

Overview

Monday, November 11, 2019 11:24 AM

A critical reflection on the planning and implementation of three pedagogical principles

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Link for viewing: https://uowtsd-my.sharepoint.com/:o:/g/personal/1900513_student_uowtsd_ac_uk/EqNX3auKtORGn_Ir4wPpn_cBFgxUc9hmGQXVhzGRu_kpiw?e=tnsRZM

Good teaching and learning means employing assessment for learning principles

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Example 1:

Opening phase (with links to prior learning)	Recapping last lesson – identifying 8 circuit symbols from last lesson Attempting to draw a series and parallel circuit.	Whiteboard task – Be asked to identify circuit symbols. Drawing simple series and parallel circuit	Whiteboards Powerpoint
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This was a year 9 GCSE Double Award lesson on electrical circuits. I was aware of the use of whiteboards from previous experience in working in other schools. They are a good easy to use resource to help with AFL in the classroom. They can be used in variety of contexts. The above context is recapping prior knowledge from the previous lesson, all pupils can be asked the same questions and give their own answer. It is a great way of finding out the ability of all the pupils in the classroom in a snapshot. It is a very useful AFL technique and cheap and easy which means it can be used in all schools. I feel the pupils engage in the activity more with whiteboards as I think they think they are contributing more directly to the lesson rather than hands up questioning. AS a teacher, I can use the feedback or answers given from the questions I have asked in order to tailor my lessons for their needs more.

Example 2:

Learning Objectives

All will be able to recall the 9 types of energy

Most will be able to write an energy transfer diagram

Some will be able to identify useful and waste energy in an energy transfer.

This was a PowerPoint from a Year 9 GCSE double award science lesson.

One of the first things I learned as a teacher is to be clear of what the pupils are going to learn in the lesson. Having clear learning objectives helped focus the learning on specific things throughout the lesson.

In this example, I have stated the learning objectives at the start of the PowerPoint, however I don't think that only saying them once is good enough for the pupils. So when the relevant learning objective is being focused on the slide. I have put the learning objective at the bottom of the slide. I feel this way the pupils can see the purpose of the learning objective and what it actually looks like.

To improve this I can add in success criteria as well for the pupils, so they are not only focusing on the learning objective and what it looks like but having a criteria of what they should know will focus their learning in the class.

The 9 Types of Energy

Type	3 example sources
Heat	
Kinetic	
Sound	
Light	
Chemical	
Electrical	
Gravitational potential	
Elastic	
Nuclear	

Know some common types of energy and state some examples of each.

Energy changes

To describe an energy change for a light bulb we need to do 3 steps:



1) Write down the starting energy:

2) Draw an arrow

3) Write down what energy types are given out:

Electrical → Light + heat

What are the energy changes for the following...?

1) An electric fire

2) A rock about to drop

3) An arrow about to be fired

Be able to draw energy transfer diagrams

Example 3:



Year 7 Cells

Play **Challenge**

A public kahoot

0 favorites 2 plays 23 players

LWHRAS
Created 1 month ago

Copy and share this playable link
<https://www.kahoot.it/share/year-7-cells/0a0a0a0a-0a0a-0a0a-0a0a-0a0a0a0a>

Questions (9)

Show answers

1 - Quiz
What is this piece of equipment?



2 - True or False
The Vacuole is found in an animal cell



3 - Quiz
Why are red blood cells different to most other cells?



4 - Quiz
What is a specialised cell?



5 - True or False
The ovaries are found in the male reproductive system



6 - Quiz
I have a tail, I swim and I carry DNA, what am I?



7 - Quiz
Select the correct spelling



8 - Quiz
The cell wall...



9 - Quiz
Which part of the female reproductive system produces the eggs?



Year 7 Cells

75% 4/22 0 1

Accuracy Report/Results Share link Difficult questions

Players: All (22)

Rank	Name	Accuracy	Final score
1	Michaela V	100%	100%
2		86%	86%
3		86%	87%
4		86%	87%
5		86%	88%
6		86%	88%
7		86%	88%
8		86%	88%
9		86%	88%
10		86%	88%
11		86%	88%
12		86%	88%
13		86%	88%
14		86%	88%
15		86%	88%
16		86%	88%
17		86%	88%
18		86%	88%
19		86%	88%
20		86%	88%
21		86%	88%
22		86%	88%

Questions: All (9)

Year 7 Cells

Question	Accuracy
1 - Question What is this piece of equipment?	100%
2 - Question The vacuole is found in an animal cell	100%
3 - Question Why are red blood cells different to most other cells?	100%
4 - Question What is a specialised cell?	100%
5 - Question The ovaries are found in the male reproductive system	100%
6 - Question I have a tail, I swim and I carry DNA, what am I?	100%
7 - Question Select the correct spelling	100%
8 - Question The cell wall...	100%
9 - Question Which part of the female reproductive system produces the eggs?	100%

This is from a Year 7 Science lesson with the focus on revision for a test on cells. There was 2 lessons left until the test, so I decided to use a kahoot to test the strengths of the pupils knowledge. Kahoots are an online test, pupils use a device to complete the test at the same time as the other pupils. After the test is done, I use the data to generate a report detailing the questions pupils struggled with the most. I then used this information to plan my next lessons to fill the gaps in the pupils knowledge. Pupils really engage in the lessons when using technology as it is different than the usual lesson. Most pupils really enjoy these tasks and I feel it is a great way to engage pupils in the lesson.

Good teaching and learning regularly reinforces Cross-Curriculum responsibilities, including literacy, numeracy and digital competence, and provides opportunities to practice them

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Example 1:

Opening phase (with links to prior learning)	Starter - LO To identify the ways of generating electricity both renewable and non-renewable. Open discussion to test pupils prior knowledge on forms of generating electricity: Non renewable: coal; oil; gas; nuclear Renewable: wind; solar; biomass; hydropower; geothermal; tidal Discuss possible advantages related to cost, efficiency	Complete a spider diagram for renewable and non renewable forms of generating electricity. Extension: think of possible advantages and disadvantages.	Powerpoint
Teaching & Core Learning	Research task- LO Research the advantages and disadvantages of renewable and non-renewable ways of generating electricity. Using the information gathered, analyse the methods of generating electricity, picking which one you think is the best. Using laptops, pupils research methods of renewable and non renewable forms of generating electricity Stating advantages and disadvantages associated with each Extension: Produce a table comparing each type of generating electricity.	Learning objectives differentiated to allow pupils to access lesson at their own level. Extension task allows pupils to challenge their knowledge, using the facts provided make a decision on the better forms of generating electricity.	Powerpoint Laptops

This was a Year 9 GCSE double award science lesson focusing on renewable and non renewable resources of energy. The pupils task was to create a PowerPoint presentation about each of the sources of energy. The aim of this task was to help the pupils to develop their research skills, focusing on credible sources and getting key points out of large pieces of texts such as websites.

By working in groups in allowed the weaker pupils to be helped by their peers without teacher interference/encouragement.

An ICT lesson was used to help pupils develop their research skills, also with a lot of content within the energy sources, it was a more pupil involved task than direct teaching with the aim for them to engage with the content with it focusing on such an important topic in the current climate.

ICT Activity:

- Research Renewable and Non-Renewable energy resources.
- Describe briefly how they work including an image.
- Find advantages and disadvantages and put them into a PowerPoint presentation.
- Use two slides for each one. (One for how they work, one for advantages and disadvantages)
- Extension: Produce a table comparing the resources directly.

Example 2:

Teaching & Core Learning	Look at temperature graph as limiting factor. Pupils to explain reaction in terms of enzymes (using information from starter). Demo – specified practical: effect of light intensity on rate of photosynthesis Explain importance of knowing the method for practical. Explain method for testing CO₂ as limiting factor. Use of sodium hydroxide as it absorbs CO₂. Use of water in separate flask for a control. Explain use of data loggers as a way to measure rate of photosynthesis using oxygen and carbon dioxide sensors.	Pupils to complete a paragraph explain the effect of temperature on the rate of photosynthesis in terms of enzymes. Pupils have method of practical in booklet Pupils make notes as to why Sodium hydroxide is used. pupils make notes on use of data loggers as a method to measure rate of photosynthesis.	Powerpoint Specified practical apparatus. Topic 1.5 booklet
Plenary	Pupils have table of results from specified practical demo. Pupils to complete graph for specified practical from table of results. Pupils to complete analysis of practical		

Investigation of the factors affecting photosynthesis

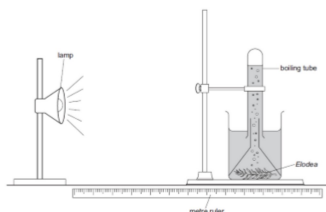
Introduction

Light is one of the factors which affects the rate of photosynthesis. In this investigation a green plant named Canadian pondweed (*Elodea*) will produce bubbles of oxygen as a result of photosynthesis. The number of bubbles of oxygen produced is affected by light intensity.

Apparatus

250 cm³ beaker
lamp
glass funnel
plasticine
test tube
8 cm length of pondweed (*Elodea*)
metre ruler ± 1 mm
sodium hydrogen carbonate powder
clamp stand, clamp and boss
spatula

Diagram of Apparatus



Method

1. Place the *Elodea* in a beaker containing 200 cm³ of water.
2. Add one spatula of sodium hydrogen carbonate to the water.
3. Stick 3 small pieces of plasticine to the rim of the funnel and place it upside down over the plant.
4. Completely fill a test tube with water and carefully place over the end of the funnel with the end under the water, clamp into place.
5. Place the lamp 5 cm away from the apparatus.
6. Start the stopwatch and record the number of bubbles of oxygen produced in one minute.
7. Repeat the experiment with the lamp 10 cm, 15 cm, 20 cm, 25 cm and 30 cm from the apparatus.

Analysis

1. Plot a graph of the distance against number of bubbles produced in 1 minute.
2. What conclusions can be reached from your results?
3. Evaluate your method and state how it could be improved.

Teacher/Technician notes

Risk Assessment

Hazard	Risk	Control measure
Hot lamps can burn	Contact with skin will cause burns when handling/touching/moving apparatus	Do not touch lamp until it has cooled down.

If the plant is not producing bubbles then the stem might have started to 'heal' up, cutting off the end off may improve bubbling.

Begin the experiment with the lamp closer to the plant and move the plant further away as this seems to give better results.

Cabomba caroliniana (and *Elodea crispata*) are no longer available to buy. They have been banned for culturing or sale under European regulations controlling invasive non-native plants. CLEAPSS have worked with native plants (Hornwort and red Cabomba), and they are OK for use. The CLEAPSS method (see the link below) overcomes the problems of the native aquatic plants bubbling slowly.
<http://science.cleapss.org.uk/Resource-Info/GI.184-Using-video-recording-to-measure-the-rate-of-photosynthesis.aspx>

Taken from <https://www.wjec.co.uk/qualifications/science/gcse/biology-gcse-2016/WJEC-GCSE-Biology-TG.pdf>

Progression step			
Learners are able to:	Learners are able to:	Learners are able to:	Learners are able to:
represent data using: – lists, tally charts, tables and diagrams – bar charts and bar line graphs labelled in 2s, 5s and 10s – pictograms where one symbol represents more than one unit using a key – Venn and Carroll diagrams extract and interpret information from charts, timetables, diagrams and graphs.	represent data using: – lists, tally charts, tables, diagrams and frequency tables – bar charts, grouped data charts, line graphs and conversion graphs extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts) use mean, median, mode and range to describe a data set.	represent data using: – lists, tally charts, tables, diagrams and frequency tables – bar charts, grouped data charts, line graphs and conversion graphs extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts) use mean, median, mode and range to describe a data set.	collect own data for a survey, e.g. through designing a questionnaire construct frequency tables for sets of data, grouped where appropriate, in equal class intervals (groups given to learners) construct a wide range of graphs and diagrams to represent the data and reflect the importance of scale

Taken from LNF - website <https://hwb.gov.wales/draft-curriculum-for-wales-2022/national-literacy-and-numeracy-framework-draft-curriculum-for-wales-2022-version/>

This was a Year 10 GCSE biology lesson focusing on a specified practical with they are required to complete as part of the course. The experiment was completed as a demonstration with the results be collected by the pupils and analysed.

Science lessons usually link well with the numeracy aspect of the LNF, this experiment is a good example of this with the strand of the LNF framework shown also.

This lesson allow the pupils to develop their graph work skills, from drawing a suitable axis, labelling the graph correctly. At this stage also using the graph to extract information about the experiment focusing on terms such as correlation of results and line of best fit.

Example 3:

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)
Opening phase (with links to prior learning)	Quickfire questions on stages of IVF Possible Arguments for and against	Answer questions on IVF
Teaching & Core Learning	Ask pupils to research arguments about IVF and produce an argument either for or against IVF Debate about IVF in groups.	In groups – come up with arguments for IVF. Debate with other groups with differening opinions to see if they can change other pupils minds.
Plenary	Discussions alley – pupils on both sides fo the argument line up on either side, a pupil walks down the 'alley' with pupils saying their arguments as they are walking down. Pupil who was walking decides which argument was strongest.	

This is a Year 7 science lesson focusing on the topic of IVF. The aim of the lesson was for pupils to have a discussion about the arguments for and against IVF. The pupils would debate against each other coming up with arguments for each side.

This would improve their oracy skills being able to use subject and topic specific language.

With these topics there are no right or wrong answers or opinions to have. An important part of this lesson and debate was to make sure everyone's opinions were respected and allowed to be heard.

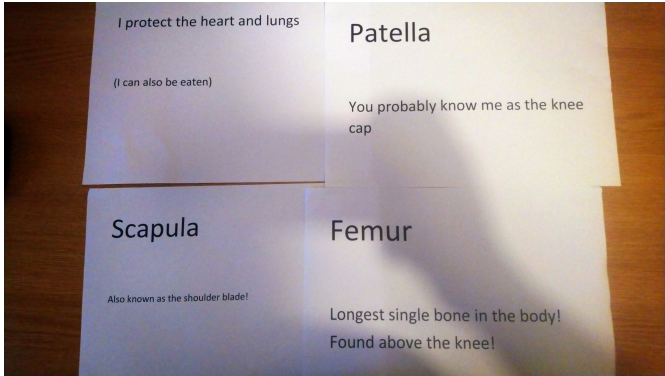
The pupils wrote down there arguments both for and against IVF, with topics like these pupils engage very well with them.

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

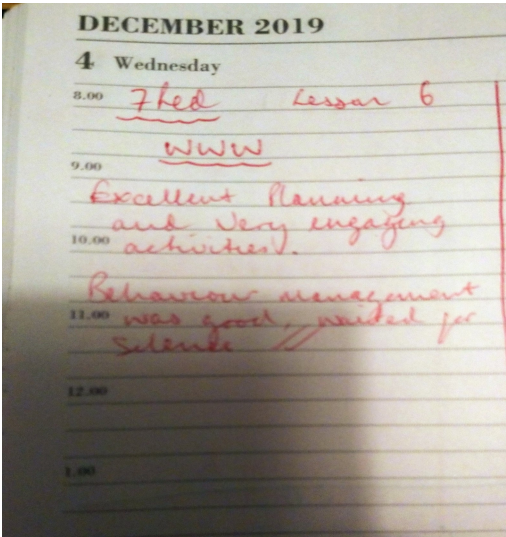
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Example 1:

	skeletai = skeleton and bones Spider diagram of these systems		
Teaching & Core Learning	Open questions – how many bones do we have in the human body? 206 What job does the skeleton do? Activity – stick skelton into book – using carousel label skeleton correctly		Skeleton circus pages



This was a year 7 lesson focusing on the human body more specifically the skeleton. I was thinking of different ways I could teach them the bones of the body. I was choosing between a video and carousel activity. I chose the carousel activity as it would be a great way of making the pupils think about the bones of the body. I put 13 pages around the room with a description of where the bones were in the body and the scientific name of the bone (examples 2nd picture). The pages spread around the room had enough information on them to allow them to identify where the bones are on the body but also allowed pupils to use prior knowledge where possible. This was a very student led activity putting them in control of their own learning, it was also an active learning activity where the pupils were on their feet moving about the room. They were encouraged to converse with each other, to help any pupil who was struggling. The feedback from the class teacher showed they were engaged in the activity showing they enjoyed the activity, this showed in the results they got from the activity. Most of the pupils had the correct answers and even the ones who did not get the right answer they were very close. If this activity were to be done again, differentiated worksheets could be used to assist pupils who would struggle with the complex words of some of the bones, adding in the first letter of the bone or how many letters each contained would really allow the lower ability to access the lesson.



Example 2:

	Demonstration on testing a leaf for starch: Focus on step and what happens at each step – checking for pupil understanding at each step. Why do we boil the leaf? Was is the purpose of the alcohol? Why is bunsen turned off before alcohol brought in? What colour does iodine go in the presence of starch. Assist pupils with practical advice in order to complete experiment safely.	Watch demonstration of practical before doing themselves. Pupils will be asked questions on experiment to check for understanding of each stage.	Practical equipment for testing a leaf for starch
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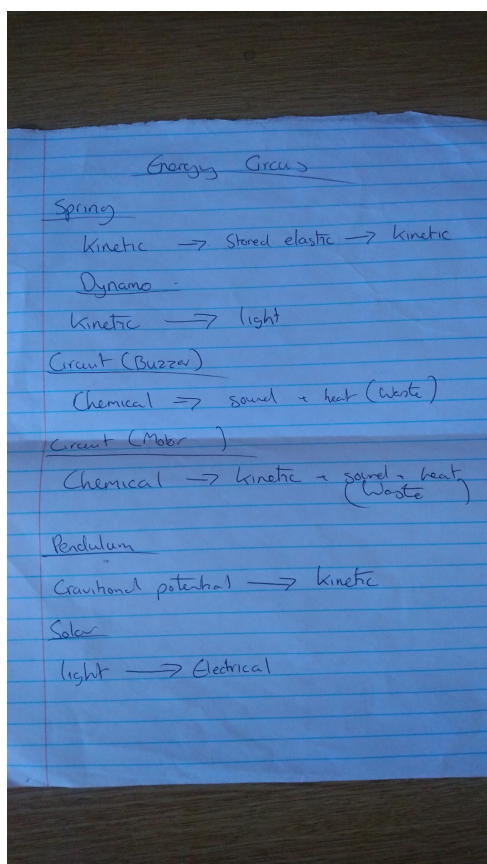
This was a year 10 GCSE Biology lesson. The topic of the lesson was testing a leaf for the presence of starch. They needed to know a step by step process of testing a leaf for starch. The first part of the lesson, they went over the theory part of the experiment. Talking about what happened to the leaf and the purpose of each stage. This was important to get the context of the experiment and to also give the pupils certain things to look out for and to also for me to keep questioning them about what happened to the leaf at each stage as it was happening. During the experiment the pupils were engaged in the lesson as they were involved in the learning. It was important for me to ensure that the purpose of the experiment was for the pupils to put theory into practice and show them what they learned. If this experiment were to be done again, different leaves would be used one that would show a positive starch test and one that wouldn't, this would allow the pupils to see what happens in different leaves.

The same experiment could also be used to show the limiting factors of photosynthesis.

In my teaching practice, I feel that using practical experiments and demonstrations are really effective in getting the pupils engaged and involved in the lessons, during these activities the pupils contribute more as they are in smaller groups that they feel more comfortable with which helps to create a more positive learning environment which will help all pupils progress in their knowledge

Example 3:

Teaching & Core Learning	KTP: How to write an energy transfer equation. Go over examples on ppt, ask pupils to identify useful and waste energy in examples. Energy circus practical: in groups pupils go to each station and write an energy transfer equation. Extension: add in useful and waste energy.	Complete practical, copy table from powerpoint and fill it in from experiment.	Energy circus practical Powerpoint.
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This example is from a Year 9 GCSE Double Award science lesson focusing on types of energy. This was a difficult topic to teach to the pupils as the concept of different types of energy is very new to them and can be quite confusing.

At the start of the lesson, I went over the 9 different types of energy and if they could give any examples of them. While some energy types are easier to understand such as light and sound, others such as gravitational potential and kinetic are not only new words for them to learn but abstract concepts to them.

I used an energy circus to help show them the different types of energy in action. This helped put the theory into something in front of them that they can understand better. I set up 6 different demonstrations with different types of the energy.

The majority of pupils really engaged with the opportunity to do active learning in the classroom whilst some did not chose to participate. The circus allowed them pupils to explore the new energy types, making sense of them and relating them to visual stimulus to help them to remember.

Critical Reflection

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Introduction:

For this assignment, a portfolio has been created detailing the use and implementation of 3 of Donaldson's pedagogical principles (Donaldson, 2015) during the Professional teaching experience 1(PTE1). The focus of the writing will be on the implementation of the 3 pedagogical principles under discussion relating to the literature about each of the principles.

The three pedagogical principles that will be discussed in this portfolio are:

- Good teaching and learning means employing assessment for learning principles.
- Good teaching and learning regularly reinforces Cross-Curriculum Responsibilities, including literacy, numeracy and digital competence, and provides opportunities to practice them.
- Good teaching and learning means employing a blend of approaches including direct teaching.

Professional teaching experience is the best opportunity for student teachers to learn what it takes to be a teacher in a controlled environment, teaching trainee teachers to engage in reflective practice but also using strategies in the classroom informed and developed from research and the benefits of these.

Literature review:

In this section the literature around the 3 pedagogical principles will be discussed. Science has an advantage over most other subjects in terms being able to incorporate different approaches, being able to use practical experiments and demonstrations to link theory into practice. However, *Millar* (2002) state there is a danger of doing it without a purpose rather than using it to put theory into practice. So, whilst it is important for pupils to do practical work, there must be a reason not just doing it without purpose. In example 2 of blend of learning approaches, the experiment is done to show that leaves produce starch and can't be produced without light, it also provides an opportunity to improve pupil's practical skills (Abrahams (2011, Pg 13). According to a study cited in Toplis (2014), using practical work makes understanding the theory easier, using the constructivist learning theory, Miller-First and Ballard (2017) explain that they constructivist learning theory puts the pupils in control of their learning, giving them to tools and enough information for them to succeed active learning and practical work are some of the fundamentals of this approach. Abrahams (2011 pg 19) states there isn't conclusive evidence to suggest that practical work enhances pupil outcomes, however many science teachers just take it for granted that this is the case. A focus on doing experiments for a purpose, by combining the practical work with effective questioning throughout following a model such as Bloom's taxonomy to increase the level of pupil thought can really make doing practical work a necessity for all science teachers.

There seems to be a pressure on trainee and newly qualified teachers to make their lessons active engaging and fun, with science teachers they take that as including a lot of practical work, however as the research of Abrahams (2011 pg19) shows practical work doesn't necessarily enhance pupil outcomes, so it is important for teachers to make sure there is a justifiable reason for doing practical work and not doing it simply because they think it will be fun to do.

It is important as teachers to not only use direct teaching as the method for teaching, in recent years there has been several pieces of research to show the benefits of active learning and problem-solving learning such as Sawyer et al (2017). Getting the pupils involved in the learning by applying their knowledge into solving problems enhances their understanding. Bernstein's (2018) research on active learning shows that whilst active learning increases pupil outcomes and satisfaction however it shows that not all methods of active learning have the same effect, what is important is to find out the way that work the most effectively. The research from Sawyer et al (2017) does this, it states that using different forms of media such as videos have the largest increase on student motivation. This is important as using something simple such as a video to engage the pupils could have a

positive effect on their motivation in the lesson. Donaldson (2015) states the need for a blend of approaches, so it is important to use the approaches where it fits naturally and that includes direct teaching too, pupils will disengage when they feel something is forced or unnecessary.

Assessment for learning (Afl) is vitally important in everyday teaching, constantly getting feedback from all pupils is crucial for planning lessons and keeping pupils motivated. It is defined by Osbourne and Dillon (2010, pg 183) as assessment which serves the purpose of promoting pupils learning. It can take shape in many ways with several collections of ideas of different AFL strategies. Black and Wiliam (1998) state that for assessment to function effectively, the teaching must be adjusted after, to take the information that the pupils have given you, otherwise there was no point in doing it. A move away from more 'traditional' forms of assessment such as tests is needed, as it doesn't encourage understanding of the subject but more superficial and rote learning (Black and Wiliam, 1998). Assessment for learning strategies really give teachers a greater understanding about individual pupils learning needs, without these strategies the teacher could think that everyone is at the same level, these strategies are necessary so that a teacher can understand what level every pupil is and can adjust accordingly. Black and Wiliam (cited in Fautley and Savage, 2008 page 38) list the four areas involved in formative assessment, they are; questioning, feedback, sharing criteria and self-assessment. Questioning is one that is done most by teachers, it is important to ask the right questions, using both open and closed questions in the right context is important. Closed questions can be used to check for surface level understanding before advancing on to the open question to get to check a pupils deeper understanding of the subject. (Allison and Tharby, 2015).

Sharing criteria is one that most teachers do, having learning objectives on the board at the start of the lesson, for them to be useful for the pupils they have to what they are, and they should be given an example or criteria in which means they haven't completed the learning objective (Fautley and Savage, 2008 page 46). This is where it is important to know you class so that SMART (Specific, Measurable, Achievable, Realistic, Time oriented) goals can be set (Steinburg and Weitzel, 2001 page 7). This gives the pupils the best chance to have a successful lesson and keep their morale high.

Giving effective feedback can really help pupils progress in the classroom, Osborne and Dillon (2010, page 201) states that feedback has moved beyond marks on a piece of work, it has moved to personal feedback specific to the individual. The focus should be about the pupils taking on board the feedback and improving from there.

An underutilised aspects of Assessment for learning is self and peer assessment, by giving pupils success criteria to assess themselves against, they are in control of their learning, They will take more ownership of their own improvement (Fautley and Savage, 2008, page 51-52), by having them assess their own work, they will gain a deeper understanding of what is required of them.

In his review, Donaldson stressed the need to promote cross curricular responsibilities such as literacy, numeracy and digital competence throughout the curriculum.

Byrne and Brodie (2011, pg 118) state that pupils with 'low literacy skills often lead to under achievement across the curriculum'. It is important that all teachers have the aim to improve the literacy skills of their pupils, as it will affect every subject in school. Science is an important subject to focus on literacy as they will be introduced to many new terms and words that are subject specific but also it is unique in having words that means someone different than what the pupils would use in day to day life (Wellington and Osborne, 2001, pg 18). It also provides a lot of opportunities to improve pupils oracy skills with discussions and debates about certain topics.

Science is one of the few topics where having numeracy involved in the lessons doesn't feel forced as analysing most experiments involve graph work, using averages, reading scales and discussing trends, Lenton and Stevens (2002 pg 140) discuss this link as a lot of science relies on an understanding of the numeracy behind it. Byrne and Brodie (2011 pg62-63) shows that whilst Science and Mathematics should be linked quite well (Meisels, 2010) , the opposite happens in the schools in terms of curriculum design, the two subjects should work together to refine the pupil's numeracy skills throughout, Ross et al (2010 pg 89) agrees by saying there should be a consistency of approach in regards to numeracy throughout the school, but also by increasing the importance of numeracy and how it will be used in everyday life. By linking together and showing the pupil's the crossover between the two will go a long way to improving numeracy across the board.

One of the other main cross curricular responsibilities is the Digital competency. This is improving the pupils use of technological skills. Working on research skills, using different forms of software so much of this is more common now than when the national curriculum was originally made in 1988 when new technologies that are so prevalent today, had not yet been invented. With most degrees involving independent research, it is important to teach pupils these skills.

Reflection:

In this section of writing, I am going to reflect on the implementation of the pedagogical principles, stating what went well and what could be done better.

A large part of PTE1 was trying different approaches out with different classes, I found out that is important to get to know the classes very quickly in order to be able to plan effective lessons for them and use the best methods in order to engage the pupils.

Teaching science is always going to have more approaches than other subjects with the emphasis is the curriculum to increase pupils' practical skills to prepare them for a potential career in science. Example 2 in the blend of approaches section, was about getting the pupils to complete a practical experiment. It was important to get them involved more in the lessons of a potentially 'dry' topic to teach, Abrahams (2011) shows that pupils motivation and engagement in the lesson increases when practical work is being done however Abrahams (2009) notes that short term engagement increases doing practical work does little to increase the longer term interests of pupils, this shows that most practical work is being done to increase pupil engagement and it is a long held belief that doing practical work in classes makes it more likely to pursue a career in the subject however the research shows otherwise. It needs to be used with other approaches such other active learning approaches and direct teaching.

In example 1 of the blend of approaches, a carousel activity was used, this was used to put the focus of the lesson on the pupils rather than the teacher. By focusing on pupil involvement and pupil discussion around the classroom, the lesson went very well, and the pupils were engaged throughout the activity. This type of activity was used several times with other classes with similar affects, for the next block of this placement, I will need to try to implement different approaches rather than just practical work, direct teaching and circus activities, using various research to inform my decisions.

In PTE1 so far, planning for improving literacy in lessons has been a weakness of mine, improving my own literacy skills is a priority over the next block, having literacy focused lessons, like in example 3 on the Cross curricular notebook, it was an oracy based lesson, the pupils seemed to enjoy it and were engaged in the topic as it was one that has various points of view. What I have done well is focusing on scientific literacy in class, making sure pupils are using the correct scientific words for the topic, also focusing on the spelling making sure they have the correct spelling, if not make sure they can learn it for next lesson.

With teaching science, opportunities to include numeracy in my lesson is quite frequent. With most experiments, analysing the data afterwards allows the pupils to apply the numeracy skills in a context they can relate to. The placement school has mixed ability KS3 classes, this means there is a massive range in the numeracy skills within the class, I have to be able to plan better and more effectively in order to adequately assist the weaker pupils and challenge the stronger pupils. To ensure all pupils have the best chance to succeed at the numeracy tasks, I will have to differentiate the tasks more to ensure all pupils are adequately challenged.

One pedagogical principle that I have struggled to implement is the cross curricular responsibilities, more specifically the Digital competency framework, I had a couple of lessons focused on researching using computers (example 1 from cross curricular tab), this was to allow to pupils to explore energy sources, and find information out for themselves, this focus of this lesson was to get them to find reliable sources of information but also to be able to compare and data from energy sources, so there was a lesser focus on numeracy as well. This lesson was good as the pupils were engaged for most of it, however for these lessons to become more successful I need to become

more familiar with the DCF framework, in order to plan lesson that improves the pupil's digital competency.

In all of my lessons, I ensure that the learning objectives are on the board and they are discussed with the pupils, research from Fautley and Savage (2008 page 46-49) shows that actively involving pupils in the learning outcomes from the lesson has a positive effect, I ensure that the learning objectives are read out in the class and that pupils understand what is meant by each of them, effectively giving them verbal success criteria. In the PowerPoint presentations that I use with the class (Example 2 from AFL tab) I put the learning objectives at the bottom of the slide where it is appropriate, This shows the pupils that the learning objectives at the start of the lesson are being worked on throughout the class, it also gives them context of what it looks like so they can see if they have achieved it more easily, To make the lessons even better, success criteria could be shown with the learning objective, this gives the pupils something to link the learning objective to, alongside having the learning objective on the PowerPoint slide, it will help to keep the lesson focused on the learning objectives. With everything being focused on the learning objectives the pupils will have more chance to stay focused as well.

Using different techniques to be able to assess where pupils are at individually is a good skill to develop, in PTE1 I have used whiteboards as a method of assessing individual pupils levels, they give their own answers to a question on a whiteboard, it allows the teacher to see each pupils level in the lesson, they can use this information to tailor the next lesson to ensure that all pupils are catered for.

To advance my teaching in the next stage of PTE1, I will need to implement these effective strategies more consistently throughout all my classes. This will allow me to plan better and more effectively for my classes as I will have gained a better understanding of the pupils in the class.

Recommendations for further development:

To ensure that I develop as a teacher and to improve on my implementation of the pedagogical principles, I must ensure that I engage more with research and make informed decisions from that. I also have to focus on my own development with the pedagogical principles, constantly trying to learn more about it, in order to increase my confidence to ensure that I can teach it more effectively. In order to improve my implementation of the cross curricular responsibilities, I will need to become more familiar with the Literacy and Numeracy framework and the digital competency framework, By becoming more familiar with these frameworks, I will be able to improve my knowledge of the criteria and be able to assist pupils more effectively. My priority for the next stage of my professional teaching experience, it to ensure that I am consistent throughout with the implementation of these principles to ensure all pupils have the best chance to succeed in my classroom.

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