

Overview

Monday, 23 September 2019 22:22

Assignment title:

PREPARE A PORTFOLIO (AS THOUGH YOU WERE SHARING WITH A MENTOR) WHICH ILLUSTRATES A CRITICAL REFLECTION OF PROGRESS MADE ON THE PLANNING AND IMPLEMENTATION OF 3 PEDAGOGICAL PRINCIPLES.

Student name:

ALEXANDER HART

Student number:

1902863

Pathway:

S-PGCE SCIENCE WITH BIOLOGY.

VIEWING LINK.

[6008](#) ([Web view](#))

https://uowtsd-my.sharepoint.com/:o/g/personal/1902863_student_uowtsd_ac_uk/EijR8HaxXxKrdakifAHrDABWLBwCab_DGmy6EixFV1M7A?e=s5sclE

Pedagogical principle 1

Friday, 4 October 2019 14:04

Good teaching and learning means employing assessment for learning principles.

Summary: the examples below show evidence of my implementation of assessment for learning techniques whilst on my first placement. This includes formative assessment games used in plenaries, the use of whiteboards, and assessing learning before the lesson has begun before moving the learning forward.

Example 1



Lesson Plan Phase 1

Lesson Plan – Step 1 Cynllun Gwers – Cam 1

Student-teacher	Alexander Hart	Class:	10D3
AoLE or Subject	Science & Technology	Date:	26/11/2019
Lesson Focus:	Anaerobic respiration		
Meaningful links to Curriculum	KS3 Science - the basic structure and function of some cells, tissues, organs and organ systems and how they support vital life processes		
Meaningful links to: Cross Curricular Responsibilities	Oracy - think, pair, share activity. Open questioning. Reading - new words added to vocabulary through reading. ICT - kahoot on iPads. Incidental Welsh - Instructions/praise/questions		
Personal Targets (Linked to QTS and identified in weekly reviews) Effective starter & ability to collapse parts of lesson to ensure quality plenary.			
Learning Objectives (focus on Learning- use accessible vocabulary):			
The pupils will learn to: Understand the difference between aerobic and anaerobic respiration.			
Success Criteria (clearly linked to each Learning Objective and related to the process and/or product of learning)	Assessment of Pupils' Learning Evidence (What have the learners to say/write/do/produce - to demonstrate learning) Marking - booklets. Open questioning - discussion of key points. Closed questioning - true/false style questions. Self Assessment - marking questions as we go through answers. ATL - kahoot/splat		
All pupils will be able to recall aerobic respiration. Most pupils will be able to understand that respiration can take place without oxygen. Some pupils will be able to understand that oxygen is used to break down lactic acid after exercise has finished - oxygen debt.			

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In this example, I assessed my pupils understand of aerobic respiration which was covered in the last lesson. I felt this was necessary because if they clearly understood important elements of the first topic, this will positively impact the successful learning of the second. Such an example is a form of formative assessment and scaffolding.

	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)	0-10mins	Starter: (RECAP) teacher distributes post it notes around class with words which fill in the blanks on ppt. If the pupils thinks they have the answer, they stand up and write answer on the board.	Pupils to call on prior knowledge to help understand new concept introduced today.	Post it notes ppt video of usain bolt
	10-15mins	Think, pair, share (1min). Watch video on Usain Bolt running 100m (1min)	Pupils given answers on post it notes, focusing on weaker pupils, and for them to come up and write answer on board.	
Teaching & Core Learning	15-18mins	Main: Introduce anaerobic respiration, and when it happens.	Pupils to answer open questions to why our heart beats faster and we breathe harder during exercise?	Ppt video on anaerobic respiration booklets
	18-23mins	Play video on anaerobic respiration (3min).		
	23-30mins	Explain to pupils the chemical word equation for anaerobic respiration; why and how we get rid of lactic acid.		
	30-40mins	Pupils answer questions in booklets about what has been taught.		
	40-45mins	Teacher to show answers on board, and go through with pupils.		

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Plenary	45-60mins	Class vote - Kahoot or Splat.	Pupils to decide on what activity they would like to do. Assessment on the topic of both aerobic/anaerobic respiration.	iPads
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As this lesson was only part of a two lesson topic, aerobic and anaerobic respiration, for the plenary I assessed my pupils learning through the online classroom game called kahoot. I gave the pupils a choice between splat or kahoot, which are both assessment tools and a way of collecting evidence to see if there are any common misconceptions, providing verbal feedback between each question if wrongly answered. It is worth mentioning was done individually. An example of the type of question used is shown below.

3

Example 2



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Yr Athrofa
Institute of Education
Addysg i Gymru / Education for Wales



Lesson Plan Phase 1

Lesson Plan – Step 1 Cynllun Gwers – Cam 1

Student-teacher	Alexander Hart	Class:	8RS
AoLE or Subject	Science & Technology	Date:	14/11/2019
Lesson Focus:	Male & female reproductive systems		
Meaningful links to Curriculum	KS3 Science - the basic structure and function of some cells, tissues, organs and organ systems and how they support vital life processes		
Meaningful links to Cross Curricular Responsibilities	Oracy - reading words/definitions in front of class. Writing - difficult new biological words introduced, pupils made to repeat spelling when labelling. ESDGC - asking questions; activating prior skills, knowledge and understanding. Incidental Welsh - Instructions/praise/questions. Da iawn atc.		
Personal Targets (Linked to QTS and identified in weekly review)			
Build classroom confidence & student-teacher relationships.			

Learning Objectives (focus on Learning- use accessible vocabulary):

The pupils will learn to:
Label and describe the functions of the male reproductive system.
Label and describe the functions of the male reproductive system.
Predict using their scientific knowledge what would happen if a part was missing.

Success Criteria (clearly linked to each Learning Objective and related to the process and/or product of learning)	Assessment of Pupils' Learning Evidence (What have the learners to say/write/do/produce – to demonstrate learning)
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All pupils will be able to label parts of the male and female reproductive system. Most pupils will be able to describe the roles of the parts in the male/female reproductive systems Some pupils will be able to scientifically describe what would happen if specific parts were missing.	Marking - assessing booklets with feedback. Open questioning - explain definitions, what would happen if..... Self Assessment - Card sort & taboo. Mark own booklets against whiteboard. AfL - Card sort. Taboo.
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		system (releases eggs, carries baby). Show and describe each part of the FRS. Teacher explains that in sexual reproduction, the DNA of the two sex cells/gametes, fuse their DNA at fertilisation, creating the start of a new person – relate this to how all the kids in the class were made.		
Plenary	48-58mins	Recap: Taboo like game is played. Teacher uses whiteboard with one word on it, one pupil with his/hers back to white board nominates one person from crowd to give functional definition. If too difficult pick someone else, that person comes up if explains correctly. 3 for MRS; 3 for FRS.	AfL: Pupils engage in fun game addressing their knowledge on the lesson.	White boards

This largely pupil led activity allowed students to assess not only what they learned in the lesson, but test others on their knowledge. You may describe this as a verbal peer assessment activity.

As an example, as the teacher I would write DNA on the whiteboard, then the pupil with his/hers who has not seen the word would nominate another learner from the class, and the question/definition I would be looking for (relating to what has been covered in the lesson) would follow along the lines of "What do the sex cells carry that fuse during fertilisation?".

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This fun and engaging activity stimulated deeper connections and thought, and promoted resilience, whilst assessing the pupils understanding of the key teaching points from the lesson.

Example 3



Lesson Plan Phase 1

Lesson Plan – Step 1 Cynllun Gwers – Cam 1

Student-teacher	Alexander Hart	Class:	7JT
AoLE or Subject	Science & Technology	Date:	3/12/2019
Lesson Focus:	Invertebrate key & scientific names		
Meaningful links to Curriculum	KS3 Science- Interdependence of organisms - studying vital life processes. New topic – Our world: relating to Successful Futures & the four purposes.		
Meaningful links to: Cross Curricular Responsibilities	Reading: distinguish between facts, theories and opinions and use evidence to show the differences. Writing: Using key words to form definitions for learning. Listening & Oracy: Pupils will listen clearly to instruction for task success and have to verbally justify answers as individuals and as a group.		
Personal Targets (Linked to QTS and identified in weekly review)			
Effective starter and plenary			

Learning Objectives (focus on Learning- use accessible vocabulary):	
The pupils will learn to:	
Use identification keys, and the use of binomial names in classification.	



Success Criteria (clearly linked to each Learning Objective and related to the process and/or product of learning)	Assessment of Pupils' Learning Evidence (What have the learners to say/write/do/produce – to demonstrate learning)
All pupils will be able to find simple differences between invertebrates. Most pupils will be able to use a key to help	Marking - booklets, creation of key. Open questioning - class discussion. Closed questioning - yes/no for key.

Lesson 5 Invertebrates	classify organisms. Some pupils will be able to successfully use a key, and understand the importance of binomial names in taxonomy and classification.	AFL – hot seat.
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	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)	0-8mins	Starter: Students look at 5 different types of biscuits, what makes them different? Shape, layers, flavour.	Pupils to use knowledge of classification to find differences in the biscuits.	Ppt. biscuits
Teaching & Core Learning	8-15mins	Introduce biscuit key, and use what the pupils have come up with to compare. Show animal key. KEY POINTS: YES/NO style key. And regularly used by environmental field surveyors.	Pupils to come up with their own keys, for biscuits and for invertebrates. Differentiated by how many animals to use in key. 4 easy, 6 medium, 8 hard.	Ppt. Scrap paper iPads (maybe) booklets
	15-20mins	Question in booklet, match animal to key.		
	20mins-35mins	Pupils create own key on <u>scrap paper</u> .		
	35-40mins	Show common names. Different animals have different common names.		
	40-50mins	Why do we use binomial names. Universal. Show examples of binomial names on slides. * EXTENSION – pupils can start homework on		

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		iPads. Gwaith cartref – WRITE ON BOARD. weds 11/12/2019 Complete binomial table in booklets.		
Plenary	50-60mins	HOT SEAT: One pupil sits and thinks of an animal, other pupils ask yes/no questions to find out what it is using KEY.	Pupil led activity, simulating creativity. Learners use knowledge of keys and work together to find the animal.	Ppt.

This example of a 'hot seat' used in the plenary is evidence of assessment for learning. Pupils here will demonstrate understanding of how a key works when classifying organisms. This activity assesses not only their ability of how to interpret a key, but also their knowledge of the animal that is chosen, i.e. they have to know how many legs it has, if it can fly, does it have a segmented body etc.

In this example believe the pupils can learn from their mistakes, and others within the class can also learn from their mistakes and successes.

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Lesson Plan – Phase 1 Evaluation of the Learning Experience (include references to QTS)

Evaluation of Pupil Learning	
Evidence of Learning (including attitude to learning over time))	Pupils engaged in topic, with some showing resilience when it came to creating own classification key.
Next Steps for Progress	Differentiate further for lower ability pupils, especially since this is a year 7 class.

Reflective Analysis of Teaching and Strategies For Development – including justification/rationale for pedagogical choices	
Evidence of my Effective Practice	APK – reaffirming knowledge gained before to build upon (scaffolding). Good plenary – HOT SEAT works well and pupils seem to very much enjoy, and a great way to assess learning.
Areas for my Development	Provide clearer instructions, particularly for lower ability pupils.
Personal Targets for Progress	Offer greater differentiation for pupils, key words on the board as an example to help stimulate ideas when some individuals are struggling.



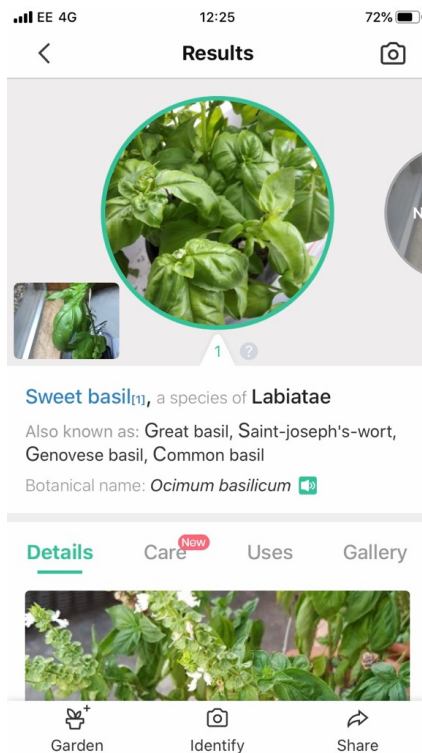
Pedagogical principle 2

Friday, 4 October 2019 14:04

Good teaching and learning regularly reinforces cross-curriculum responsibilities, including literacy, numeracy, and digital competence, and provide opportunities to practice them.

Summary: the evidence below shows a mixture of different cross-curricular responsibilities incorporated into lessons during my first placement. The aim of this is to develop the literacy, numeracy and digital competency of my pupils, adding value to what is being taught in the lesson whilst reinforcing other vital skills.

Example 1

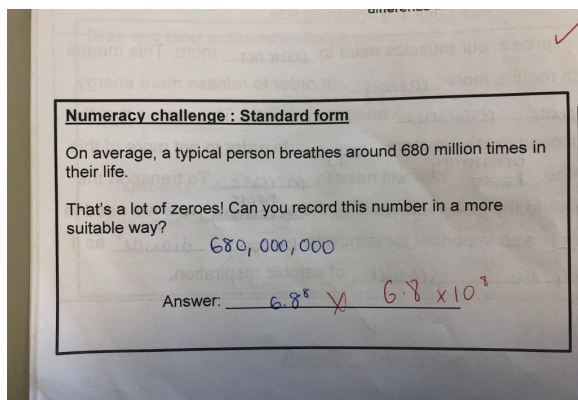


Digital competency:

This is a screenshot from an digital application which was used in one of my lessons, where learners used iPads out side of the classroom to identify plant species around the school based on their individual characteristics, such as leaf size and shape, structure of flowers, and other unique features.

This type of identification tool is actually used by ecological/environmental specialists when carrying out surveys, and therefore gives pupils a real life feel and experience of what such a job entails.

Example 2 & 3



Numeracy:

Here, the use of standard form as a way of describing how many breathes the average human takes in a lifetime is shown. In this example, the student has incorrectly answered the question, and feedback was given for the correct answer. This was also gone over in class so that the pupils understand how to calculate this correctly.

PORTHCAWL TO CARDIFF AIRPORT IS 22 MILES (35KM)

IF MY CAR TRAVELS AT AN AVERAGE OF 50 MPH (80KPH).....

THEN....

(TIME = DISTANCE / SPEED)

$35\text{KM} / 80\text{ KPH} = 0.4375 (\times 60) = 26.25$ minutes.

ROUND IT TO WHOLE NUMBERS.

SO, **26 MINUTES.**



This slide from a PowerPoint was used when pupils were given the opportunity to plan a holiday of their choice, calculating the logistics of how long it would take them to get there from point to point travel. The above example clearly demonstrates numeracy being used within a physics lesson, where pupils used prior knowledge of how to calculate speed, and had to transpose the equation (Speed = Distance/Time), to calculate time taken. Equation transpositions are used commonly in mathematics, and therefore this work reinforces this concept and enhances the pupils ability to interpret this in a different and useful way.

Example 4

THE SOLAR SYSTEM

Our solar system is made up of 8 main planets and a number of smaller dwarf planets. The size of our solar system is vast, and the distance between planets would take many, many years to travel in some cases. The planets all have different surfaces, properties and structures. Earth is the only planet we know of that can support human life...for now

An easy way to remember the order of the planets (including Pluto) is:
My Very Easy Method Just Speeds Up Naming Planets
See if you can come up with a new rhyme to remember the order of the planets (not including Pluto)

M ercury
V enus
E arth
M ars
J upiter
S aturn
U ranus
N eptune

Pluto

It takes 365 1/4 days for our planet, Earth to orbit the Sun - this is one earth year.

It takes 24 hours for our planet to turn once on its axis - this is one earth day.

What do you think happens to the length of time it takes the planets to orbit the sun as they get further away? Explain your answer.

Literacy:

The example shown was for a year 7 physics class. Here, the pupils are learning about the planets, and as a way to remember the order of planets from the sun the learners had to create their own mnemonic. This is a very common and usual activity for this, but the students very much enjoyed, and some really showed off their knowledge of a wide and creative vocabulary. Others found it more challenging, but the underlying aim was for them to develop literacy skills through such a challenge. Examples of this were shown to help learners, such as:

"Man, Voldermort Exclaimed! My Jinx Should Utterly Nuke (Potter)".

I also provided sentence starters from some on the whiteboard, which included:

"My Very Extravagant Mother....."

"My Various Entourage Might....."

Mon 18/11 L1 7th Physics

- Pupils enjoyed bingo and showed good recall from last lesson

- Good reminder about one voice, more strict about

but be
 sticking to it - you can wait
 for them to be absolutely silent.

- Good use of praise
- Nice example of a mnemonic!
- You waited for silence much better after the next task.
- Go over definitions to make sure pupils have come up with something suitable - some did not complete.
- You could allow pupils to read out some of their mnemonics.

I think this was in your plan - this was done at the end.

Feedback from my class tutor of use of the mnemonic in the lesson.

Pupils had the opportunity at the end of the lesson to read out their own mnemonics. I believe this is important not only for them to show off their creativity, but also to build confidence in speaking in front of others and developing oral skills, but also for pupils to learn from their peers.

Pedagogical principle 3

Friday, 4 October 2019 14:04

Good teaching and learning means employing a blend of approaches including direct teaching.

Summary: the evidence below will show a blend of approaches that I have incorporated into my teaching and planning, from traditional methods such as direct teaching by the teacher (which definitely has its place in a content/fact driven subject such as science), showing videos, to using other methods such as constructivism and discovery learning. By using such a variety of methods hopefully all pupils can access the learning objectives and progress as learners, whilst building different learning skills.

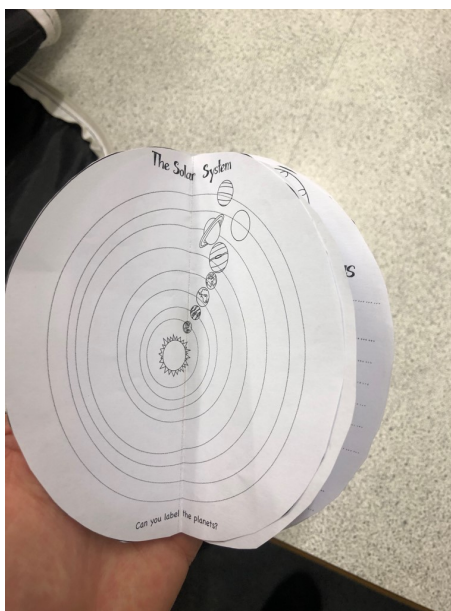
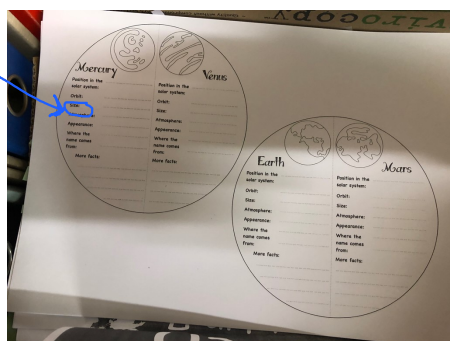
Example 1

	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)	0-10mins	Starter: Research terms – learners to think about what each term means relative to research: Accuracy, Relevance, Authority, Purpose Define and discuss each term as a class.	Pupils to come up with ideas for key words regarding research – pupil led activity.	Ppt.
Teaching & Core Learning	10-15mins	Main: Solar System Circle Books Discuss with learners examples of good websites to use e.g. NASA shown on power point – hyperlinked so they can be shown how to navigate the website. Go through instructions for creating the book.	Learners use iPads to research and gather information to create their circle book for the remainder of the lesson.	Solar system circle book sheets. Glue Scissors iPads ppt.
	15-50mins	Pupils research information and create solar system booklets.		

2

In the above example, pupils created their own solar system circle books based on the research they conducted on the iPads in class. Firstly we discussed how to collect and to critically choose the right information to fill in the books, such as what websites are you using, do the facts look right, and consistency of information i.e. diameter or circumference of planet when filling in size.

I assisted the pupils as much as possible, but after a brief introduction and model of how to complete the task effectively, they worked in pairs to research and complete as much of their booklets as they possibly could.



Example 2

The PowerPoint shown below is one that I created to teach a lower ability year 10 biology class, a lesson of which I was proud of. Here I demonstrated a few different approaches to teaching and learning, such as:

(1) assessing prior knowledge from previous lesson, as a way to reaffirm learning and to build upon (scaffolding).

- (2) the use of relatable video's to engage pupils in a visual way.
 (3) Open questioning to draw out and expand pupils ideas and understanding for them to pull all the information together, creating links!
 (4) Think-pair-share activity where pupils work in pairs and collaborate their ideas to stimulate and progress learning.

LEARNING CHECK

WHAT IS THE CHEMICAL CHANGE THAT OCCURS IN AEROBIC RESPIRATION?

OXYGEN + GLUCOSE → CARBON DIOXIDE + WATER

THIS RELEASES ENERGY, AND OCCURS IN OUR LIVING CELLS, AND IS CONTROLLED BY ENZYMES.

Think-pair-share activity to address key questions of when does aerobic respiration turn into anaerobic respiration.
 *Pupils struggled at this hurdle. Maybe due to lack of understanding of anaerobic respiration, however I did present this as a challenge just to see if they could work together and benefit for one another's ideas/interpretation.

IMAGINE IF OUR BLOOD CANNOT SUPPLY ENOUGH OXYGEN TO OUR MUSCLES FOR AEROBIC RESPIRATION?

SHARE AN EXAMPLE OF WHEN THIS COULD HAPPEN?



https://www.youtube.com/watch?v=3nbjhpCZ9_g

This video is of Usain Bolt setting the 100m record, to demonstrate when anaerobic respiration could take place. A lot of pupils in the class are heavily involved in sport, so such a video is well suited and promotes maximum engagement.

WHEN WE EXERCISE, OUR:

BREATHING RATE INCREASES. WHY?



HEART RATE INCREASES. **WHY?**



IS THERE A LIMIT TO HOW FAST WE CAN BREATHE, AND HOW FAST OUR HEART CAN BEAT?

THERE IS A LIMIT TO HOW MUCH OXYGEN IS SUPPLIED TO OUR MUSCLES FROM THE BLOOD.

SOME TIMES WE CANNOT SUPPLY ENOUGH OXYGEN, BUT WE STILL NEED RESPIRATION TO TAKE PLACE.

WHY? WHAT DOES IT RELEASE?

IF THE DEMAND FOR OXYGEN IS GREATER THAN THE SUPPLY, OUR CELLS CARRY OUT ANOTHER TYPE OF RESPIRATION.

WE CALL THIS **ANAEROBIC** RESPIRATION. THIS IS **WITHOUT OXYGEN**.

**The questions on this slide and discussion that followed helped the pupils to develop and progress their knowledge step by step (scaffolding).

[HTTPS://WWW.YOUTUBE.COM/WATCH?
V=40WP3-NTNIS](https://www.youtube.com/watch?v=40WP3-NTNIS)

This video explains anaerobic respiration in terms of biology, and included a fun and engaging activity where the pupils opened and clenched their hands for the duration of the video (3min), and ACTUALLY felt the by-products of anaerobic respiration (lactic acid), making it real and tangible!

ANAEROBIC RESPIRATION

GLUCOSE → LACTIC ACID
(+SOME ENERGY)

LACTIC ACID IS HARMFUL TO OUR BODY – WHAT COULD IT CAUSE?



OXYGEN DEBT



Why is our heart rate still high, and why do we continue breathe fast/hard after exercise?

The lactic acid that our muscles just produced is broken down by the oxygen that we need to pay back!

Key questions were included to help explain, discuss and tackle difficult concepts in the topic.

This blend of explanation, followed by discussion, is vital to show that the pupils understand what is being presented to them.

Type of respiration	Aerobic	Anaerobic
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Requires oxygen		
Requires glucose		
Releases energy		
Produces carbon dioxide		
Produces water		
Produces lactic acid		
Results in oxygen debt		

Word equation for anaerobic respiration:

_____ → _____ + (_____)

Anaerobic respiration in humans releases _____ from glucose without needing _____.

This means that when there is a _____ of oxygen, cells carry on _____ for a short time. Anaerobic respiration releases _____ as a waste. This is a mild poison and can cause _____.

Word equation for anaerobic respiration:

GLUCOSE → LACTIC ACID + (SOME ENERGY)

KEY WORDS:

CRAMP ENERGY SHORTAGE OXYGEN LACTIC ACID
POISON RESPIRING

Anaerobic respiration in humans releases _____ ENERGY _____ from glucose without needing _____ OXYGEN _____.

This means that when there is a _____ SHORTAGE _____ of oxygen, cells carry on _____ RESPIRING _____ for a short time. Anaerobic respiration releases _____ LACTIC ACID _____ as a waste. This is a mild _____ POISON _____ and can cause _____ CRAMP _____.

Example 3

This example demonstrates how I use open ended questions to allow students to develop as learners. I have provided the first page of the lesson plan showing the topic (fertilisation and embryo/fetus development), and a slide from the PowerPoint which contains the open questions (see after lesson plan below).

Lesson Plan Phase 1

Lesson Plan – Step 1 Cynllun Gwers – Cam 1

Student-teacher	Alexander Hart	Class:	8RS
AoLE or Subject	Science & Technology	Date:	28/11/2019
Lesson Focus:	Gametes and fertilisation in sexual reproduction		
Meaningful links to Curriculum	KS3 Science- the basic structure and function of some cells, tissues, organs and organ systems and how they support vital life processes.		
Meaningful links to: Cross Curricular Responsibilities	Oracy - pupils asking other pupils questions in the hot seat. Writing - Numeracy - use of table of results and creating graph. Incidental Welsh - Instructions/praise/questions		
Personal Targets (Linked to QTS and identified in weekly review) Effective starter and plenary.			

Learning Objectives (focus on Learning- use accessible vocabulary):	
The pupils will learn to: Identify male and female sex cells; understand the process of fertilisation.	
Success Criteria (clearly linked to each Learning Objective and related to the process and/or product of learning)	Assessment of Pupils' Learning Evidence (What have the learners to say/write/do/produce – to demonstrate learning)
All pupils will be able the name and female sex cells. Most pupils will be able to show a good understanding of the fertilisation process. Some pupils will be able to comprehensively predict how a sperm gets to the egg.	Marking - answers in booklets. Open questioning - discussion of sex cells specialisations. Self Assessment - some questions in booklet. AfL – hot seat.

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The idea behind this was to get the students to make links between what has been taught to them before about all living things, and make it relatable to the development of human offspring. The actual link was between respiration (one of the seven life processes) and how that it is used for growth, and how a fetus develops when in the uterus.

By passing these questions to the learners, they themselves can start to make links across the topics, with an aim of boosting their understanding and confidence.



Example 4

The lesson plan below was for a year 7 chemistry class where we looked at different gases, and how we can test for some in particular (Hydrogen, Oxygen and Carbon dioxide).

A variety of teaching methods were used for the session, but for this I have concentrated on the demonstration that I showed the pupils before they would conduct the practical themselves. This was done for a variety of reasons, a way of giving health and safety instructions being one, but also to show the pupils how to execute the practical correctly to achieve the required and wanted result. This style of teaching modelled how to carry out the experiment correctly, which would be far more difficult to do via a written method or instruction list. By the pupils engaging visually, and asking related questions, they were much more likely to achieve the expected outcome

safely and correctly.

To give further detail, the pupils only carried out the hydrogen gas test, where they would hold a lit splint to a test tube (containing the reactants hydrochloric acid and magnesium ribbon, producing hydrogen), which had been sealed for approx. 2 mins, creating a squeaky and loud 'pop' sound.

	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)	0-6mins	Starter: Pupils write down on sticky notes name of three common gases they know (mention nitrogen in the atmosphere too).	Pupils to use any prior knowledge, stimulating engagement and creativity.	Ppt Gas test apparatus post it notes
Teaching & Core Learning	6-20mins	Demo: gas test for hydrogen, oxygen and carbon dioxide.	Pupils engage and ask questions when watching demo, before trying the hydrogen prac themselves.	Ppt. Gas tests for pupils booklets
	20-25mins	Teachers instructs pupils to exercise 5 in booklets, p8 to complete.	Pupils fill in booklets.	
	25-35mins	Teacher plays demo of combustion (youtube) and its products, pupils write down observations in booklet.		
	35-50min	PRAC: hydrogen gas test (pupils in pairs, 13 sets)		
	50-55mins	Exercise 2, p.9 in booklets		

2

Lesson Plan – Phase 1 Evaluation of the Learning Experience (include references to QTS)

Evaluation of Pupil Learning	
Evidence of Learning (including attitude to learning over time)	All pupils engaged throughout lesson, very much so in the practical!
Next Steps for Progress	Continue to ask questions around the class to increase and maintain engagement/involvement.

Reflective Analysis of Teaching and Strategies For Development – including justification/rationale for pedagogical choices	
Evidence of my Effective Practice	Good simple and effective starter. Quick but well covered plenary, assessing knowledge gained from this lesson and ones gone past.
Areas for my Development	Plan extension tasks for pupils that quickly go through tasks, literacy or numeracy tasks!
Personal Targets for Progress	Always check risk assessments to ensure everyone is safe! Make extension tasks, possibly a worksheet ready to go just in case.

4

Critical reflection

Friday, 4 October 2019 14:04

“PREPARE A PORTFOLIO (AS THOUGH YOU WERE SHARING WITH A MENTOR) WHICH ILLUSTRATES A CRITICAL REFLECTION OF PROGRESS MADE ON THE PLANNING AND IMPLEMENTATION OF 3 PEDAGOGICAL PRINCIPLE”

Introduction

This essay is a written critical reflection of my personal progress in the planning and implementation of three pedagogical principles from the new Wales Curriculum 2022, Successful Futures (Donaldson, 2015). This reflection will be linked to and supported by related reflective evidence that I have gathered from my first teaching placement whilst working towards the completion of my PGCE at University of Wales Trinity St. David.

Furthermore, this essay will draw upon useful and relevant literature, informing the reader of the effectiveness of different teaching methods and techniques associated with each pedagogical principle, ultimately developing my teaching skills, knowledge and understanding, with an overarching goal to inform future practice.

The purpose of a critical reflection is to help develop myself as a student-teacher (Pollard and Triggs, 1997; Smyth, 1989), through discussing the successes and failures of pedagogy I have tested within the learning environment.

Pedagogical principle 1

“Good teaching and learning means employing assessment for learning principles”
(Donaldson, 2015).

Literature review

This pedagogical principle suggests that the implementation of assessment for learning (AfL) in an educational practitioner's everyday teaching practice supports learners through feedback so they can move forward in their development, creating effective teaching and learning. Assessment should be used in this way, to aid and benefit learners in increasing their levels of attainment and progress (Black & Wiliam, 2005, 2006; Gardner, 2012).

An everyday example of AfL, and one which reaps great rewards, is the use of formative assessment in a teachers' planning and teaching (Gardner, 2012). The theory of formative assessment is difficult to define and pin down within pedagogy, nevertheless such an assessment tool can be used dynamically in many varying ways and methods as a way to inform both teacher and learner of progress and understanding (Black & Wiliam, 2009). Different methods of this may include displaying the success criteria to pupils before a task; the use of questioning during learning; peer assessment; self-assessment; and the use of formative assessment from summative assessment tasks i.e. evaluation of knowledge from end of topic tests to address misconceptions etc. The use of feedback during key points in a lesson or along a learning journey is vital to the progress of the individual, and also the class as a functional unit (Gardner, 2012; Hattie, 2009; Hattie and Timperley, 2007).

With such a broad variation in the application of different methods used as formative assessment, all of these techniques must relate back to the AfL pedagogical principle to create continuity. Therefore, a structured framework would be extremely beneficial. Wiliam and Thompson (2007) used the work of Ramaprasad (1983) to help focus the aims of AfL by employing three clear objectives, which are: i) establish an idea where the learning is in his or hers learning; ii) establish where he or she is going; iii) establish a course of how to get there (Wiliam, 2019).

The implementation of such a frame work for formative assessment is supported by significant evidence of learning acquired from real classrooms. Research conducted by Black et al. 2003, concluded that even though it is hard to give quantitative data to show improved attainment from assessments such as GCSE or KS3 examinations, their results show small improvements (an increase of between one-quarter and one-half of a grade per learner per subject, specifically to maths, English and Science at GCSE level) are achievable and directly linked to the implementation of formative assessment over the course of a teaching year. Even though this

improvement of attainment sounds modest, formative assessment has the potential, if used effectively, consistently and carried across the whole school culture, to improve overall performance which all staff, particularly senior leadership, would very much welcome.

Implementation within my planning

AfL, in particular the use of formative assessment in learning, is something I believe I would have unknowingly used within my planning even without identifying it with such a title. I understand that learning anything or working towards any goal is an ongoing process, and like many other things in life, you have to honestly identify where you are, where you want to go, and how you plan to achieve it.

Evidence that I have collected to show the implementation of this principle in my planning and teaching mostly took the form of starter and plenary activities. I found that these are key points during a lesson, and a great opportunity to assess pupils understanding at the start of a lesson before carrying the learning forward, and as a way of assessing pupils understanding after information is presented and worked towards. With reference to example 1 for the first pedagogical principle, this was the second lesson in a two-lesson topic, covering aerobic and anaerobic respiration. This was for a lower set foundation double science class, where some, if not most pupils, may have found the content difficult to access and understand. By distributing post-it notes at the start of the lesson to all pupils around the class with a specific word written on, and then by completing a 'fill in the blank' paragraph on a powerpoint, I was able to assess my pupils understanding of aerobic respiration from the last lesson, before advancing on to anaerobic respiration which introduces new and potentially difficult concepts. Here, most pupils showed a good level of understanding, so I was pleased to move the learning forward. This relates back to the AfL framework that William and Thompson (2007) put forward, as a means of understanding where the pupils are in their learning, in this case as a class, before deciding where to go next.

Examples 1, 2 and 3 all show examples of AfL used within my plenaries. I found that by incorporating formative assessment activities into the end of my lessons, I could capture any misconceptions or common errors made by pupils in real time, and correct them then and there, by giving instant feedback. I also identified that by varying the formative assessment activities I used such as *Kahoot!* (an online quiz platform), pupil hot seat, and taboo, I could monitor the levels of engagement from the learners, demonstrating the effectiveness of each activity, which subsequently may affect the quality of feedback that it gave me. Moreover, feedback from learners from formative assessment activities helped inform the progress and success of decision-making that I was making as a teacher. In example 3, pupils showed a consistent and fair amount of difficulty during the plenary. This gave me valuable insight into the way in which I delivered the main activity where pupils had to make their own classification key. If I provided a clearer framework for how to successfully complete the task, and delivered the information at a more manageable pace, pupils may have achieved greater results and showed greater understanding during the plenary.

Going forward, I plan to continuously use different AfL activities within my starter and plenary activities to develop a bank of trial and tested techniques. I also found that within some lessons, activities would go on for longer than I hoped, and as a direct result I missed key opportunities to assess learning through employing AfL techniques. Therefore, I plan on developing my ability in being able to collapse certain parts of a lesson and/or tasks, to allow time for such important events to take place.

Pedagogical principle 2

"Good teaching and learning regularly reinforces cross-curriculum responsibilities, including literacy, numeracy, and digital competence, and provide opportunities to practice them" (Donaldson, 2015).

Literature review

This pedagogical principle places a focus on embedding cross-curricular responsibilities in everyday teaching through a natural and real-life approach, rather than just an add-on tick box exercise (Donaldson, 2015). This approach ultimately aims to equip pupils with skills, knowledge and resourcefulness that is vital for life beyond the classroom, in order to contribute to society in a positive and impactful way as citizens of the world (Byrne and Brodie, 2013; Donaldson, 2015). In particular to Wales, the Welsh Government introduced the Literacy and Numeracy Framework (LNF) in 2013 as a way of supporting schools to improve their pupils' skills in these areas in order to help learners reach their potential, more recently the Digital Competence Framework (DCF) was also released, and both are now a statutory responsibility within all areas of teaching and learning (Welsh Government, 2019).

This theme of cross-curricular teaching and learning takes on a holistic approach through developing an individual's skills by transferring them across varying subject areas, making learning much more relevant (Byrne and Brodie, 2013). This blends perfectly well with

Successful Futures, the new curriculum for Wales 2022, where subjects are not seen as or taught in isolation, but are all interwoven under the same learning umbrella (Donaldson, 2015). With this in mind, teachers of particular subjects may argue that some subject areas are more compatible with others, and thus trying to make links in some instances can be categorised as forced and unnatural. Subject identity is definitely drawn upon in the everyday teaching of a subject, and a certain level of intelligence needs to be applied into the planning stage when incorporating these cross-curricular responsibilities (Savage, 2010).

Hickman and Kiss (2010) carried out a case study to assess the success of different strategies associated with the learning experiences of their pupils. They concluded that the pupils involved within the study found that cross-curricular activities were more relevant to their learning when the links were made clear and purposeful by the teacher. Furthermore, Savage (2012) put forward the idea, developed during cross-curricular case study analysis with four secondary schools within the UK, that the implementation of cross curricular responsibilities should fall within a teacher's subject-specific pedagogy rather than being viewed as a principal feature of curriculum design, and therefore it is *how* the cross-curricular activity is implemented that is most significant to its success in order to benefit the individual learner.

Implementation within my planning

During my first 5-week teaching block within my first placement school (PTE1) for my PGCE year I had the opportunity to teach all three sciences, biology, chemistry and physics. Some of these subjects lend themselves to particular cross curricular links more than others, such as the regular use of numeracy in physics, and the literacy element of writing a prediction or hypothesis before an experiment in biology or chemistry.

The three cross-curricular links that I have evidenced as part of my planning and teaching are all stated within the associated pedagogical principle, including numeracy, literacy and digital competence. Example 1 shows a digital application called PlantSnap, which was used by each pupil during a lesson, where learners had to identify and classify a plant species within the school grounds using an iPad, and later research facts about each species from internet sources. This may appear to be solely a fun and engaging activity, but as having previous experience of ecology work I used my knowledge to explain to the pupils that applications such as the one we used, are in fact regularly used by working professionals. I believe this gave the pupils a greater sense of ownership of their learning. The learners also worked critically on the information that they received, deciding whether the application was reliable and accurate. Considering this was a year 7 class, many of the pupils showed great promise, and obvious progress was seen throughout the lesson.

Examples 2 & 3 show evidence of numeracy used within two separate lessons, which tested some pupils on their knowledge of standard form, and others worked on their understanding of equation transposition. As Savage (2010) suggests, I believe I have shown two strong examples of practical ways to include, test and develop numeracy within the sciences, which definitely carry the potential to improve a learner's number skills in an abstract way.

Example 4 shows the use of a mnemonic to develop literacy in a year 7 physics class, by ordering the planets in distance from the sun. The task worked well and most pupils were fully engaged, suggesting some creative and unique ideas. Pupils also responded well to the Harry Potter example used. However, in honest reflection, I found literacy difficult to evidence, but I am confident that as I gain more experience in teaching the science curriculum I will have more opportunity to develop this cross-curricular responsibility within my own teaching. Furthermore, due to the fact that pupils work from booklets which are created by the department, and I have a general scheme of work to follow, opportunities for me to implement my own ideas to show such links are further limited.

To improve my implementation of cross-curricular activities within my teaching, I plan to focus on the appropriateness of tasks when creating links to avoid creating unnecessary confusion (Savage, 2010), and to orally make links clear to pupils so they understand their relevance, as Hickman and Kiss (2010) suggest. Further to this, I plan to research different techniques and examples of how to include literacy within an everyday lesson when in the planning phase (Savage, 2010).

Pedagogical principle 3

"Good teaching and learning means employing a blend of approaches including direct teaching" (Donaldson, 2015).

Literature review

Lev Vygotsky (1962) and Jean Piaget (1964) were both pioneers regarding research into how one develops as a lifelong learner. Their relatively opposing findings build the foundation of which teaching was based upon. Vygotsky proposes a greater emphasis on a teacher-led

approach, where an individual who is more skilled provides opportunities to pass on their knowledge, whereas in Piaget's more pupil-led approach a teacher merely supports children in their development through discovery learning. However, since much time has passed since these initial theories were proposed, approaches to teaching and learning have moved on significantly. Current research has now led us to the consensus view that rather than using a one size fits all teaching approach, we must employ a blend of approaches teaching to maximise the chance of progress made by the learner (Bidarra and Rusman, 2017; Bransford et al. 2000; Hattie, 2008, 2012). In John Hattie's (2012) book, *Visible Learning for Teachers*, this idea of a blended approach is taken a step further. Through countless observation, he proposes that when presenting material through different mediums, such as visual, verbal or digital forms, they need to be closely linked in time and space for effective learning to take place so learners can interact with different examples to develop a deeper sense of understanding. Hattie (2012) also mentions that through this varied method of teaching, it reduces the chance of overloading cognitive function, allowing for clearer function and focus.

Even though it is important to use a blend of teaching methods, when teaching the sciences, direct teaching, if done effectively, is an extremely invaluable teaching tool as it a fact and content driven subject, similar to mathematics (Bransford et al. 2000). However, this traditional method of teaching can be tailored to engage learners through different means. Gaba (2002) showed that the use of modern technologies such as video to help explain concepts to learners is a simple, accessible and powerful tool to develop knowledge, but should not be used as a substitution but rather as an enhancement. As teaching and learning are deeply related, for direct teaching to be successful, a teacher must understand where the pupils are in their learning. This can be done through calling upon pupils' prior knowledge to help learn new material. This strategy is termed scaffolding, and in some cases, knowledge needs to be even unlearned and built back up again if there are misconceptions or concepts poorly perceived (Hattie, 2012). Another useful example of direct teaching is modelling, where a teacher visually demonstrates how to do something successfully before the pupils try for themselves (Haston, 2007). Again, this needs to be used appropriately to benefit learning and clearly demonstrated through using explicit success criteria to not cause future confusion (Hattie, 2012).

This pedagogical principle of blended approaches is greatly connected to the others mentioned within this text. Pupil feedback from AfL is needed to inform the teacher on his or her choice of teaching approach such as implementing scaffolding or assessing prior knowledge as examples, and through embedding cross-curricular activities purposefully and creating clear links within tasks, an individual is given multiple opportunities to develop as a learner (Hattie, 2008, 2012).

Implementation within my planning

Out of all of the pedagogical principles this was not only the easiest one to implement, but the most enjoyable. Experimenting with different approaches to engage young minds was a great challenge but extremely rewarding for both teacher and learner when it went successfully. I think it was the easiest to implement because as a teacher I am continually making these decisions in every minute of my teaching in every class.

The examples I have used as evidence show the different approaches in my teaching style. For one year 7 physics class we created a solar system circle book, where learners had to conduct critical research for themselves using ICT in order to complete the fact book. The idea of this is that it was a pupil-led activity, with some direct teaching incorporated. At the start of the lesson I did model how to physically create the book, but could have given extra guidance as some of the information the pupils had to collect was slightly ambiguous i.e. planet size. I should have stated more detail, such as circumference in km etc, and as a consequence had to stop the class during the activity to allow for continuity. As Haston (2007) and Hattie (2012) showed, clearer instruction of how to complete the task correctly avoids confusion during and after the event.

The powerpoint example shown for a year 10 lower ability double science foundation class, demonstrates a varied teaching approach to engage and stimulate learners. Here, I built upon learners' prior knowledge of aerobic respiration and the respiratory system, with an aim to expand it to anaerobic respiration through creating clear links. My aim was to achieve this through open questioning around the classroom during key steps in the learning, peer-discussion (Vygotsky, 1962), and by selecting suitable and engaging video as Gaba (2002) suggests. I received good feedback from my mentor regarding the choice of video and the ingenuity of relevant activities within the lesson.

Example 3 shows my application of modelling when demonstrating a gas test for hydrogen (including a test for oxygen and carbon dioxide) in a year 7 chemistry class, where the pupils worked in pairs and conducted the practical themselves afterwards. This was probably my proudest moment as a student-teacher. The modelling demonstration went well, and was delivered very calmly, clearly and concisely. As a direct result, pupils worked safely when carrying out the experiment themselves, and all achieved the desired outcome.

Moving forward, I aim to develop this pedagogical principle within my teaching by using feedback from my pupils through observing engagement and understanding, to judge the effectiveness of the strategy employed.

Conclusion

This critical reflection has provided me with the knowledge and understanding of where I am in my development as a student-teacher, where I want to go, and how I plan to get there in relation to the pedagogical principles that are central to the new curriculum Successful Futures, which will be implemented in Wales in 2022 (Donaldson, 2015). I have developed this path of improvement by researching relevant and suitable literature, and applied it to my past teaching practices to inform my futures decisions. It is through this critical reflection that I aim to improve as a progressive student-teacher (Pollard and Triggs, 1997; Smyth, 1989).

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