

## Overview

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Monday, October 7, 2019 1:55 PM

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 three pedagogical principles.

Student name: Lowri Alys Powell

Student number: 1900167

Pathway: S-PGCE Biology

Link to OneNote assignment:

[https://uwotds-my.sharepoint.com/:o/g/personal/1900167\\_student\\_uwotds\\_ac\\_uk/ErThCzQOBd5Km60Y6U9ygWkBwYiDr9GB84\\_z4TNjpXbrEg?e=EREg84](https://uwotds-my.sharepoint.com/:o/g/personal/1900167_student_uwotds_ac_uk/ErThCzQOBd5Km60Y6U9ygWkBwYiDr9GB84_z4TNjpXbrEg?e=EREg84)

# Assessment for Learning

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Selected Pedagogical Principle 1: Good teaching and learning means employing **assessment for learning** principles.

**\*First example of application of AfL:**

**Assessment of Pupils' Learning Evidence**  
(What have the learners to say/write/do/produce – to demonstrate learning)

**\*Peer assessment flow diagram for pupils to use (guided by the student teacher) to identify marks for a written explanation task. Pupils will peer assess in green pen following school guidelines. Student teacher assessment (in red pen as per school guidelines) will then take place after lesson to check that peer assessment has been successfully employed.**

Figure 1: Extract from lesson plan showing the use of structured peer assessment.

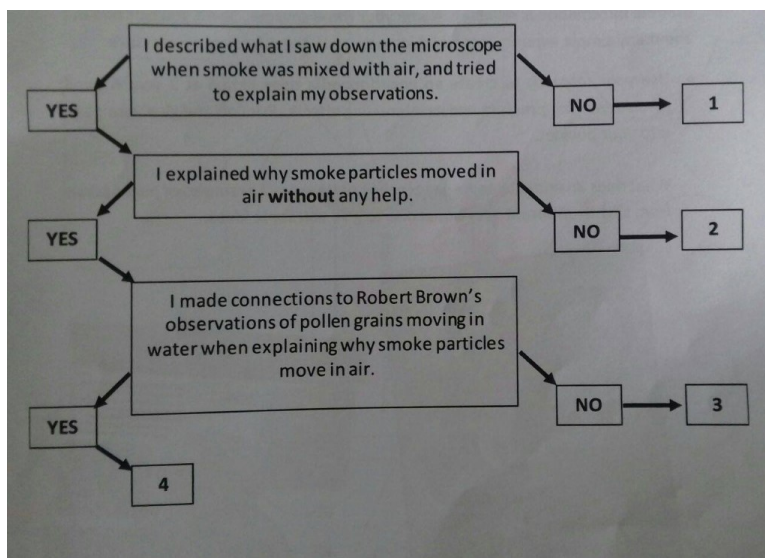


Figure 2: Flow diagram outlining the success criteria to be used to provide structure to peer assessment.

Annotations:

- Context:  
Year 7 science class. First lesson of new topic (solids, liquids and gases).  
The task given to the learners required them to describe and explain their observations of smoke particles down a microscope and link this to Robert Brown's initial observations of pollen grains down a microscope. The learners were instructed to use the flow diagram as their success criteria for the task and were aware that the task would be peer assessed based on the flow diagram.
- Rationale:  
The topic content had been explained to the class in detail so the written explanation task was given to the learners in order to assess their understanding and also to consolidate their learning

(William, 2013). It was recommended for the learners to use the flow diagram for the success criteria of the task as it clearly outlined what needed to be included in their answers. Peer assessment was planned to be used in order to motivate learners to complete the task to the best of their ability, as well as to improve learners' understanding of the topic based on the comprehension and evaluation of their peers' answers (William, 2018; Black *et al.*, 2007). As the pupils were new to the topic it did not seem appropriate to include peer assessment unless it had a clearly defined structure. The flow diagram provided clear guidelines as to how peers should assess each other's work and allocate marks (Brown 2019; Vu and Dall'Alba, 2007). I also guided the class through each step of the peer assessment flow diagram, stating what scenarios pupils should circle the 'yes' or 'no' boxes (please see Figure 2). However, as some of the pupils may be relatively new to peer assessment or lack understanding of this new topic I felt that it would be necessary to check that peer assessment had been employed successfully to ensure that all learners were receiving appropriate and informative feedback.

- **Evaluative points (improvements / why felt something was successful):**  
Most pupils in the class seemed to be quite clear of how to complete the written explanation task, using the flow diagram to provide success criteria. Pupils were also engaged during peer assessment, indicating that the process of peer assessment was activating their learning due to the required comprehension of their peers' answers. When I checked over the written explanations and adjoining peer assessments after the lesson, it was encouraging to see that over half of the class had gained full marks and that over 75% of the work had been correctly assessed by peers. Most pupils who had not achieved full marks did not do so due to seemingly due to timing issues (rather than due to lack of understanding). This informed me that it would be beneficial to provide time during the next lesson for the completion of this task (perhaps while pupils who had achieved full marks could complete an extension activity). Some peer assessments had incorrectly awarded full marks so I amended these marks in red pen (as per school policy). Where learners had not achieved full marks I provided written instruction to focus on these elements of the flow diagram in their answers in the allocated time given in the next lesson. Initially, I did not plan to cover the task again. However, checking the answers and peer assessments highlighted a need for some pupils to be given more time to complete answers and to more clearly highlight whether peers should award each mark or not. Although peer assessment was not always correctly employed by the learners, their engagement in the evaluation of others' answers would have helped to improve and consolidate their own understanding. Additionally, while correct marks were not always given, all learners would have participated in reflecting on and evaluating their peers work. In order to improve the use of peer assessment I will ask learners to sign their assessments with their names in future so that if incorrect marks have been awarded, the assessor can be made aware in order to improve their own understanding of the success criteria and to improve their ability to peer assess.

**\*Second example of application of AfL:**

**Assessment of Pupils' Learning**

**Evidence**

(What have the learners to say/write/do/produce – to demonstrate learning)

**\*Pupils work in groups of three to answer questions based on learning from previous lessons, random questioning of pupils using lolly pop sticks, verbal answers given form lead class discussion**

**Figure 3: Evidence of assessment of pupils' learning taken from lesson plan.**

**Annotations:**

- **Context:**  
Year 7 Science class. Third lesson of new topic (solids, liquids and gases).  
\*The starter task required pupils to work in groups of three (based on the class seating plan) to answer questions based on prior learning. Following the small group discussion of answers, for each question lollypop sticks with the pupils' names on were picked to ask a random learner to give an answer which would then be discussed with the class.
- **Rationale:**  
\*The purpose of asking pupils to try to answer questions based on prior learning in groups of three was to try to engage learners, helping to activate prior knowledge with prompts from peers. The groups were intended to be small enough that all pupils were able to be fully involved in

discussion and explanation of answers. In order to ensure that learners did not avoid engaging or merely relied on their peers to answer the questions, lollypop questioning was used so that learners were aware anyone could be chosen to provide their group answer to the class (rather than a nominated member of each group) (Coe *et al.*, 2014). Additionally, students who felt less confident to provide their own individual answer to the class are likely to have felt more confident to share their group's answer.

- Evaluative points (improvements / why felt something was successful):  
 \*The starter task, which involved pupils working in groups of 3 to answer questions based on learning from the previous two lessons, seemed to be effective. The learners could be heard discussing their thoughts with each other and sharing their ideas about what the answers to the questions were, helping each other to recap what was covered in the previous lessons. Lollypop questioning seemed to be an effective way to randomly choose learners to share their answers with the class, providing a demonstration of the range of understanding present within the class. Less confident individuals were also fully engaged in the task and did not appear to be daunted by the random group questioning using lollypop sticks.

\*3<sup>rd</sup> example of application of AfL:

#### Assessment of Pupils' Learning

##### Evidence

(What have the learners to say/write/do/produce – to demonstrate learning)

**\*Pupils write answers to starter task on sticky notes & place on board (anonymous answers discussed in front of class, highlighting any common misconceptions, using lolly pop sticks to randomly choose learners to give their opinion of sticky note answers)**

Figure 4: Evidence of assessment for learning taken from lesson plan.

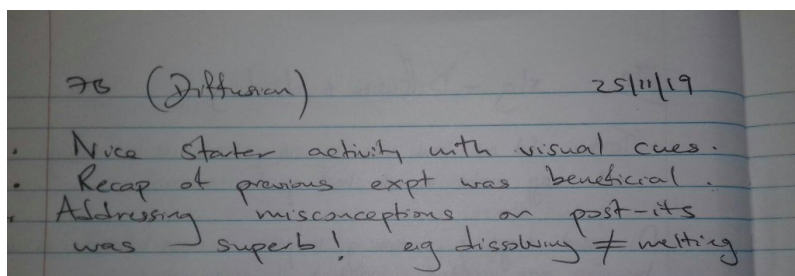


Figure 5: Comments made in learning journal by the teacher observing the lesson.

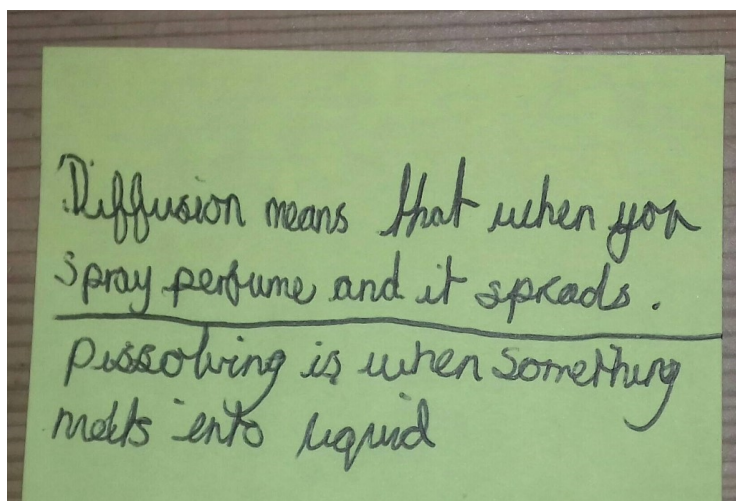


Figure 6: Example of a Year 7 student's answer on a sticky note highlighting a common area of misconception.

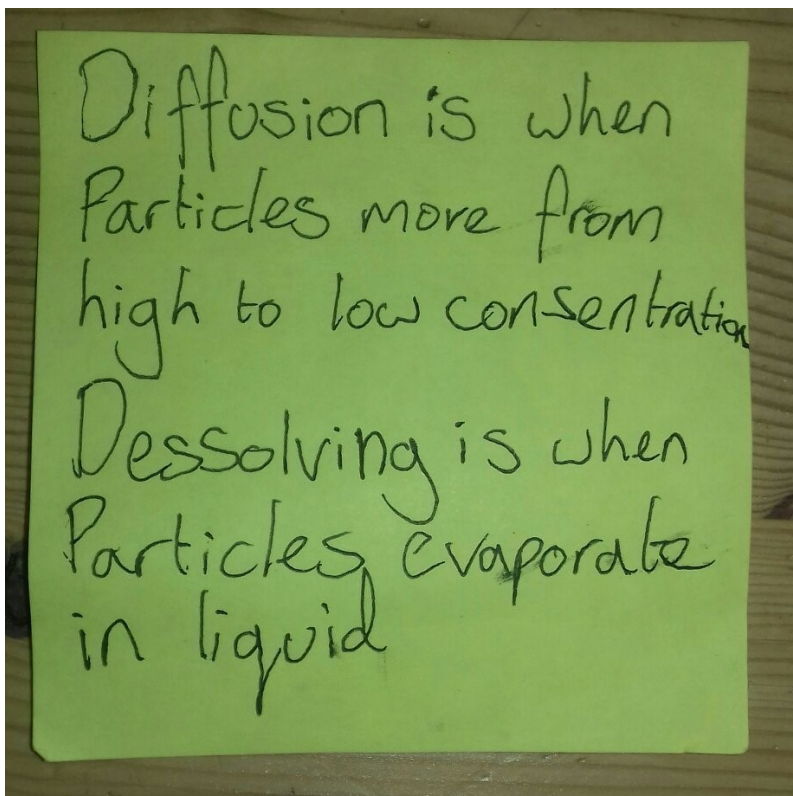


**Figure 7: Example of a Year 7 student's answer on a sticky note highlighting a common area of misconception.**

- Context:  
Year 7 Science lesson. Mixed ability class. Fourth lesson of new topic (solids, liquids and gases).  
\*Starter task requires learners to write (on sticky notes) descriptions of dissolving and diffusion (based on learning from previous two lessons). Pupils then stick the sticky notes on the board and the anonymous answers were to be discussed in front of the class. Pupils' were questioned on their thoughts of the answers on the sticky notes using lollypop questioning.
- Rationale:  
\*The purpose of pupils putting their answers on sticky notes at the front of the class was to anonymise answers so that all pupils felt confident enough to engage and provide answers which could be read out in front of the class. This also meant that all pupils were required to give an answer (even if not all were discussed) therefore engaging all pupils. Additionally, the array of answers stuck onto the board would allow common misconceptions or any common points of confusion to be identified and clarified to the whole class.
- Evaluative points (improvements / why felt something was successful):  
This process seemed to be successful as it demonstrated that multiple pupils had confused the processes of dissolving with melting and evaporation. This enabled clarification of the differences between these processes to the whole class, without making one individual feel singled out. The teacher observing also commented on the perceived efficacy of this AfL strategy, as can be read in Figure 5. While there was not enough time to read through each answer in front of the class I was able to collect the sticky notes and read through every answer after the lesson to gauge the basic level of understanding of the whole class which was useful for the identification any further misconceptions which also required clarification in subsequent lessons.

## Cross-Curriculum Responsibilities

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Selected Pedagogical Principle 2: Good teaching and learning regularly reinforces **Cross-Curriculum Responsibilities**, including literacy, numeracy and digital competence, and provides opportunities to practice them.

### \*First example of application of the Cross-Curriculum Responsibilities:

|                                                              |                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meaningful links to:<br>Cross Curricular<br>Responsibilities | <p>*Numeracy – correctly use equipment to measure &amp; record mass &amp; volume &amp; analyse data obtained.</p> <p>*Literacy – clearly explain observations using scientific terminology &amp; with focus on correct spelling &amp; grammar.</p> |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 8: Extract from lesson plan highlighting the links to the Cross Curricular Responsibilities

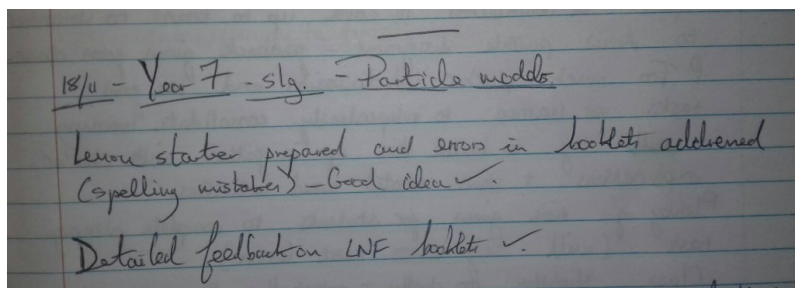


Figure 9: Comments made by teacher observing the lesson.

- Context:  
Year 7 mixed ability science class. Lesson involves an investigation into how dissolving a substance into a solvent effects mass and volume. In order to carry this out successfully pupils need to use a weighing scales to measure mass and a measuring cylinder to measure volume. This will be demonstrated to the class before learners work in groups to carry this out. Each learner must record values obtained using appropriate units and use data to identify what has been observed during the investigation. Learners must clearly explain their observations in writing with focus on using correct spelling and grammar. Each step of the investigation will be outlined and demonstrated, prior to the learners having to carry it out independently, in order to ensure that they are clear of the success criteria. Written explanations will be assessed by the teacher in order to give pupils formative written feedback.
- Rationale:  
\*For good understanding of scientific data and findings it is very important that learners are able to develop numeracy skills. The lesson outlined aims to enable the learners to practice and improve their ability to take measurements in order to obtain numerical data which must be clearly recorded using correct units. This is important as this skill is necessary for understanding of the content in the science curriculum in year 7 and throughout school. Additionally, this skill is important to be able to understand and interpret data outside of school and later in life (Donaldson, 2015).  
\*The lesson plan outlines the use of good literacy skills in the written explanation task of the observations from the investigation. Success criteria are shared with the learners so that they understand the importance of clearly sequencing their ideas and must focus on using correct spelling and grammar. This enabled pupils to practice putting their thoughts into writing in order to clearly convey and communicate their ideas and justifications. Additionally, learners were told to focus on using correct spelling and grammar in order to highlight the importance of this in being able to communicate clearly in writing. Teacher assessment was used to give pupils formative feedback which was used to identify misunderstandings or spelling and grammar errors to enable learners to learn from mistakes and progress.

- Evaluative points (improvements / why felt something was successful):
  - \*The numeracy covered in this lesson seemed to be successful at progressing the numeracy skills of students in the class. At the beginning of the lesson, not all students initially were familiar with the terms volume and mass (this was established through pupil questioning). At the end of the lesson all students in the class demonstrated that they were able to use a measuring cylinder to measure volume and a weighing scale to measure mass and recorded their findings in their science booklets. This demonstrated that the numeracy involved in this lesson was able to teach some learners something new, as well as to allow other learners to improve this skill.
  - \*The written explanation task in this lesson gave learners an opportunity to practice clearly communicating their ideas in writing. Learners were each provided with a list of success criteria so that they were clear about what the task required them to explain and how to communicate this effectively. Learners also had to complete the task independently during the lesson to avoid over reliance on peers to ensure that each pupil had the opportunity to practice their individual writing skills. The task was assessed to provide the pupils with individual formative, written feedback. Any common errors were also addressed to the whole class during the next lesson to ensure learners were able to understand how to improve their writing. This was also deemed to be effective by the teacher observing the lesson, as can be read in Figure 9. In particular, the written task highlighted a couple of words which were frequently, and almost exclusively, misspelt ('particle' and 'pollen'). Therefore, the spellings of these words were highlighted to the class.

**\*Second example of application of the Cross-Curriculum Responsibilities:**

|                                                              |                                                                                                                                                                                                                                           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meaningful links to:<br>Cross Curricular<br>Responsibilities | Numeracy - correctly interpret, draw and label Sankey diagrams to demonstrate proportions of energy used and wasted by an appliance, using appropriate units. Use the correct formula to calculate the energy efficiency of an appliance. |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Figure 10: Extract from lesson plan highlighting the use of numeracy.**

- Context:  
Top set Year 9 science class of MAT students. First lesson teaching this class and the class' first lesson of this year on the topic of energy. The class is very enthusiastic about learning but is also very lively.
- Rationale:  
It is important for the pupils to be able to correctly interpret Sankey diagrams in order to understand the energy transfers and efficiencies of different devices. It is also important for the learners to be able to correctly draw and label Sankey diagrams in order to be able to effectively illustrate the energy transfers and efficiencies of different devices. The pupils are required to use appropriate units to label values. This will enable learners to be able to recognise that values with different units cannot be directly compared.  
The learners also need to understand how to calculate energy efficiencies of devices using a given formula. These calculations are centred around simple percentage calculations, which are important for learners to be able to use outside of their academic studies at school and beyond. Being able to correctly calculate percentages will equip learners with numeracy skills which are useful for many things throughout life.
- Evaluative points (improvements / why felt something was successful):  
None of the pupils knew what a Sankey diagram was at the start of the lesson (this was assessed using a hands up approach). By the end of the lesson all students had completed a Sankey diagram worksheet and self-assessed the task. This took the pupils longer than I had expected and their questions indicated an appropriate level of challenge had been provided by the task. The pupils' work demonstrated that the learners had all learnt how to correctly draw, interpret and calculate labelled energy values of Sankey diagrams. At the beginning of the lesson the class also did not know how to calculate the energy efficiency of a device as a percentage. By the end of the lesson all pupils were able to do this, improving their understanding of percentage calculations and different methods of how to carry out percentage calculations. Therefore, both of these aspects of the lesson which focused on improving the learners numeracy skills seemed to be successful.

**\*Third example of application of the Cross-Curriculum Responsibilities:**

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meaningful links to:<br>Cross Curricular<br>Responsibilities | <p>Digital competence – Use of Chromebooks to use the internet to carry out research of atmospheric pressure using reliable sources. Creation of an e-encyclopaedia page to clearly present findings.</p> <p>Literacy – Comprehension of sources and ability to clearly record and summarise findings (in research notes). Clear &amp; concise presentation &amp; explanation of research findings (in e-encyclopaedia page), using correct scientific terminology and correct spelling and grammar.</p> |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Figure 11: Extract from lesson plan highlighting the application of digital competence and literacy.**

- **Context:**  
Mixed ability Year 7 science class. The research the pupils have to carry out (detailed in the extract of the lesson plan) is the learners' first introduction to this area of the topic which they are likely not to be familiar with (unless from learning about it outside of school).
- **Rationale:**  
\*Chromebooks were chosen to be used to carry out research of a new topic in order to foster good, independent research skills using the internet, which will equip the learners throughout life. It is important for the pupils to learn how to evaluate the reliability of the sources they use for research in order to understand how trustworthy and valid the information they have gathered is likely to be.  
Students also have to use the Chromebooks to create an e-encyclopaedia page using Microsoft word. It is important for the pupils to be able to successfully use applications to clearly convey their findings aesthetically. This allows learners to develop the way that their findings are communicated with others so that they are well presented and easily understood.  
\*Students work on developing their comprehension of written sources to be able to improve their understanding of a topic independently, without relying on verbal communication. Students also need to be able to clearly record and summarise findings so that they can be reviewed and accessed for later use. Additionally, students' writing needs to be able to clearly explain their findings using scientific terminology and correct spelling and grammar in order to be able to effectively communicate ideas.
- **Evaluative points (improvements / why felt something was successful):**  
Students effectively used Chromebooks to independently locate sources to gather relevant information. This task was successful as it required students to think about the reliability of the sources used which students referenced on the worksheet provided. To improve this further the provision of success criteria to help students to identify reliable sources would have helped. This would have clarified what kind of criteria can be used to indicate whether a source is likely to be reliable, also enabling students to justify why they have deemed a particular source to be reliable.  
Learners successfully used digital applications to create an e-encyclopaedia page, demonstrating that they had an opportunity to improve and practice their skills surrounding the manipulation of digital media to clearly present ideas.

## Authentic contexts

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### Selected Pedagogical Principle 3: Good teaching and learning creates **authentic contexts** for learning.

\*First example of application of authentic contexts:



#### Lesson Plan Phase 1

#### Lesson Plan – Step 1 Cynllun Gwers – Cam 1

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |     |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|
| Student-teacher                | Lowri Powell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Class: | 91a |
| AoLE or Subject                | Science & Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Date:  |     |
| Lesson Focus:                  | Renewable energy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |     |
| Meaningful links to Curriculum | <p>Ethically informed citizens – learners will understand the importance of renewable energy sources to help to limit global warming.</p> <p>Authentic contexts – the importance of renewable energy sources in order to help to combat the current environmental and social impacts of global warming will be highlighted. Videos of speeches made by Greta Thunberg and David Attenborough will be played in order to highlight the current challenges presented by global warming.</p> <p>Renewable energy sources present in the local area and in Wales will be discussed, alongside the recent proposals for a tidal barrage in Swansea Bay which have not gone ahead.</p> |        |     |

Figure 12: Extract from a lesson plan highlighting the focus on authentic contexts.

- Context:  
Top set Year 9 science class of 28 students. All students are very academically capable and are very enthusiastic about learning.
- Rationale:  
Students learnt about the importance of renewable energy sources to help to limit global warming. This authentic context provides a backdrop for learning to take place upon, making it more relatable and relevant. The authentic context also importantly teaches the pupils about the environmental and ethical implications of renewable energy sources which is in line with one of the Four Purposes of the new curriculum: "Ethical, informed citizens who are ready to be citizens of Wales and the world" (Donaldson, 2015).  
Students will also watch videos of speeches made by David Attenborough and Greta Thunberg, people they are likely to be familiar with from the media. These speeches may help to make students realise what is possible and necessary in order to combat the effects of global warming. Examples of renewable energy resources present in the local area and in Wales will be highlighted in order to help students to relate to what is possible in the area in which they live, linking their learning to familiar contexts and highlighting its relevance and importance.
- Evaluative points (improvements / why felt something was successful):  
The use of authentic contexts in this lesson enabled the students to understand the relevance of their learning about different renewable energy sources in terms of helping to combat global warming. Students were also interested by the local renewable energy sources which were discussed, indicating that this successfully helped to engage them in the topic area. The students also enjoyed watching the passionate and motivational speeches made David Attenborough and Greta Thunberg, who are both regularly present in the media. This helped students to link their learning to documentaries or news stories which they may have seen outside of school.

**\*Second example of application of authentic contexts:**

**Lesson Plan Phase 1**

**Lesson Plan – Step 1 Cynllun Gwers – Cam 1**

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|
| Student-teacher                | Lowri Powell                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Class: | 8TN2 |
| AoLE or Subject                | Science & Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Date:  |      |
| Lesson Focus:                  | Balanced diets                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |      |
| Meaningful links to Curriculum | <p>Healthy, confident individuals – Learners will understand foods and drinks which are important to eat and drink as part of a balanced diet to enable them to make well informed choices about what they consume to stay healthy.</p> <p>Authentic contexts – Pupils will complete an 'eat well plate', drawing and labelling foods which they enjoy eating in the different sections for each food group. Pupils will also create a healthily balanced three course menu.</p> |        |      |

**Figure 13: Extract from a lesson plan highlighting the use of authentic contexts in a lesson focusing on balanced diets.**

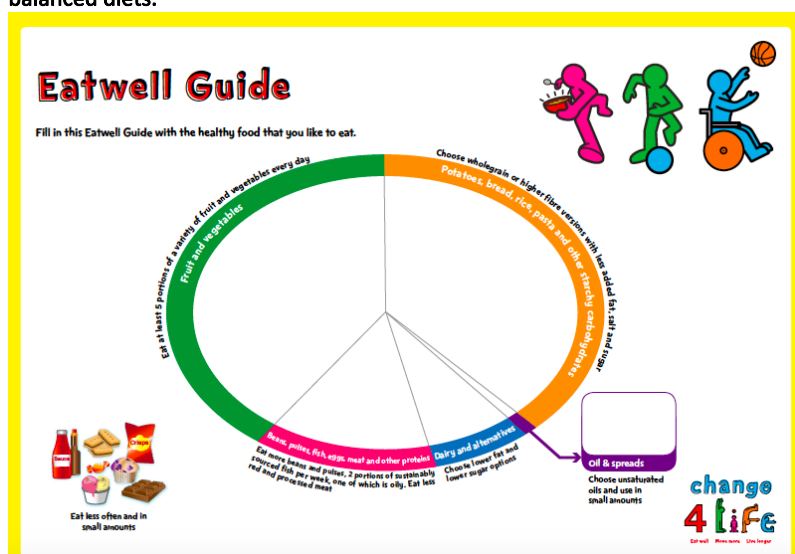


**Figure 14: Template given to students to complete as a task in a lesson focusing on balanced diets (NHS, 2019).**

- Context:  
Lowest set year 8 science class of 26 pupils over half of whom have additional learning needs, including 4 pupils with Autism Spectrum Disorder.
- Rationale:  
Learners were able to link their learning to their own diets. It was important that this topic highlighted the importance of adopting a healthily balanced diet to the learner, in order to improve the learners' understanding of what types of foods provide the body with important nutrients. Not only should this make the content of the lesson relevant to the learners, but it also aims to encourage individual students to make healthier dietary choices throughout life. As part of the lessons the pupils had to complete an 'eat well plate', filling each food group with foods which each individual pupil enjoys, thus making the task relevant and unique to each learner. The lesson also involved students creating a well-balanced three course menu which created an authentic context in which students could apply what they have learnt creatively.
- Evaluative points (improvements / why felt something was successful):  
When explaining the components of a balanced diet to the learners, using foods which were familiar to the pupils seemed to successfully engage the learners, as well as allow better understanding. Furthermore, linking the pupils' learning about balanced diets to their own diets successfully allowed the pupils to understand how and what they were learning was relevant and important to them. All students seemed to be focused and engaged on the tasks they were given

to complete and were keen to discuss their ideas with the class. This demonstrated that the authenticity of the tasks enthused learners and motivated them to engage with the tasks.

**\*Third example of application of authentic contexts:**



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



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



**APLP**  
**PDPA**  
Partnership Group of Professionals for Addysg  
to Advance Professional Learning for All

**Lesson Plan Phase 1**  
**Lesson Plan – Step 1 Cynllun Gwers – Cam 1**

|                                |                                                                                                                                                                                                                                                                                                     |        |    |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|
| Student-teacher                | Lowri Powell                                                                                                                                                                                                                                                                                        | Class: | 7B |
| AoLE or Subject                | Science & Technology                                                                                                                                                                                                                                                                                | Date:  |    |
| Lesson Focus:                  | How solids, liquids & gases behave in terms of diffusion and dissolving                                                                                                                                                                                                                             |        |    |
| Meaningful links to Curriculum | Pedagogical principle – authentic contexts – diffusion of gases and liquids explained using familiar examples (e.g. perfume, coffee, squash). Also discussion of how understanding diffusion can have important environmental implications, e.g. oil spill off the coast of Milford Haven in Wales. |        |    |

**Figure 15: Extract from a lesson plan highlighting the use of authentic contexts.**

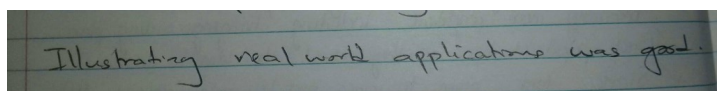


**Figure 16: Observation notes made by a teacher observing the lesson.**

- **Context:**  
Mixed ability year 7 science class. First lesson in which pupils have learnt about diffusion, so the topic would be unfamiliar to most students. Some pupils in the class may have some understanding of what 'dissolving' means due to the topic potentially having been covered during Primary school.
- **Rationale:**  
As the majority of the class would have little or no initial understanding of what the term 'diffusion' means it was felt that the provision of familiar examples would help the pupils to better understand the new concept. Real life examples were also demonstrated (perfume sprayed into the air and watching coffee granules diffuse in water) to help the students to link their learning to familiar contexts, helping to provide foundations upon which further learning could be built. The inclusion of examples illustrating where diffusion had had significant environmental implications in the local area also helped learners to understand the relevance and importance of learning about the topic.
- **Evaluative points (improvements / why felt something was successful):**  
At the beginning of the lesson only a couple of pupils had a very basic understanding of what the term diffusion meant. After a brief explanation most students still did not appear to have a very firm understanding of what the term meant. However, after giving some real life examples and demonstrating these in the class (with perfume and coffee granules) most pupils were able to provide a basic description of what the scientific term meant, highlighting the success of the use of authentic examples. Furthermore, the examples which illustrated the significant effects diffusion can have helped to enable students to understand why the topic was important to understand.

# Critical Reflection (3291 words)

Monday, October 7, 2019 2:00 PM

## Introduction

The review of the curriculum in Wales, conducted by Professor G. Donaldson, proposed twelve pedagogical principles which aim to positively impact upon learning and achievement in a holistic sense. Donaldson (2015) highlights that good teaching, which employs effective pedagogy, is of great importance in terms of improving the learning experiences and benefitting the progress of all learners.

This critical reflection will focus on the progress made in the planning and implementation of three of Donaldson's twelve pedagogical principles outlined in *Successful Futures* (2015, pp. 67 - 68). The three selected pedagogical principles will be discussed in the following order:

1. "Good teaching and learning means employing assessment for learning principles."
2. "Good teaching and learning regularly reinforces cross curricular responsibilities, including literacy, numeracy and digital competence, and provides opportunities to practice them."
3. "Good teaching and learning creates authentic contexts for learning."

Lessons which were taught which involved the planning and implementation of the three selected pedagogical principles detailed in this report, took place in a school which will be referred to as 'School X', in accordance with anonymity guidelines (British Educational Research Association, 2018). School X is a mixed gender comprehensive school in South Wales. Only 6.8% of students in School X are eligible for free school meals (Welsh Government, 2019) which is significantly lower than the Welsh National average of 16% (The Children's Society, 2018). Aspects from lessons illustrated in this reflection have taken place in Year 7, Year 8 and Year 9 classes, all within the Science and Technology Area of Learning and Experience (AoLE). This document will focus on the developments and improvements surrounding teaching at departmental level (science) at Key Stage Three, demonstrated in the portfolio of illustrative examples and reflection of the implementation of the selected pedagogical principles. The classes involved include a mixed ability Year 7 class of 28 pupils, a lowest set Year 8 class of 26 pupils and a top set Year 9 class of 29 pupils.

## Literature Review

The critical analysis and synthesis of pedagogical literature is of great importance in understanding how to progress and develop best professional practice in teaching (Welsh Assembly Government, 2008; Fook 2015). This allows for continual reflection and evaluation of teaching practices to help to effectively inform areas for development in order to ensure that learners' progression is being aided as effectively as is reasonably possible. The need for reflection in the development of effective teaching and learning should be informed by pedagogy (Welsh Assembly Government, 2019b). It is greatly important that the development of teaching and learning is based upon sound pedagogy, with the role of the reflective practitioner in Wales vital for professional progress (Education Workforce Council, 2019).

The first pedagogical principle from *Successful Futures* selected for implementation was "Good teaching and learning means employing assessment for learning principles" (Donaldson, 2015). *Successful Futures* argues that assessment for learning (AfL) techniques allow practitioners to better understand the level of progress made in learning by students and therefore, should enable the provision of meaningful, formative feedback to learners, as well as enabling teaching to be adapted more regularly to suit the learners' needs (Bowen and Ellis, 2009; Tillema, Leenknecht and Segers, 2011). *Successful Futures* also argues that the regular feedback provided to learners can clearly identify next steps to progress learning, as well as fostering learners' individual motivation to improve. These benefits are strongly supported by Dylan Wiliam, who claims that AfL techniques can double the rate of progress made by learners (Donaldson, 2015). A recently published article outlined that effective AfL strategies should involve students, peers and the teacher and promote students taking responsibility for their own learning (Marshall, 2019). This is in contradiction with constructivist learning theory, established by Jean Piaget, which described learning as an individual and internal process founded on individual experience (Wallace, 2009). However, peer and teacher interactions with learners

have now been broadly established as of great importance to learning (Wiliam, 2013; Welsh Assembly Government, 2010; Powell and Cody, 2009). Effective AfL should enable identification of the learner's current level of progress, identification of the level of progress the learner is aiming to reach and clarification of next steps needed for progression (Wiliam, 2013; Bowen and Ellis, 2009). Dylan Wiliam (2013) goes as far as to argue that teaching does not necessarily elicit learning, explaining that this is because if everything taught was simply learnt, there would be no need to assess whether learning had taken place. Therefore, the process of assessment need not merely be used for reporting on the progress made by learners, but is itself instrumental in the learning process (Wiliam, 2013). However, AfL may not always be employed effectively or appropriately which can hinder and negatively impact upon learning. For example, poor understanding of learning objectives and success criteria can cause self-assessment and peer assessment (both common AfL strategies) to negatively impact upon learning (Brown, 2019; Dall'Alba and Vu, 2007). Furthermore, certain AfL strategies, if not employed appropriately, may negatively impact upon learners' self-esteem (Black *et al.*, 2007) or may simply be rendered ineffective if the delay before receiving feedback is too large (Wiliam, 2018). In light of these challenges, if delivered appropriately and sensitively, AfL still has the potential to greatly benefit teaching and learning (Coe *et al.*, 2014; Welsh Assembly Government, 2010).

The next pedagogical principle selected for this review was "Good teaching and learning regularly reinforces cross curricular responsibilities, including literacy, numeracy and digital competence, and provides opportunities to practice them" (Donaldson, 2015). *Successful Futures* outlines that literacy, numeracy and digital competence should be developed throughout each current Area of Learning in an authentic manner. This aims to insure that the development of literacy, numeracy and digital competence within lessons is relevant to learning and links to the Four Purposes of the new proposed curriculum for Wales. For example, good literacy skills should enable learners to "communicate effectively in different forms" and "explain ideas and concepts"; good numeracy skills should enable learners to "understand how to interpret data and apply mathematical concepts"; and good digital competence should enable learners to "use digital technologies to creatively communicate, find and analyse information" (Donaldson, 2015, p. 31). *Successful Futures* highlights that the cross-curriculum responsibilities provide a foundation for nearly all learning and are also necessary skills throughout life; for independent living, the world of work and leisure. It is therefore of great importance that learners are provided with regular opportunities to practice and develop these skills in a range of contexts (Welsh Assembly Government, 2010). As advised by the ICT Steering Group, focus should not be placed upon the development of skills relating to particular technologies. Instead, the rapidly developing world necessitates the development of transferable skills which may be applied to future technologies which do not yet exist (Arthur, Crick and Hayward, 2013).

The final pedagogical principle selected for this review was "Good teaching and learning creates authentic contexts for learning" (Donaldson, 2015). *Successful Futures* discusses the importance of learners understanding that learning in school is relevant to life outside of school. It suggests that this may be done so by using online resources to provide current and relatable examples. *Successful Futures* also outlines that, where appropriate, learning should be applied to a variety of contexts to be able to consolidate learning and practice skills in a more authentic setting, creating a bridge to help pupils to transfer what they have learnt in the classroom to real life scenarios (Prins, Bulte and Pilot, 2016). It is argued that the provision of authentic contexts to provide a backdrop for learning to take place upon increases students' self-motivation to learn as they understand the relevance and meaningfulness of what they are learning (Soulé and Warrick, 2015). Additionally, the use of authentic contexts which students may already be familiar with can help students to more easily relate to and conceptualize new learning (Waters, 2013). Furthermore, linking learning to authentic contexts can make learners more interested in particular topics, thus making students more likely to remember certain concepts and promoting learners' individual desire to delve deeper into the topic area (Pellegrino and Hilton, 2012). However, as made reference to in *Successful Futures*, it is important that applications of learning used in the classroom are not overly contrived (Donaldson, 2015). If opportunities to apply learning in the classroom are overly contrived and relatively tenuous students are not able to make real and meaningful links between what they are learning and the outside world. As well as this, overly contrived contexts for learning may confuse students, adversely affecting learning (Gilbert *et al.*, 2003). While it is important for teaching practitioners to be able to effectively link subject content knowledge to contexts which are likely to be meaningful to the learners, it is also important to ensure that links are not artificial.

## Conclusions About Progress and Recommendations for Further Development

The first illustrative example of the implementation of AfL principles in lessons planned and taught involved peer assessment. Please refer to the 'page' of the 'notebook' of illustrative examples labelled, 'Assessment for Learning' and the section titled, 'First example of application of AfL' for the context, related rationale and evaluative points. Peer assessment was used as an AfL strategy in order for learners to consolidate learning through the evaluation of their peers' work (Wiliam, 2018). As discussed in the portfolio, as the Year 7 class was new to the topic and relatively new to peer assessment a flow diagram was used (Figure 2) to provide success criteria and a clear structure for the peer assessment of the written task. The pupils' relative lack of experience of peer assessment would have been likely to render the use of peer assessment as potentially harmful to learning if it was not for the clearly and simply structured success criteria. This is because a learner with a poor understanding of the assessment criteria would not be able to provide informative feedback to their peer (Brown, 2019; Vu and Dall'Alba, 2007). It is argued that this challenge can be overcome with the use of clear and simple marking criteria to structure peer assessment (Tillema, Leenknecht and Segers, 2011). In order to understand how successfully peer assessment was employed by the whole class, the task and adjoining peer assessments were checked after the lesson. This demonstrated that the use of peer assessment was effective as over 75% of the class had allocated the correct number of marks to their peers. However, some peer assessments did not allocate the correct number of marks and these misunderstandings had to be addressed with the class in the following lesson, reducing the benefit of the immediacy of feedback provided by peer assessment (Wiliam, 2019; Topping, 2009). While incorrect marking renders the peer assessment less useful to the learner receiving it, the peer assessment activity would still have been successful at engaging all learners involved in carrying out the peer assessment due to the required reflection of the success criteria and comprehension of peers' work (Wiliam, 2013; Welsh Assembly Government, 2010). While peer assessment successfully engaged learners in the evaluation of their peers work, it may be improved upon by asking learners to reflect upon the feedback given to and given by their peers in order to make improvements to their own work (Coe *et al.*, 2014).

The second illustrative example of the implementation of AfL principles can be found under the 'Assessment for Learning' 'page' in the portfolio titled, 'Second example of application of AfL'. Lollypop questioning was used to improve the immediacy of feedback generated by AfL, in order to be able to more regularly adapt lessons to suit the learners' needs and provide any necessary clarification (Wiliam, 2018; Bowen and Ellis, 2009; Tillema, Leenknecht and Segers, 2011). In addition to this, questioning is not only able to assess student understanding, but also is able to improve understanding (Abbasnasab-Sardareh *et al.*, 2014). Dividing students into small groups of three to work together to discuss possible answers to questions based on activation of prior knowledge (APK) helped to engage all learners. Lollypop questioning as an AfL strategy successfully motivated all students to engage as they knew they could be picked to answer the questions relating to APK in front of the class (Coe *et al.*, 2014; Welsh Assembly Government, 2010). As answers had been discussed as a group this effectively enabled the confidence of the individuals picked upon to be increased as the whole group was responsible for the answer of the individual (Coe *et al.* 2014). This AfL strategy effectively engaged and motivated learners and provided immediate verbal feedback to the whole class to aid with the progression of understanding and to consolidate learning (Abbasnasab-Sardareh *et al.*, 2014). However, while the answers given by an individual from a small group of learners can be representative of the ideas of the whole group, it was not possible to elicit the level of understanding of each learner within the group. Additionally, while the group's responsibility for the answers of the individual helps to minimise any negative effects on self-esteem when answering questions in front of the whole class, the risk cannot be completely ruled out.

The third illustrative example of the implementation of AfL can be found in the section of the portfolio titled, 'Third example of application of AfL'. This example involved a task in which students had to try to explain or describe, on a sticky note, two named scientific terms covered in the previous two lessons. Students then had to stick the anonymous sticky notes on the board and the answers were discussed with the class. As demonstrated in Figures 6 and 7, this enabled any common misconceptions present to be addressed to the whole class. Unlike the illustrative example of the use of peer assessment this enabled informative feedback to be given to the class with a greater level of immediacy, benefitting learning (Wiliam, 2018; Topping, 2009). Furthermore, unlike the lollypop questioning AfL strategy, learners' answers remained completely anonymous, therefore avoiding any negative consequences on self-esteem due to feeling embarrassed from giving an incorrect answer (Abbasnasab-Sardareh *et al.*, 2014). Additionally, as every learner had to give a sticky note answer the level of understanding of the whole class could be more effectively assessed. The success of this was also commented on by the teacher observing as can be seen in Figure 5.

The second pedagogical principle selected for implementation was Cross-Curriculum Responsibilities. Please refer to the 'page' of the portfolio labelled, 'Cross-Curriculum Responsibilities' for the context, evidence, rational and evaluative points relating the three examples of application. As can be read in the annotations of the examples of application and in Figures 8, 9 and 10, opportunities to practice and improve numeracy skills were provided in the lessons delivered. An appropriate level of challenge was afforded by the numeracy tasks to help to stimulate and improve the numeracy skills of 'more able and talented' (MAT) Year 9 pupils. Additionally, simpler tasks appropriate for improving the numeracy skills of Year 7 pupils were also provided. All tasks which involved numeracy (discussed in the 'Cross-Curriculum Responsibilities' section) were relevant to the topic, making learning more meaningful to the students (Prins, Bulte and Pilot, 2016; Soulé and Warrick, 2015). Furthermore, as outlined in *Successful Futures* the numeracy skills developed in the lessons aided learners to better "understand how to interpret data and apply mathematical concepts" (Donaldson, 2015, p.31), in line with the proposed purpose of the new curriculum in developing, "ambitious, capable" individuals. This was assessed using a variety of techniques including book marking and pupil questioning.

Opportunities to practice and improve literacy skills were also provided in the lessons delivered as can be seen in Figures 8, 9 and 11. The contexts, rationale and evaluative points relating to the development of literacy skills in lessons can be read about in greater depth in the 'Cross-Curriculum Responsibilities' page of the notebook. Literacy tasks involved comprehension of sources and clear written explanation, focusing on the use of correct spelling and grammar. These tasks effectively enabled students to practice and improve their literacy skills through the provision of clear success criteria, peer and self-assessment and teacher explanation (Welsh Government, 2010). Common errors, especially relating to spelling, were picked up on and effectively addressed to the whole class, as can be seen in Figure 9.

Additionally, opportunities to practice and improve digital competence skills were provided in the lessons delivered, as is demonstrated in Figure 11. Opportunities included identification of reliable online sources to gather information and the creation of an 'e-encyclopaedia' page to clearly present findings. In an age where increasing amounts of unfiltered information is uploaded online daily, it is important for students to be able to learn how to identify sources which are likely to be reliable (Arthur, Crick and Hayward, 2013). While the lessons effectively provided opportunities for students to practice digital competence skills using clear success criteria (Tillema, Leenknecht and Segers, 2011), students were not provided with particularly innovative or new areas of digital competence which they may have been unfamiliar with. Therefore, these lessons did not provide adequate opportunities to broaden the students' skill sets in relation to digital competence. In the future, digital tasks which the students are likely to be unfamiliar with should be used to help to expand and improve the learners' skills in this area.

The final pedagogical principle selected for implementation was the use of authentic contexts. Please refer to the 'page' of the 'notebook' titled, 'Authentic Contexts' to read about the examples of application in greater detail. The implementation of authentic contexts successfully enabled the students to understand the relevance of their learning, partly demonstrated in Figures 12, 13, 14, 15 and 16 and discussed in the annotations of the first, second and third examples of application. As well as the importance of the students' understanding of the meaningfulness of their learning, (as discussed in greater depth in the literature review (Donaldson, 2015; Soulé and Warrick, 2015; Pellegrino and Hilton, 2012)), the implementation of authentic contexts also helped to improve the learning of unfamiliar concepts, which is discussed in greater detail in the third example of application on the 'Authentic Contexts' page of the OneNote portfolio. The use of authentic contexts also provided good opportunity for the lessons to link with and promote the Purposes of the new curriculum in Wales as advised by Donaldson (2015). The linking of the food and digestion topic to authentic contexts involved the learners reflecting upon foods within their own diets and creating a menu for a well-balanced meal (please refer to Figures 13 and 14), linking to the Purpose of developing "healthy, confident" individuals (Donaldson, 2015). Meanwhile, the linking of the renewable energy topic to the environmental and social impacts of global warming also linked to the Purpose of developing "ethical, informed citizens" (Donaldson, 2015). While the provision of authentic contexts helped to aid understanding and engage the interest of learners, this may have been better done so through out of school visits or talks from external speakers invited into the school (Donaldson, 2015).

While it was largely felt that the selected pedagogical principles were successfully implemented in terms of benefitting teaching and learning, it does not mean that there is not room for improvement. Reflection of pedagogical principles and their implementation within teaching practice is a process that should take place regularly in order to continue to develop professionally and improve the learning experiences of all (Education Workforce Council, 2019). In-depth synthesis and analysis of related pedagogical literature allowed a greater insight into how to better implement the selected pedagogical principles in order to improve learning. Reflection upon the implementation of the selected pedagogical principles helped, and will continue to help, to further inform practice, developing teaching and benefitting learning.

# Reference List

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- Abbasnasab-Sardareh, S., Saad, M. R. M., Othman, A. J., and M, R. C. (2014) 'ESL Teachers' Questioning Technique in an Assessment for Learning Context: Promising or Problematic?', *International Education Studies*, 7(9).
- Arthur, S., Crick, T. and Hayward, J. (2013) *The ICT Steering Group's Report to the Welsh Government*, Cardiff: BoxUk.
- Black, P. et al. (2007) *Assessment for Learning*. Maidenhead: McGraw-Hill Education.
- Bowen, T. and Ellis, L. (2009) 'Assessment for Learning', *A Dictionary of Education*, Oxford: Oxford University Press.
- British Educational Research Association [BERA] (2018), *Ethical Guidelines for Educational Research* 4th Ed. London: BERA.  
Available at:  
<https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018-online>  
(Accessed: 21 December 2019).
- Brown, G. T. L. (2019) 'Is Assessment for Learning Really Assessment', *Frontiers in Education*, 4(64).
- Coe, R., Cesare, A., Higgins, S. and Major, L. E. (2014) *What makes great teaching? Review of the underpinning research*. London: Sutton Trust.  
Available at:  
[suttontrust.com/researcharchive/great-teaching](http://suttontrust.com/researcharchive/great-teaching)  
(Accessed on: 21 December 2019)
- Dall'Alba, G. and Vu, T. T. (2007) 'Students' Experience of Peer Assessment in a Professional Course', *Assessment and Evaluation in Higher Education*, 32(5), p. 541.

- Donaldson, G. (2015) *Successful Futures: Interdependent Review of Curriculum and Assessment Arrangements in Wales*.  
Available at:  
<https://gov.wales/sites/default/files/publications/2018-03/succesful-futures-a-summary-of-professor-graham-donaldsons-report.pdf>  
(Accessed: 21 December 2019).
- Education Workforce Council (2019) *Code of professional conduct and practice*. Cardiff: Crown.
- Fook, J. (2015) 'Reflective practice and critical reflection', *Handbook for Practice Learning in Social Work and Social Care*, 26, pp. 440 – 453.
- Gilbert, J.K., de Jong, O., Justi, R., Treagust, D.F., van Driel, J.H. (Eds.) (2003) *'Chemical Education: Towards Research-based Practice' Science and Technology Education Library*, Kluwer Academic Publishers: Dordrecht.
- Marshall, K. (2019) 'Dylan Wiliam on the Powerful Potential of Formative Assessment', *International Educator*, 33(3), pp. 19 – 21.
- NHS (2019) *Eat-well guide*.  
Available at:  
<https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/?tabname=recipes-and-tips>  
(Accessed: 21 December 2019).
- Pellegrino, J. and Hilton, M. L. (Eds.). National Research Council. (2012). *Education for Work and Life: Developing Transferable Knowledge and Skills in the 21st Century*, Washington DC: National Academies Press.
- Powell, K. and Cody, K. (2009) 'Cognitive and Social Constructivism: Developing Tools for an Effective Classroom', *Education*, 130(2), pp. 241 – 251.
- Prins, G.T., Bulte, A.M.W. and Pilot, A. (2016) 'An Activity-Based Instructional Framework for Transforming Authentic Modeling Practices into Meaningful Contexts for Learning in Science Education.' *Science Education*, 100(6), pp. 1092 – 1123.
- Soulé, H. and Warrick, T. (2015) 'Defining 21st century readiness for all students: What we know and how to get there.' *Psychology of Aesthetics, Creativity, and the Arts*, 9(2), pp. 178 – 187.

- The Children's Society (2018) *Welsh Government consultation on revised eligibility criteria for free school meals in Wales due to roll out of Universal Credit*.

Available at:

<https://www.childrenssociety.org.uk/sites/default/files/uc-fsm-wales-tcs-consultation-response-final-12-sep-2018.pdf>

(Accessed: 21 December 2019).

- Tillema, H., Leenknecht, M. and Segers, M. (2011) 'Assessment for Learning', *Studies in Educational Evaluation*, 37(1), pp. 24 – 34.

- Topping, K. J. (2009) 'Peer Assessment', *Theory Into Practice*, 48(1), pp. 20 – 27.

- Wallace, S. (2009) *A Dictionary of Education 1st Ed*. Oxford: Oxford University Press.

- Welsh Assembly Government (2019a) *My Local School*.

Available at:

<https://gov.wales/my-local-school-guide>

(Accessed: 21 December 2019).

- Welsh Assembly Government (2019b) *Professional standards for teaching and leadership*.

Available at:

<https://s3-eu-west-1.amazonaws.com/hwb-live-storage/fc/a7/a4/e2/e348428381e68434ea93f611/professional-standards-for-teaching-and-leadership-interactive-pdf-for-pc.pdf>

(Accessed: 21 December 2019).

- Welsh Assembly Government (2010) *How to develop thinking and assessment for learning in the classroom*.

Available at:

<https://s3-eu-west-1.amazonaws.com/hwb-live-storage/0b/7e/2a/dc/dc1f4a3dbf14716ec0041020/how-to-develop-thinking-and-assessment-for-learning-in-the-classroom.pdf>

(Accessed: 21 December 2019).

- Welsh Assembly Government (2008) *Observing Children*.

Available at:

<https://s3-eu-west-1.amazonaws.com/hwb-live-storage/a8/9c/a8/ee/f299432c801d025d875da415/observing-children.pdf>

(Accessed: 21 December 2019).

- Wiliam, D. (2018) *Self and peer assessment* [video].

Available at:

<https://education.gov.scot/improvement/practice-exemplars/Dylan%20Wiliam%20-%20Self%20and%20peer%20assessment>

(Accessed: 21 December 2019).

- Wiliam, D. (2013) 'Assessment: The Bridge between Teaching and Learning' *Voices From The Middle*, 21 (2), pp. 15 – 20.

- Waters, M. (2013) *Thinking Allowed on Schooling*, Independent Thinking Press: Carmarthen.