

Appendix A

Research lesson 1

Tick if observed	Student A <i>EASY</i>	Student B <i>HARD</i>	Student C <i>MEDIUM</i>
1. Not engaged			
2. Regularly not engaged	✓		
3. Generally engaged			
4. Periods of prolonged intense engagement		✓	✓

1. **Not engaged** – Activity at this level can be simple, repetitive and passive. Engagement and cognitive demand appear to be absent. Characteristics of this may be the child staring into space, disrupting other pupils or refraining from completing tasks.
2. **Regularly not engaged** – The child is engaged in an activity but this engagement is frequently interrupted by distractions or periods of disengagement; displaying the characteristics described in the 'not engaged' category.
3. **Generally engaged** – The child appears to be engaged with teaching/busy during task completion time, however this is at a basic level. There is some progress made in terms of learning however there are no signs of eagerness to learn/ask questions. The child is easily distracted from the continual engagement
4. **Periods of prolonged intense engagement** – For the majority of the observation period, the child shows continuous levels of intense activity and engagement, including: concentration, energy, resilience and persistence. Attitudes towards learning are positive and the child is rarely distracted by other stimuli.

Appendix B easy

INTERVIEW QUESTIONS FOR STUDENT A

Tell me one/two/three things new you learned today?

acid rain melts limestone

How did you feel about the task you chose?

it was easy

Did you enjoy the task or not enjoy it, and why?

yes because it was easy

Did you find the task to challenging, or too easy?

What would you change about the task you were given to improve it in helping you learn?

give it more questions we could have done an experiment to prove some stuff

INTERVIEW QUESTIONS FOR STUDENT C

Tell me one/two/three things new you learned today?

- How Acid rain is formed
- If acid rain is put in rivers lakes etc it kills aqualife

How did you feel about the task you were chose?

it was not too hard and it wasnt too easy
I really enjoyed it because it was intresting
to find out about acid rain.

Did you enjoy the task or not enjoy it, and why?

I did enjoy the task because it was
intresting to learn

Did you find the task to challenging, or too easy?

It was a little bit challenging.

What would you change about the task you were given to improve it in helping you learn?

I would extend the activity and learn
more about it.

Hard

INTERVIEW QUESTIONS FOR STUDENT B

Tell me one/two/three things new you learned today?

that Sulfur and Oxygen can create Sulfur dioxide,
Sulfuric acid is acid rain.

How did you feel about the task you were chose?

it was challenging but very fun and creative.

Did you enjoy the task or not enjoy it, and why?

I enjoyed it as it was a challenge.

Did you find the task to challenging, or too easy?

I found it fairly challenging

What would you change about the task you were given to improve it in helping you learn?

the extention could be different instead of giving another
solution.

Appendix C

Reflection model - (Gibbs, 1988)

Paragraph 1: Describe what happened? (in the lesson)

- direct teaching of the topic at first.
- sheets given to pupils (chosen by them in level of difficulty!)

Paragraph 2: Describe your feelings and emotional responses? (what did you think about the lesson and what did the pupils think about the lesson?)

- ^{most} ~~some~~ pupils loved the fact they chose the sheets: sense of ownership.
- Surprised 35% of class went for easy task

Paragraph 3: Consider what was good and bad about your response? (did the views between you and the learner differ?)

- good → pupils enjoyed topic + activity.
- bad → Some could it challenged themselves further.

Paragraph 4: How do you know sense of the situation? (Use sources/theories/academic research to help you to make sense of your reflection) (what does the literature say to back up your views?)

: later do this

Paragraph 5: What general conclusions can you draw from the event? What specific conclusions can you draw from the experience? (was it successful or not, why do you think this?)

* Success

- Pupils showed high levels of engagement.
- pupils showed ~~progress~~ progress

Paragraph 6: Based on your reflection, what would you do differently in the future? Do you have an action plan? (ideas for future use of differentiated tasks. How are you going to carry this forward?)

EB1: pupils recommended more questions?

- more bite activities during the lesson.
- potentially longer task ~~task~~
- ~~practical~~ hands on approach vs written.

Appendix D

Research Lesson 2

Tick if observed	Student A EASY (1)	Student B MEDIUM (2)	Student C HARD (3)
1. Not engaged			
2. Regularly not engaged			
3. Generally engaged	✓		
4. Periods of prolonged intense engagement		✓	✓

Q11/40

Q10/40

Q15/40

- Not engaged** – Activity at this level can be simple, repetitive and passive. Engagement and cognitive demand appear to be absent. Characteristics of this may be the child staring into space, disrupting other pupils or refraining from completing tasks.
- Regularly not engaged** – The child is engaged in an activity but this engagement is frequently interrupted by distractions or periods of disengagement; displaying the characteristics described in the 'not engaged' category.
- Generally engaged** – The child appears to be engaged with teaching/busy during task completion time, however this is at a basic level. There is some progress made in terms of learning however there are no signs of eagerness to learn/ask questions. The child is easily distracted from the continual engagement
- Periods of prolonged intense engagement** – For the majority of the observation period, the child shows continuous levels of intense activity and engagement, including: concentration, energy, resilience and persistence. Attitudes towards learning are positive and the child is rarely distracted by other stimuli.

Appendix E

INTERVIEW QUESTIONS FOR STUDENT A

Tell me one/two/three things new you learned today?

How to have a final method for adding, subtracting,
dividing, multiplying

How did you feel about the task you chose?

a bit easier than I thought

Did you enjoy the task or not enjoy it, and why?

I enjoyed it because it was easy

Did you find the task to challenging, or too easy?

too easy

What would you change about the task you were given to improve it in helping you learn?

Nothing

INTERVIEW QUESTIONS FOR STUDENT B

Tell me one/two/three things new you learned today?

How ~~do~~ to add ~~in~~ mentally

How did you feel about the task you were chose?

given?

it helped me learn

Did you enjoy the task or not enjoy it, and why?

i enjoyed it because we used the
ipads

Did you find the task to challenging, or too easy?

challenging

What would you change about the task you were given to improve it in helping you learn?

longer to do them.

INTERVIEW QUESTIONS FOR STUDENT C

Tell me one/two/three things new you learned today?

I learned different written methods.

How did you feel about the task you were chose?

There could have been more time

Did you enjoy the task or not enjoy it, and why?

I enjoyed the task but it was too easy.

Did you find the task to challenging, or too easy?

The task could have been harder

What would you change about the task you were given to improve it in helping you learn?

More time and harder questions

Appendix F

Reflection model - (Gibbs, 1988)

Paragraph 1: Describe what happened? (in the lesson)

→ differentiated task, back end of the lesson.

→ pupils were given differentiated task based on pre-assessed task

Paragraph 2: Describe your feelings and emotional responses? (what did you think about the lesson and what did the pupils think about the lesson?)

teacher: sheets worked well, class as a whole generally engaged.

pupils: enjoyed the challenge but needed more time.

Paragraph 3: Consider what was good and bad about your response? (did the views between you and the learner differ?)

→ Similar response to pupils.

pupils could of had more time on task.

Paragraph 4: How do you know sense of the situation? (Use sources/theories/academic research to help you to make sense of your reflection) (what does the literature say to back up your views?)

do later.

Paragraph 5: What general conclusions can you draw from the event? What specific conclusions can you draw from the experience? (was it successful or not, why do you think this?)

→ differentiation works better in ~~mixed~~ mixed ability vs set classes

→ classes like this maybe need extension activities more than scaffolded tasks/different challenges.

Paragraph 6: Based on your reflection, what would you do differently in the future? Do you have an action plan? (ideas for future use of differentiated tasks. How are you going to carry this forward?)

success in class engagement overall.

→ more time on main task.

• Still use pre-assessed tasks to link to main tasks

• differentiation depends on class and performance.

Appendix G

Name/Enw: _____ Form/Dosbarth: _____

The causes, effects and solutions of acid rain.

1) List at least two causes of acid rain, mentioning the gases involved:

a) _____

b) _____

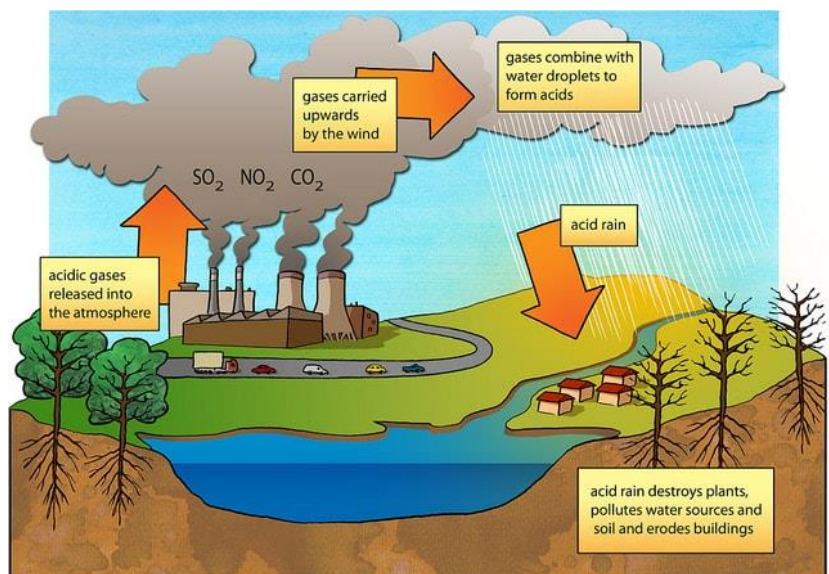
2) List at least two effects of acid rain:

a) _____

b) _____

3) List at least one solution for reducing the chance of acid rain:

Extension: why might people resist moving away from fossil fuels as a main source of fuel? (Please complete on back)



Name/Enw: _____ Form/Dosbarth: _____

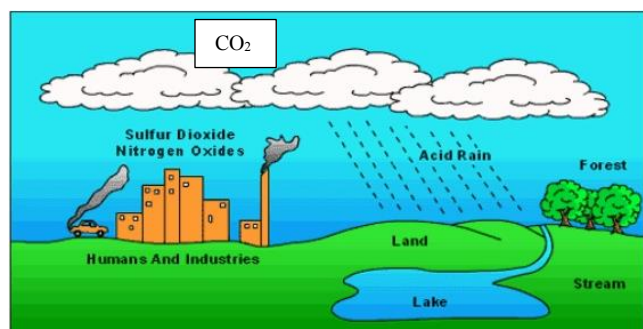
The causes, effects and solutions of acid rain.

- 1) Describe the process of how acid rain is made, including the names of the gases involved. Also describe some causes (where the gases come from):

- 2) Describe some effects of acid rain:

- 3) Suggest some possible solutions, and why people may oppose these changes:

Extension: how can you, as an individual, reduce your carbon footprint? Please complete on back)



Name/Enw: _____ Form/Dosbarth: _____

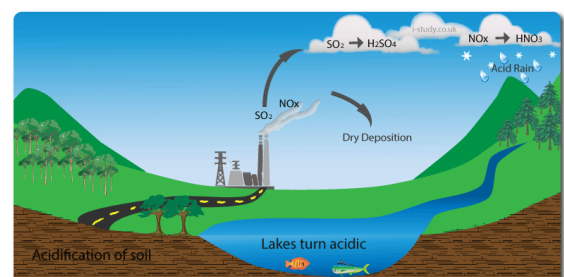
The causes, effects and solutions of acid rain.

- 1) Fully explain how acid rain is made. HINT - where do the gases come, which gases react with water, and what they become...:

- 2) Fully explain the effects of acid rain. HINT: Say what the long-term effects could be:

- 3) a) Suggest a solution b) how would this solution reduce the formation of acid rain c) evaluate the challenges that this solution presents (continue on back if out of room):

Extension: repeat question 3 (parts a,b and c) for another solution.
(Please complete on back)



Appendix H

Use a **WRITTEN METHOD** to calculate the answers to the following questions. (1)

1) $50 + 44$

2) $72 + 79$

3) $52 + 34$

4) $59 + 85$

5) $87 + 98$

6) $29 + 31$

7) $83 + 55$

8) $90 + 53$

9) $72 + 84$

10) $61 + 21$

11) $59 - 25$

12) $60 - 16$

13) $36 - 33$

14) $29 - 22$

15) $63 - 20$

16) $67 - 22$

17) $49 - 34$

18) $39 - 27$

19) $82 - 42$

20) $79 - 31$

21) 39×83

22) 28×74

23) 40×42

24) 78×22

25) 70×62

26) 97×57

27) 50×64

28) 60×80

29) 83×77

30) 87×30

31) $21 \div 7$

32) $18 \div 9$

33) $60 \div 10$

34) $81 \div 9$

35) $15 \div 3$

36) $56 \div 7$

37) $30 \div 5$

38) $10 \div 2$

39) $54 \div 9$

40) $63 \div 9$

Extension

- 1) Gwyn originally had 20 people going to his party. He then decided he wanted another 15 people to come. What is the total number of people going to Gwyn's party?
- 2) A drink and a box of popcorn together cost £3.00. If the popcorn costs £1.70, how much does the drink cost?
- 3) I need 25 booklets. Each booklet weighs 50g. How much do the 25 booklets weigh altogether?
- 4) Three people win £777 in the lottery. How much do they get each?

Use a **WRITTEN METHOD** to calculate the following. (2)

1) $39 + 65 + 27$ 2) $45 + 40 + 30$ 3) $40 + 17 + 34$ 4) $54 + 55 + 35$

5) $48 + 40 + 74$ 6) $44 + 51 + 39$ 7) $42 + 40 + 37$ 8) $29 + 87 + 71$

9) $70 + 30 + 87$ 10) $14 + 37 + 77$ 11) $203 - 78$ 12) $814 - 22$

13) $807 - 47$ 14) $457 - 13$ 15) $483 - 63$ 16) $257 - 24$

17) $874 - 84$ 18) $749 - 43$ 19) $633 - 38$ 20) $639 - 47$

21) 435×8 22) 949×7 23) 822×9 24) 637×8

25) 682×9 26) 706×8 27) 451×6 28) 180×8

29) 807×5 30) 329×5 31) $384 \div 4$ 32) $777 \div 7$

33) $228 \div 6$ 34) $999 \div 9$ 35) $636 \div 6$ 36) $396 \div 9$

37) $840 \div 7$ 38) $540 \div 6$ 39) $275 \div 5$ 40) $318 \div 3$

Extension

- 1) Gwyn originally had 6 people going to his party. He then decided he wanted another 15 people to come. Another 21 people came to the party uninvited. How many people went to Gwyn's party?

- 2) A tablet and its accessories came to £634. If the tablet was £576, how much were the accessories?

- 3) I need 34 booklets. Each booklet weighs 47g. How much do the 34 booklets weigh altogether?

- 4) Three people win £1260 in the lottery. How much do they get each?

Use a **WRITTEN METHOD** to calculate the following. (3)

- | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|
| 1) $94.3 + 76.9$ | 2) $83.5 + 71$ | 3) $77.1 + 40.3$ | 4) $32.6 + 19.1$ |
| 5) $57.5 + 83.7$ | 6) $19.7 + 99.3$ | 7) $34.6 + 49$ | 8) $38 + 85.8$ |
| 9) $97.2 + 66.3$ | 10) $48.9 + 99$ | 11) $89.6 - 40.2$ | 12) $88.6 - 47.1$ |
| 13) $90.4 - 26.4$ | 14) $79.4 - 45.7$ | 15) $66.5 - 28.6$ | 16) $78.4 - 36.9$ |
| 17) $86.7 - 34.1$ | 18) $64.9 - 34.7$ | 19) $75.2 - 37.7$ | 20) $77.1 - 15.5$ |
| 21) 913×37 | 22) 912×48 | 23) 209×15 | 24) 246×61 |
| 25) 860×60 | 26) 687×30 | 27) 323×53 | 28) 964×99 |
| 29) 208×49 | 30) 868×47 | 31) $3378 \div 6$ | 32) $3892 \div 7$ |
| 33) $1628 \div 4$ | 34) $8344 \div 7$ | 35) $3912 \div 6$ | 36) $8216 \div 8$ |
| 37) $2115 \div 3$ | 38) $2460 \div 4$ | 39) $3384 \div 3$ | 40) $5405 \div 5$ |

Extension

- 1) Gwyn was measuring the temperature over two days for a science project. The temperature on the first day was 10.3°C . By the second day, the temperature had increased by 7.9°C . What was the temperature on the second day?
- 2) A tablet and its accessories came to £804.99. If the tablet was £601.54, how much were the accessories?
- 3) I need 104 booklets. Each booklet weighs 92g. How much do the 104 booklets weigh altogether?
- 4) Three people win £9913 in the lottery. How much do they get each?

Appendix I

	Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points, differentiation strategies and key questions)	Pupil Tasks (Pupils' role –including differentiation, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
Opening phase (with links to prior learning)	0-5min	Welcome class, take register.	Pupils engagement with peers and show level of current understanding.	Ppt. Booklets
	5-8min	Think-pair-share starter: what are the causes of acid rain?		
	8-10min	Discuss pupils response.		
Teaching & Core Learning	10-12min	How can we measure how acidic something is? So pH scale and discuss substances.	Pupils are asked to draw on board the key stages.	Ppt. Whiteboard Worksheets Paper for poster coloured pencils
	12-15mins	What causes acid rain? Have pupils draw on board the following in boxes: Coal factory + car; clouds; rain; forest with river and lake.		
	15-20mins	Discuss with pupils how these all link. (1) Coal (fossil fuels) release sulfur when burned (2) Sulfur + oxygen in air = sulfuric dioxide (3) SO ₂ dissolves in water (clouds) = sulfuric acid (4) Sulfuric acid = acid rain (5) Making lakes, streams rivers acidic, damaging aquatic life. Pupils read out other effects from booklets.		

	20-25mins	ppt slide: We know the causes and effects, what about solutions? How can we solve the problem?		
	25-40mins	Pupils decide what worksheet to pick and complete. <u>Easy; medium; hard.</u>	Extension: (1) questions in booklet.	
	40-55mins	Pupils attempt poster of how we can reduce our carbon footprint.	(2) Start persuasive poster, explaining the causes, effect and solutions of acid rain.	
Plenary	55-60mins	<u>Answer following questions:</u> What is the name of the acid that causes acid rain? What does sulfur dioxide react with in the clouds? What two gases react to make sulfur dioxide? What do we burn that releases sulfur into the atmo.? What is the pH of acid rain? What is the pH of rivers, lakes and streams? What is the pH of normal rain water? List one negative effect of acid rain? List one solution to reduce the chance of acid rain? <u>***Pupils share ideas of how we can reduce our carbon footprint from poster.</u>	Formative assessment.	Whiteboards

Appendix J

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points, differentiation strategies and key questions)	Pupil Tasks (Pupils' role –including differentiation, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
Opening phase (with links to prior learning)	(GREET CLASS APPROX. 5 MINS.) - Welcome the class at the door (use Welsh such as shwmae, bore da or prynhawn da) - Ask the pupils to write the date (in Welsh), title and 'Gwaith Dosbarth' into their books - Have the starter on the board ready for pupils who settle quickly	(GREET CLASS APPROX. 5 MINS.) - Come into the class and be greeted in Welsh - Write the date (in Welsh), title and 'Gwaith Dosbarth' into your book - Look at the starter activity and begin if you have settled	- PowerPoint - Pens, pencils, rulers, etc - H&S: Ensure all bags and coats are under desks to avoid a tripping hazard
	(MENTAL METHODS DISCUSSION AND EXAMPLES APPROX. 5 MINS.) - Ask the pupil to think about and discuss how they work out operations mentally - Ask pupils at random to contribute to a class discussion (give praise in Welsh, e.g. da iawn) - Go through some examples on the board, explain the thought process for each mental method clearly – emphasise that if pupils have a	(MENTAL METHODS DISCUSSION AND EXAMPLES APPROX. 5 MINS.) - Think about the ways you work things out mentally – share this with the person next to you and the class - Listen to any explanations given about mental methods – it might benefit you if you don't have a clear way of thinking when doing mental maths	

	different method that works well, they can do it that way		
Teaching & Core Learning	(KAHOOT APPROX. 10 MINS.) • Load the Kahoot quiz • Ask pupils to use the iPads to access the Kahoot quiz • Explain that they have 20 seconds to answer each question • Work through the Kahoot quiz (WRITTEN METHODS DISCUSSION AND EXAMPLES APPROX. 5 MINS.) • Ask pupils if they have a written method for each of the operations (e.g. column method for addition and subtraction, Gelosia method for multiplication, bus-stop method for division) • Go through some examples – model one of the methods for each so pupils without a method can see	(KAHOOT APPROX. 10 MINS.) • Use an iPad to log on to the Kahoot quiz • Attempt the questions when they are on the board using a mental method (WRITTEN METHODS DISCUSSION AND EXAMPLES APPROX. 5 MINS.) • Explain any written methods you have so the class can hear you • Follow the examples on the board, listen carefully to the explanations	• PowerPoint • Pens, pencils, rulers, etc • iPads • Worksheets • H&S: Ensure all bags and coats are under desks to avoid a tripping hazard

	clearly what to do (PRE-SHEET QUESTIONS APPROX. 5 MINS.) • Explain how the questions work – the pupils have a few minutes to answer as many questions as they can, the amount correct determines which worksheet they are to work on • Put the questions on the board • Put the answers on the board for pupils to self-mark (WORKSHEET APPROX. 15 MINS.) • Ask pupils to collect the sheet they should be completing and then start working through it • Circulate when pupils are working – offer support to those who need it, check that pupils are on task, check that pupils are using a written method • Put the answers on the board for pupils to self-mark their answers	(PRE-SHEET QUESTIONS APPROX. 5 MINS.) • Listen to the explanation – ask any questions you may have about the task and how it works • When the questions are on the board work through them using a written method • When the answers are on the board, self-mark your answers • Total your score up (WORKSHEET APPROX. 15 MINS.) • Collect the appropriate sheet based on the score you got in the questions • Work through the sheet – ask for help if you need it • When the answers are on the board, self-mark your answers	
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Plenary	(WRITING QUESTIONS AND SWAPPING APPROX. 10 MINS.) • Ask pupils to write questions for their peers to answer based on what they've done today • Ask pupils to swap questions and answer each other's questions (DISMISS CLASS APPROX. 5 MINS.) • Ask the pupils to pack away and stand behind their desks • Dismiss the pupils, use Welsh such as hwyl fawr, da boch chi, etc.	(WRITING QUESTIONS AND SWAPPING APPROX. 10 MINS.) • Write questions for your peers • Swap questions with someone and answer their questions (DISMISS CLASS APPROX. 5 MINS.) • Pack away and stand behind your desk • Be dismissed	• PowerPoint • Pens, pencils, rulers, etc • H&S: Ensure all bags and coats are under desks to avoid a tripping hazard
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