent reasoning.

Also, halfway through, we realised that the window had been open. This meant that sound could easily travel through and disrupt our experiment. ✓

I do not believe that our results were correct, as I thought the sound was louder with the whiteboard when I was listening to the experiment, although the data logger we used should be more accurate than my ear.

I am puzzled by our results. I am utterly baffled.

You've spotted the problem

Brilliant.

Monday

April 7th

Task 7

How we will carry out the investigation, (The method):

Firstly, we are going to get all of the equipment we need - a straw, a data logger, scissors, and a person to blow into the straw. We will need a ruler and whiteboard marker too.

After that, we will go to a completely silent place (to make it a fair test) and set down the data logger.

When we have done that, we will blow into the straw, producing a sound. We will measure the volume in decibels using a very accurate data logger. We will then write the number of dB into the 'Longest length; test 1' cell of the table below.

Repeat this process 3 times, putting the number of decibels on the second & 3rd attempts in 'Test two,' and 'Test three' columns. *This is to

We will do this all again with make our results more reliable.

We will do this all again with a slightly shorter straw, then a slightly shorter straw again. Do this with about five different lengths of straw.

Next, extrapolate the data from the table to create a graph. I do not recommend making a pie graph: a line graph could work, but a bar graph would be the best choice.

If every bar in the graph is the same height, then the length of the straw did not affect the volume. If some are higher than others, we will know whether a longer straw or a shorter straw makes a louder sound.

* We must also work out the average number of dB by adding the volumes of tests 1, 2 & 3, then dividing (sharing) by 3.

Prediction: I think that a longer straw will make a louder sound. A longer straw will have long and slow vibrations, (sound waves) causing a lower pitch than a short straw. I'm afraid I have no scientific reason, but I think a lower pitched

Tuesday

April 8th

sound is generally ^{louder} higher than a high-pitched sound, just from using my observation skills. ✓ That's all I ask.

Here is the table:

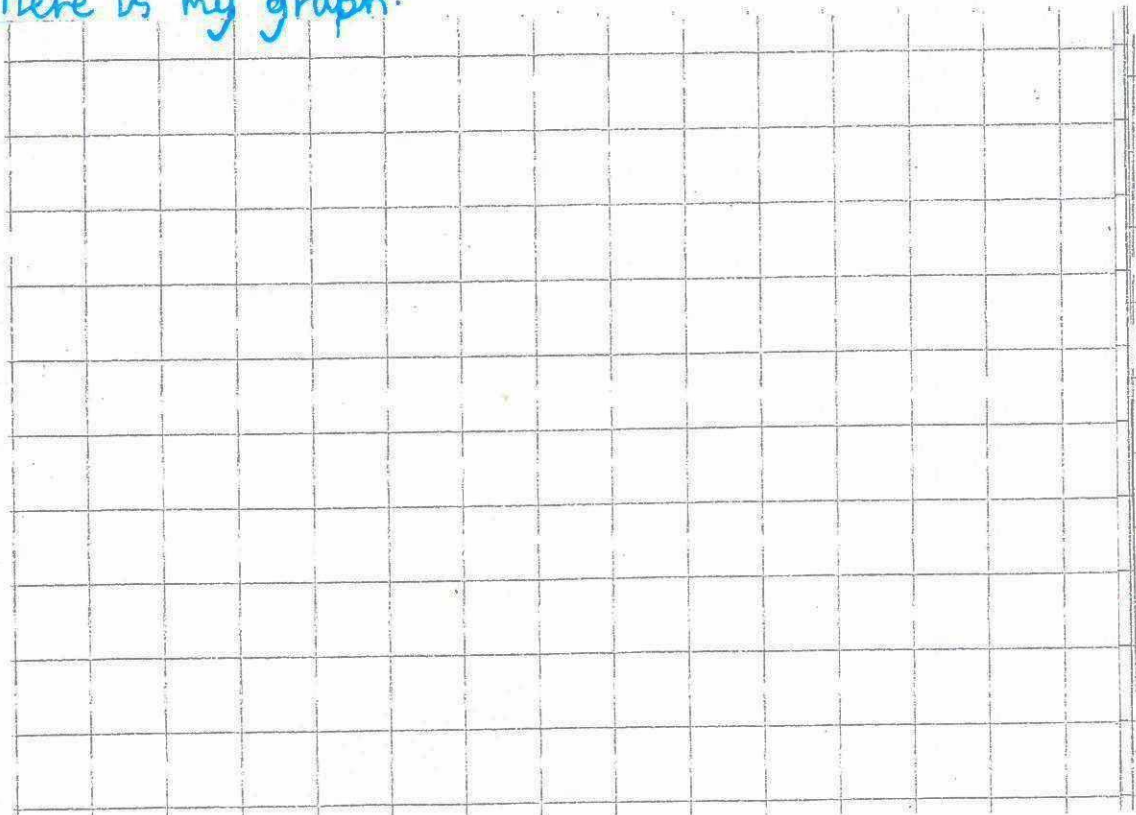
Length of straw	Test 1 vol in dB	Test 2 vol in dB	Test 3 vol in dB	Average vol in dB
25cm	72	83	83	79.3
20cm	73	83	85	80.3
15cm	88	87	85	86.6
10cm	86	81	90	85.6
5cm	92	88	94	91.3

9.4.14

9.4.14

Wow you have got no mistakes good handwriting as well.

Here is my graph:



7. Length of straw. 1st Draft.

Monday

April 7th

Note: To plan my own investigation correctly.

Does the length of the straw affect its loudness?

Variables:

- The length of the straw. ✓
- Distance between the straw and the data logger. ✓
- If the straw is slightly bent or not. ✓
- Holes in the straw. ✓
- The width of the straw (different to length). ✓
- Height of straw. ✓
- Colour of straw? ✓

Great suggestions.

Independent Variable (What we'll change):

We will change the length of the straw. The other variables must be kept the same to make it a fair test. ✓

Dependent Variable (What we'll measure):

We are going to measure the ^{volume} ~~loudness~~ in decibels, using a data logger to make it accurate. ✓

Well explained.

A graph to show how the length of the straw affects the volume.

Title ✓

Choice of graph x

Labels ✓

Scale ✓

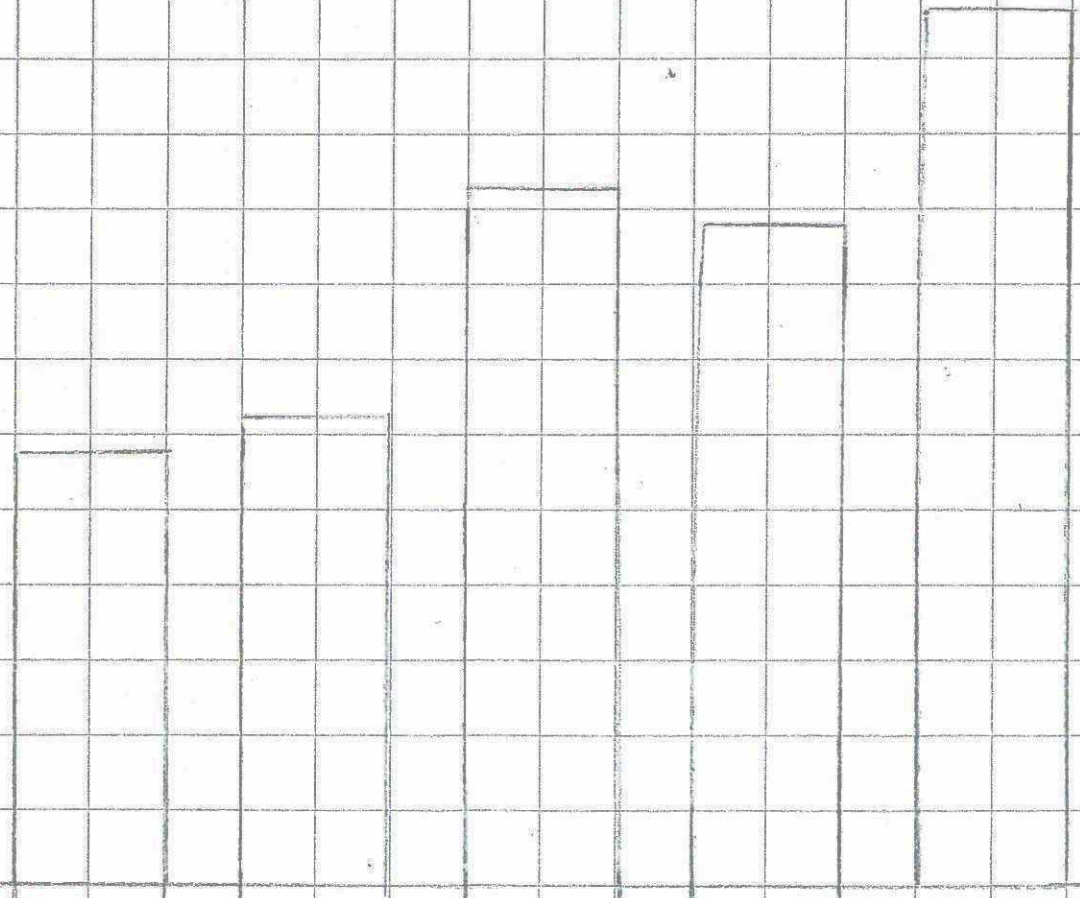
Average volume in decibels

100
98
96
94
92
90
88
86
84
82
80
78
76
74
72
70



25 cm 20 cm 15 cm 10 cm 5 cm

Length of straw.



My conclusion is that, the shorter the straw is, the louder the sound it makes. I think this is because a higher-pitched sound is more shrill, which makes it louder. But I did think that a lower-pitched sound would be louder, e.g. the lowest pitched drum, the bass drum, is the loudest.

I also have my suspicions that Glenn was blowing through the shorter straw harder than he was with the longer straw, making it an unfair test.

Though, I am also surprised by the slight dip in the graph between the 15 & 10cm straws. Wonder what caused it?

However, if our results were correct, a 5cm straw is the loudest.

★ The conclusion is detailed and thorough.

★ Well planned and carried out.



Choose the correct graph.

Would a line graph have worked better: If so I will do this next time.

7. Length of straw. 2nd draft.

Thursday

April 10th

Mod: To redraft our science investigations.

Does the length of a straw affect the its loudness?

Variables

- The length of the straw. ✓
- Distance between straw and data logger.
- Any holes in the straw.
- If the straw is bent, it will affect the results. ✓
- Width of straw.
- Thickness of straw.
- The person blowing through the straw.
- Weight of the straw.
- The colour of the straw. ✓

Independent variable

We will change the length of the straw, but ~~keep~~ the other variables the same, to make it a fair test. ✓

Dependent variable.

We will measure volume in decibels (dB), using a data logger. The data logger makes our results accurate. ✓

Method.

Firstly, we must find all our equipment, i.e. straw, ruler, scissors, data logger, whiteboard marker, and a person to blow through the straw.

Next, we must find a totally quiet place that has a plug socket. We will plug in the data logger, and press 'start.' It will be preferable to put the data logger on a flat surface, to avoid it sliding around, as that would make it an unfair test.

When we press 'start,' it will begin to record the number of dB.

Before we start, we must create a table like the one on the next page.

When we have snipped a triangle shape in the top of the straw,* we will start the experiment by blowing through the straw and recording the highest number of decibels we see. We will write this number in the 'length of 25 cm; Test 1' cell of the table.

Do this process twice more, and put the results in the 'Test 2' and 'Test 3' columns. For each length of straw, we will work out the average dB by adding the volumes of Tests 1, 2, and 3, and then dividing (sharing) by 3.

Next, we will extrapolate the data from the table to create a line graph.

Finally, we will write a conclusion to sum up what's happened, and to answer the question at the top of the previous page. Clearly explained.

A graph to show how the length of a straw affects the loudness.

Average vol in dB

100
98
96
94
92
90
88
86
84
82
80
78
76
74
72
70

25 20 15 10 5

Length of straw in cm

Scale ✓
Graph ✓
Title ✓
Label ✓

Prediction

I predict that the longest straw will be the loudest. A longer straw will have longer & slower vibrations than a shorter straw. This will cause a lower pitch. The only reason I have for thinking that a lower pitch will be louder is that it sounds louder to me in real life situations.

Here is the table to record my results:

Length of straw	Test 1 Vol in dB	Test 2 Vol in dB	Test 3 Vol in dB	Average Vol in dB
25 cm	72	83	83	79.3
20 cm	73	83	85	80.3
15 cm	88	87	85	86.6
10 cm	86	81	90	85.6
5 cm	92	88	94	91.3

Conclusion

In conclusion, I have learnt that the length of the straw does affect the loudness: the shorter the straw, the louder the sound.

However, this surprised me, as I think that lower pitched sounds are generally higher. E.g. the loudest type of drum is the lowest pitched.

Another thing that bagged me was the sudden dip in the middle. I have no idea why this happened; the only thing I can think of is that something made it an unfair test, like Glenn not blowing as hard, or me not seeing a higher volume. I am not sure.

But what I do know is that a 5 cm straw is very ^{loud!} easy!



8. How our bodies work.

Task 8

Monday

March 31st

Not: to investigate how our bodies work.

We take a breath in, and then....

- Our bodies take in the mixture of gasses in the air.
- The oxygen travels down the windpipe to the lungs, where it is collected by the blood.
- It is carried by the blood through ~~arteries~~ to all the body's muscles and organs.
- Once the oxygen is burned up, it is taken by the veins and out of our ~~moth~~ mouth again.

After discussion, this is what I think happens...

- Firstly, we take in all the gasses ~~in~~ in the air. ~~at~~
- It travels to the lungs ~~by~~ through the windpipe.
- Next, it's collected by the blood.
- The heart pumps the blood ^{up} to ~~there~~ muscles, which use the oxygen as fuel.
- Once the oxygen has been ~~used~~, the carbon dioxide (waste) is sent back into the blood.
- This blood is sent back to the heart, and drops off the waste at the lungs. From ~~where~~, it is breathed out.

A very detailed, step by step explanation
would be
practical.

would be

Wednesday

May 7th

Nod: To explain, in detail, what we have been doing with iPads & exercise.

Firstly, Before the Easter Holidays, we tested an app called VitalSigns. This is an app with a very detailed camera to measure our heart and breathing rate with remarkable accuracy. ✓

Firstly, we measured ourselves whilst resting to find out our normal heart rate. Next, we went into the hall and did forty-five seconds of star jumps while our chosen partner recorded us as proof. ✓

After exercising, we came back into class and sat in front of the iPad, while VitalSigns measured.

Once it had ~~measured~~ finished measuring, we took a screenshot. Then we waited a minute, and ~~&~~ repeated the process. We continued this until our heart rate came back to normal. ✓ Thorough and easy to follow.

We then opened Numbers ^a And used the data to create a spreadsheet & graph. The screenshots were pasted under the graph as proof. ✓

We put our work on numbers into Explain Everything as a PDF and sent it on showbie. ✓

We also used the iPads to test our fitness last week: we made a (very tiring) workout using Seconds Pro.

Following Mr Evans' instructions, we chose how long we wanted to rest between each exercise. We chose how long we wanted to exercise for.

We decided which exercises we wanted to do, and chose a colour for it. ✓

We carried out our workout, and then it was very hard work. That's what I like to hear.

Now to ~~see~~ ^{explain} why we are doing this.



Peer marked according to success ladder for writing.

✓ 1.9/10 for writing, 1/10 for oral

✓ 1.9/10 for writing, 1/10 for oral

✓ 1.9/10 for writing, 1/10 for oral

✓ 1.9/10 for writing, 1/10 for oral

✓ 1.9/10 for writing, 1/10 for oral

si
il

		Level 3	Level 4	Level 5	Level 6	
Plan	Find evidence, information and ideas	3P.1 Pupils suggest where to find evidence, information and ideas.....	4P.1 Pupils find and use a variety of evidence, information and ideas.	5P.1 Pupils find and use relevant evidence, information and ideas.		Level 5 best fit profile
	Methods & strategies	3P.2.... and plan, with support , the method to be used for their enquiries.	4P.2 They use scientific knowledge and skills to plan their enquiries....	5P.2 They systematically plan their enquiries	6P.2 Pupils suggest a variety of methods or strategies for their enquiries.	
	Predict	3P.3 They talk about their ideas and using their everyday experience they make simple predictions	4P.3 (<i>use scientific knowledge and skills to</i>) and predict outcomes.	5P.3 (they) making predictions based on scientific knowledge and understanding, including simple models.	6P.3 They make predictions using abstract scientific ideas.	
	Fair testing		4P.4 In a fair test enquiry, they recognise, with support, the variables to change and measure and those to be kept the same.	5P.4 When planning a fair test, they identify key variables and distinguish between independent and dependent variables and those that they will keep the same.	6P.4 In a fair test enquiry, they plan how to control the variables that they need to keep the same and make decisions about the range and values of the independent variables.	
	Determining success criteria	3P.5 They agree on some basic success criteria.	4P.5 They decide upon some basic success criteria.	5P.5 They give some justification for their success criteria.	6P.5 They justify their success criteria.	
Develop	Observe & measure	3D.1 They follow a simple series of instructions safely to gather their findings, and where appropriate make observations that they could measure using simple equipment.	4D.1 They follow the planned method They make qualitative observations and use standard equipment to measure within a given range using S.I. units.	5D.1 They select measuring instruments that allow them to make a series of accurate measurements.	6D.1 They make precise observations and accurate measurements using equipment with fine divisions.	
	Monitor progress		4D.2 (<i>They follow the planned method</i>) making amendments where necessary.	5D.2 They regularly check progress and revise the method where necessary.	6D.2 They regularly check progress, make ongoing revisions when necessary and begin to justify any amendments or improvements made.	
	Communicate findings	3D.3 They begin to organise their findings and display them in a given format, to include simple tables and bar charts.	4D.3 They organise and communicate their findings using relevant scientific language and display these in tables, bar charts and in simple line graphs when the axes and scales are given.	5D.3a They organise and communicate their findings integrating different forms in various presentations and record these systematically, using S.I. units where appropriate. 5D.3b They select the most appropriate type of graph or chart to display data.	6D.3a They organise and communicate their findings in a variety of ways fit for purpose and audience. 6D.3b They use appropriate axes and scales for graphs to show data effectively.... 6D.3c and begin to use some quantitative definitions..	
	Review findings	3D.4a They begin to identify simple patterns and trends. 3D.4b They begin to distinguish between scientific 'facts', beliefs and opinions.	4D.4a They identify patterns and trends. 4D.4b They distinguish between 'facts', beliefs and opinions and begin to recognise bias.	5D.4a They can use a line graph to describe relationships between two continuous variables. 5D.4b They identify bias and start to consider reliability.	6D.4b When considering their findings they assess bias, consider reliability 6D.4c and offer some explanations for any anomalies	
	Explaining	3D.5a They give an explanation, based upon their everyday experiences , for their findings, including any patterns. 3D.5b They give simple explanations for differences between and changes to organisms, objects, materials and physical phenomena.	4D.5a They use <i>some</i> scientific knowledge and understanding to explain their findings 4D.5b and differences between, or changes to organisms, materials and physical phenomena	5D.5a They use scientific knowledge and understanding, including simple models, when explaining their findings..... 5D.5b and differences between, or changes to organisms, materials and physical phenomena.	6D.5a They use abstract scientific knowledge and understanding, including models, when explaining their findings 6D.5b and differences between, or changes to organisms, materials and physical phenomena. 6D.5c They recognise that a number of factors and / or processes may have to be considered when explaining changes.	
	Conclusions & decisions	3D.6 They say what they have found out from their work and make their own decisions by weighing up pros and cons.	4D.6 They begin to draw conclusions, from considered opinions and make informed decisions.	5D.6 They draw conclusions that are consistent with the findings and consider others' views to inform opinion and decisions.	6D.6 They consider a wider range of perspectives to inform opinions and decisions	
	Reflect	3R.1 They link outcomes to success criteria and identify what worked and what didn't,.... 3R.1b beginning to think about how the method could be improved.	4R.1a They decide whether their method was successful by referring to their success criteria..... 4R.1b and say how they could improve it.	5R.1 They begin to evaluate how far success criteria fully reflect successful outcomes.	6R.1 They evaluate how far success criteria fully reflect successful outcomes.	
		Evaluate learning	4R.2 They describe how they have learned and identify the ways that worked the best.	5R.2 They identify the learning/thinking strategy they have used	6R.2 They identify the learning / thinking strategies being used.....	
		Link learning	4R.3 They link the learning to similar situations.	5R.3 (<i>They identify the learning/thinking strategy they have used</i>) and link the learning to dissimilar situations.	6R.3 (<i>They identify the learning / thinking strategies being used</i>) ...and link the learning to unfamiliar situations.	

Level 5: 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 5. The commentary should enable the reader to see why the learner profile has been given a best-fit level 5.

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 5

This evidence is drawn from eight tasks that are contained within the learner's Year 6 topic 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.

Commentary <i>(all comments reflect attainment at level 5 unless indicated otherwise)</i>	Source	Reference
Annotated diagram of how we see. As part of the light and sound topic pupils were asked to draw a diagram of how light reaches the eye. Previous work had been carried out in year 4. This example was done independently with an explanation. The annotations, arrows and use of a ruler show a clear understanding. <u>Developing</u> • The pupil uses abstract scientific knowledge and understanding, including a model, when explaining his findings (Level 6)	Task 1	page 1
Coin swing investigation. An investigation to practise writing the question, prediction, variables, graph and conclusion. The prediction shows use of scientific vocabulary and a valid explanation to support his prediction. The investigation is planned systematically and clearly. The table and graph were completed independently. The conclusion uses the data collected to reinforce what was learnt. The explanation takes into account reliability and accuracy of data and also discusses possible reasons for the outcomes. <u>Planning</u> • He makes predictions based on scientific knowledge and understanding. • He identifies key variables and distinguishes between independent and dependent variables and those that he will keep the same. • He systematically plans the enquiry. <u>Developing</u> • He selects measuring instruments that allow him to make a series of accurate measurements. • He organises and communicates the findings, integrating different forms in various presentations and	Task 2	pages 2 - 5

records these systematically, using S.I. units where appropriate. • He selects the most appropriate type of graph or chart to display data. • He can use scientific knowledge and understanding, including simple models, when explaining his findings... • ... and differences between, or changes to organisms, materials and physical phenomena. • He draws conclusions that are consistent with the findings and considers others' views to inform his opinions and decisions. • He can assess for bias, consider reliability and offer some explanation for any anomalies. <u>Reflecting</u> • He links his learning to similar situations (Level 4).		
The best light insulator Success criteria were discussed and suggested by the pupil for carrying out an Investigation. Pupils were given a question to answer and had to choose the independent and dependent variables themselves. The investigation was carried out in small groups but the written work was done independently. <u>Planning</u> • The pupil decided upon some basic success criteria (Level 4). • He identified key variables and distinguished between independent and dependent variables and those that will stay the same. <u>Developing</u> • He organised and communicated the findings using different forms, recording these systematically and using S.I. units where appropriate. • He selected the most appropriate type of graph to display the data. • He has begun to draw conclusions and make informed decisions. (Level 4) <u>Reflecting</u> • He has identified how he could improve the method (Level 4).	Task 3	pages 6 - 11
Forces mind map and test Pupils were asked to draw and write what they knew about forces. They then looked at what they knew and thought of questions they could ask to help build a deeper knowledge. These questions will be researched as homework.	Task 4	pages 12 - 16

Test questions were given before we started the forces topic. No help was given other than reading the questions when necessary. These are the answers given. The pupil used clear, annotated diagrams where necessary and gave justification for some answers using various examples. <u>Developing</u> The pupil researched and used relevant evidence, information and ideas.		
Paper spinner investigation. This investigation has been carried out in groups of 3 using the iPads. There is minimal use of text. The files are video and audio format. The PDF gives a basic outline. They were asked to think about possible variables that could affect how long a paper spinner takes to fall. They then chose the independent and dependent variables. Using apps such as Camera, Stopwatch, Numbers and Explain Everything, they carried out the investigation, following the standard protocol. Once complete, they explained how they felt the investigation had turned out and how to improve it. There is a diagram, drawn independently, by the pupil as evidence in their books. <u>Planning</u> - He identified key variables and distinguished between independent and dependent variables and those that he will keep the same. <u>Developing</u> - He choose measuring instruments that allowed him to take accurate measurements. - His findings were well organised using different forms of presentation and he used S.I. units where appropriate. - He used line graphs to describe relationships between two continuous variables. <u>Reflecting</u> - He has identified how he could improve the method (Level 4).	Task 5	pages 17 - 21
Best sound insulator This is a detailed written investigation. The possible variables are listed, accuracy, reliability and fair testing are recognised and explained. Correct scientific vocabulary is used consistently when giving reasons 'why' and explaining. The pupil recognised the need to find the baseline measurement without an insulator. The work,	Task 6	pages 22 – 27

including the graph, are independent. <u>Planning</u> • The enquiry has been systematically planned. • The pupil has made predictions based on scientific knowledge and understanding, and included simple models. • He has planned how to control the variables that he needed to keep the same and made decisions about the range and values of the independent variable. <u>Developing</u> • The measuring instruments chosen allowed him them to make a series of accurate measurements. • He organised and communicated the findings using different forms, recording these systematically and using S.I. units where appropriate. • He selected the most appropriate type of graph or chart to display data. • His conclusions were consistent with the findings and he considered others' views which helped to inform his opinions and decisions. • He offered some explanation for the anomaly despite claiming to be “baffled” (Level 6).		page 27
Does the length of a straw affect its loudness? This investigation was carried out once pupils had been shown how to cut straws and how to use a straw to make a sound. Some pupils chose the pitch of the sound produced as the dependent variable but this pupil chose loudness. Pupils decided how the enquiry was to be done. Success criteria were discussed and agreed upon. Once completed, the pupils checked and redrafted the work in order to raise standards. <u>Planning</u> • The pupil suggested a variety of methods or strategies for the enquiry (Level 6). <u>Developing</u> • He made precise observations and accurate measurements using equipment with fine divisions (Level 6). • He regularly checked progress and revised the method when necessary.	Task 7	pages 28 - 36

<u>Reflecting</u> • He has begun to evaluate how far the outcomes fully reflect the success criteria.		
Write about how our bodies work. Pupils were asked to write an account of an iPad investigation into fitness. Pupils were asked to explain what they thought happened when we breathe. They began with the same sentence and continued, without help, to explain what happens next. We shared the work and discussed as a class how we breathe and what happens inside our bodies. Pupils then redrafted their explanations. Following on from this, they next carried out an investigation using various apps on the iPads. This was then rewritten in their books. <u>Developing</u> • The pupil's findings were recorded systematically, and were well organised and communicated; he integrated different forms of presentation into his work.	Task 8	page 37 - 39

Best-fit level: Summary

Planning

This pupil is able to plan their enquiries systematically (**coin swing/best sound insulator**).

The pupil makes predictions based on scientific knowledge and understanding, including simple models and linked learning (**coin swing/best sound insulator**) and confidently identifies key variables and distinguishes between independent and dependent variables and those that he will keep the same.

The pupil can suggest a variety of methods or strategies for his enquiries both verbally and in written form (**length of straw**).

Developing

The pupil can recognise the need to select measuring instruments that allow him to make a series of accurate measurements (**coin swing/ sound insulator**.) This leads to his ability to organise and communicate his findings integrating different forms in various presentations and record these systematically, using S.I. units where appropriate. Independent selection of the most appropriate type of graph or chart to display data is consistently carried out by this pupil (**coin swing/sound insulator/length of straw**.)

He is able to use scientific knowledge and understanding, including simple models,

when explaining his findings, drawing conclusions that are consistent with the findings and considering others' views to inform opinions and decisions.

He is able to organise and communicate his findings integrating different forms in various presentations and record these systematically, using S.I. units where appropriate. **(Paper spinner/ sound insulator)**

He is able to make precise observations and accurate measurements using equipment with fine divisions such as cataloguers and stopwatches to a 10th of a second. The pupil can regularly check progress and revise the method where necessary. **(Length of straw/ paper spinner)**

Reflecting

During discussions and in his conclusions the pupil is able to link learning to dissimilar but familiar situations. He can describe whether his method was successful or not and how to improve next time. While these are mainly characteristics of Level 4, they are well developed and there are some instances of characteristics of Level 5.

Summary

While this pupil shows a few characteristics of performance at level 6, the pupil's performance overall is best described as being at **Level 5**. There are instances of the pupil's work which illustrate some characteristics of level 4. These include improving some aspects of the way conclusions are drawn and success criteria are identified and making links between what has been learned in various situations.