

**A critical analysis of the relationship between teacher subject knowledge and effective teaching and learning in the primary school.**

Word Count: 4344

**Introduction**

The aim of this assignment is to critically evaluate the relationship between a teacher's subject knowledge and effective teaching and learning within a primary school environment. Firstly, this piece of writing will provide contextual information regarding the primary school in which the reflections are based. Secondly, a literature review surrounding the importance of subject and content knowledge for primary teachers will be conducted. The main aspects of such literature review will be based upon Shulman's (1986) teacher's knowledge base theory and the Knowledge Quartet theory, initiated by Rowland et al. (2003). Both theories discussed within the text are supported or critiqued with the use of additional researchers and theorists. The final aspect of the assignment will be an analysis and evaluation based upon personal experiences in relation to a recent Professional Teaching Experience (PTE). It will be discussed how personal subject knowledge has influenced the planning and delivery of certain sessions and with the use of self-assessment, what actions can be put in place to improve such aspects.

Based upon the guidelines received from the British Educational Research Association [BERA] (2018) and the Data Protection Act (Department for Digital, Culture, Media and Sport, 2018), throughout this piece of writing, I will be keeping the school, the staff and the learners anonymous and confidential, thus referring to the school as School A, with learners being referred to as initials.

School A is located in which is considered to be an affluent area in its location, with 6.5% of pupils eligible for free school meals (reference removed for anonymity). The schools latest Estyn inspection came during the late weeks of 2017, with the school receiving an overall rating of 'good' (reference removed for anonymity). I was placed within a Year 4 classroom with twenty-seven learners (14 male and 11 female), aged 8 and 9 with birth dates between September 15<sup>th</sup> to August 25<sup>th</sup>. There was a teaching assistant present during sessions 2 on Tuesdays and Thursdays. Also, there was a volunteer present Monday morning; to assist with the Mathematics and Literacy sessions for that day. The teaching assistant would read

with and then test all children on aspects from a chosen book (set book if the children are going through the oxford dreading tree scheme) weekly using the Scholastic 'Reading Pro' programme.

### **Literature Review**

The importance of teachers' subject knowledge in relation to effective teaching and learning has been researched extensively over time. Shulman (1986) explains curriculum knowledge as the 'tools of the trade' for all teachers, and that it is vital for all educators to achieve a foundation in all areas of their knowledge. This is supported further by a longitudinal study conducted by Verloop et al. (2001) who concluded that an understanding of knowledge base for teachers results in enhanced levels of teaching. When discussing teacher knowledge base, Shulman (1986) explains that at minimum, this would consist of seven categories: Content knowledge, General Pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge and understanding of learners, knowledge of educational contexts such as the finance situation, the group of children and the community and the knowledge of educational ends, purposes and their values.

Shulman (1986; 1987) believes that specifically, pedagogical content knowledge is of great importance for effective teaching and learning. This aspect is concerned with the planning and delivery of differentiated tasks to a range of children and abilities. Pedagogical content knowledge therefore, is the ways in which a teacher uses subject knowledge to facilitate the learning of the class, in a clear and rational manner (Shulman, 1987). This is reiterated by Coe et al. (2014), who aver that as well as having a high level of subject knowledge, for teaching to be effective, teachers must have high pedagogical content knowledge to understand the different ways in which the learners think about the content being taught.

Bliss and Askew (1996) conclude that a lack of subject knowledge results in an absence of scaffolding of children's understanding and knowledge. Kennedy (1991) supports this, claiming that without an understanding in all areas of the curriculum, it is difficult for teachers to relate ideas and knowledge from one area to another. Moreover, a case study conducted by Shulman (1987) of Colleen illustrates that because of an inadequate knowledge of the subject related to the session, there was no given opportunity for questioning or contribution through discussions for the learners on the given topic. Colleen

however, admitted that throughout the session avoided eye contact with one particular pupil as they always had a broad range of questions, ones in which Colleen may not have answered effectively. Consequently, Colleen has possibly limited the learning taking place for said student. Therefore, the lack of confidence from Colleen's content knowledge resulted in a lack of efficient pedagogy used in the session, diminishing the level of outcome for the students involved. Moreover, during the session, opportunities for the children to scaffold upon their knowledge and thinking were impacted because of this. As a result of this, Shulman (1987) believes that effective teachers must be familiar of previous learning along with how current learning can be expanded upon in the future.

Nevertheless, it is documented that when Colleen had substantial subject knowledge of a topic, she displayed effective pedagogy, being both creative and engaging with her teaching (Shulman, 1987), instead of using the teacher-led, didactic approach when the subject knowledge was low. Therefore, it can be said that subject knowledge allows a practitioner to develop a student-centre pedagogical approach. This is an area that Donaldson (2015) is looking to enhance through 'Successful Futures'. The curriculum focusses on the children becoming ambitious, engaging and empowered individuals, through a holistic approach to teaching (Donaldson, 2015).

Shulman (1987) believes that having high knowledge of learners and the characterises they individually possess is also important in becoming a very effective educator. With such knowledge, educators can create a positively challenging environment, celebrating effort rather than achievement, thus enhancing the learners' attitudes towards learning (Coe et al. 2014). Having knowledge of the different abilities, you can challenge the pupils accordingly, enhancing both confidence and self-esteem (Coe et al., 2014).

The Knowledge Quartet is a theoretical framework used to examine the effectiveness of mathematical teaching (Rowland, 2014). This theory articulates upon a framework for primary mathematics sessions, analysing the content knowledge displayed. The results were the outcome of twenty-four scrutinised videotapes regarding a trainee teacher. The main aim of this research was to identify how trainee teachers' subject knowledge in mathematics relates to their teaching of the subject (Rowland et al, 2003). The theory focussed upon two main areas of this; subject matter knowledge and pedagogical content knowledge both identified by Shulman (1986). Following this research, the researchers

identified four groups as a relatable tool for thinking about how subject knowledge is transferred in to a classroom. The four groups are; Foundation, Transformation, Connection and Contingency (Rowland et al, 2003).

Firstly, the foundation element consists of the trainee's base knowledge, understanding and beliefs that have been developed through full-time education and the teacher training programme. According to Rowland et al (2003), the knowledge and beliefs of the trainee inform the different pedagogical strategies in a fundamental way. In summary, the educator understands the topic and content that is being taught whilst using the correct terminology, has an understanding of the different ways' children can be taught through different pedagogical approaches and are able to identify pupil errors and how they can be overcome.

The second category being transformation. This category is demonstrated by progressing the knowledge through both the planning of sessions and in fact, the act of physically teaching a group of students (Rowland et al, 2003). Therefore, the transformation category places emphasis on how subject knowledge is used to supplement pedagogy. For example, how a learner can demonstrate and model appropriate examples with the use of appropriate materials for the task. This ties in with the belief of Shuman (1987) that a teacher's base knowledge is distinguished by the ability they possess to use a range of effective pedagogical strategies. In both examples, teachers are combining the subject knowledge with the practicality of transferring such knowledge effectively within a classroom environment. Ball et al. (2001) and Hattie (2012) reiterate this point, stating that subject knowledge has been recognised to be highly important in the preparation and planning of sessions and activities. Through exploring and defining characteristics of effective teaching and thus learning, Rosenshine (2012) amongst other aspects, found that effective facilitators provide detailed explanations of new material introduced during sessions with the use of high standard modelling. Therefore, an element of effective teaching is using your subject knowledge to influence the pedagogy used and how the children understand the point the teacher is putting across.

Moreover, the third category of the knowledge quartet 'connection' links the planning and teaching of a series of sessions. It is associated with the scaffolding of the learner's knowledge. Connection is based upon making connections with and having the ability to

build upon prior and future learning. To display effective connection skills, Rowland et al (2003) suggest that it more than simply connecting prior or future learning, but also the ability to sequence topic and task orders, allowing the students to visualise and understand the links between the learning.

The final category of contingency is associated with classroom events that are beyond the control of the teacher, making planning for such events almost impossible (Rowland et al, 2003). Even though it will be unknown of such events during the planning process of sessions, effective teaching occurs when one is able to respond quickly and effectively. An example of contingency within a classroom is responding to a learner's question. Even though educators will have an idea on questions the learners may ask, questions can be asked which the educator has unplanned for, or answers or methods to questions asked by the educator may be different to what the educator was looking for.

Even though Shulman's (1986) seminal work on 'pedagogical content knowledge' and Rowland et al's (2003) knowledge quartet influenced this field substantially, Guerriero (2017) implies that there is a lack of empirical studies based upon the area. Furthermore, Ball et al. (2008) aver that the conceptual background of this concept lacks substance, because it is predominately mathematical and scientific subject based with a mathematics and scientific census. Moreover, as the research is subject specific, it can be difficult to relate this theory to different subject areas within the curriculum. When looking at the redevelopments of the national curriculum throughout Wales, this is an aspect in which educators should visit closely. 'Successful Futures' will narrow our curriculum subjects in to six areas of learning and experience, with three cross-curricular responsibilities running throughout; numeracy, literacy and digital competence (Donaldson, 2015). As the curriculum subjects are now becoming more fluid and relatable, Ball et al's. (2008) belief as to why has the research conducted by Shulman (1986) been too subject specific becomes strengthened.

Furthermore, the importance for teachers to have a high level of subject and curriculum knowledge throughout Wales is demonstrated with the foundation of trainee teachers. For example, for trainee teachers throughout Wales to get awarded with their qualified teacher status, they must demonstrate a range of standards. In order to gain such status, student teachers must demonstrate that 'they have a secure knowledge and understanding of the

subject(s) they are trained to teach' (Welsh Government, 2009 p.5). Also, it is specified that trainee primary teachers have an understanding on how to teach such subjects, again reiterating Shulman (1986) and Rowlands et al. (2003).

During the research 'what makes great teaching?' conducted by Coe et al (2014), there was a positive relation between a teacher's subject knowledge and the influence this had upon the learners. Nevertheless, in the aspect of subject knowledge and effective teaching, Rockoff et al. (2011) found that educators with high qualifications in a range of subjects often do not make the most effective teachers. Again, the beliefs of Rockoff et al. (2011) link with that of Shulman (1986) and Rowland et al. (2003). An effective teacher does not only have substantial knowledge throughout a broad range of subjects, it is how this knowledge is transferred into a classroom that displays an effective educator; through a range of effective pedagogy (Rockoff et al., 2011).

### **Analysis and Evaluation**

This section of the assignment will discuss examples of my personal teaching experience, highlighting strengths and weaknesses in relation to personal content knowledge. The examples used will refer specifically to the Knowledge Quartet outlined by Rowland et al. (2003) and the knowledge base outlined by Shulman (1986). During this placement, I was able to teach nine of the eleven curriculum subjects within key stage two (excluding Welsh Language and Science, however there was use of 'incidental' Welsh throughout all sessions). The knowledge quartet can be a vital initiative to refer to when assessing and monitoring sessions. Brown et al (1999) show that when reviewing a session, a main focus will be upon the organisation skills used when planning and delivering the session and not solely on the subject knowledge gained by the learners.

During my professional teaching practice, I noticed that one area in which my subject knowledge was lacking was regarding the Roman's and the Roman Empire. As 'The Romans are coming' was the class' topic for the term, most of our lessons throughout different subject areas was based upon this. A session I have chosen to reflect upon was a geography-based, topic lesson, which involved the learners exploring a map of Caerleon, identifying and thus completing a map including Caerleon's key roman features into their books (see Appendix A for session plan). This session has been chosen to reflect upon as it was the first

teaching session conducted by myself related to the topic on the first teaching day of the teaching experience.

Although such Roman features were researched beforehand, I still lacked knowledge surrounding such features. From having limited content knowledge, a lack of confidence developed which in turn, increased anxiety levels (Furlong and Maynard, 1995). Referring to Shulman (1986) and Rowland et al. (2003), this was a strong indication as to why having a strong foundation base knowledge prior to teaching a specific subject is important for teachers. As discussed by Rowland et al. (2003), a teachers' subject knowledge influences pedagogical choices, which was the case in this instance, as I believe that I focussed too much on the ICT map software during the introduction of the session rather than explaining the different roman features and the purposes they served. By doing so, little opportunity was given to the children to scaffold upon knowledge or ideas from previous sessions, which in turn, reiterates the view that a lack of subject knowledge diminishes the opportunity for learners to scaffold upon knowledge and understanding (Bliss and Askew, 1996; Rowland et al., 2003). Within the session plan, I intended to include probing questions for the children to develop their learning further such as 'why do you think the Romans decided to build a fort in Caerleon?', however, because of a lack of confidence, such questions were not asked, again, hampering the learning of the children.

This is similar to that of the case study of Collen (Shulman, 1987). As stated in the literature review, Colleen avoided eye contact with one particular pupil as they had always shown a broad range of 'good' questions. Also, because of the lack of knowledge related to the subject, Colleen refrained from questioning the students and opening the session up for discussion. During this session, an element of the 'contingency' category from the knowledge quartet had arisen. For example, during the session, a pupil asked me about the year in which the Romans decided to build their fortress in Caerleon. This was an area which was researched beforehand, however, the year could not be remembered. This could have been problematic if not controlled calmly and confidently. Nevertheless, instead of dismissing the question which could result in low self-esteem and confidence for the child (Bliss and Askew, 1996), I asked the child to use the internet to research this for themselves, giving them an element of independent learning.

To overcome this, I ensured that I had gathered information based around the topic, including information that is excluded from planning. This allowed me to have less task-specific knowledge, whilst having more rounded knowledge. This, therefore diminished the 'contingency' strand of the knowledge quartet, as with having more broad knowledge based upon a topic, I was more comfortable with answering questions derived from students in future sessions. Before taking a topic session, I would also research upon the area intensely, thinking about the different ways in which such sessions could be taught.

From undertaken my professional teaching experience in a key stage two environment, it was clear that the mathematics sessions were all closely linked. Therefore, my mathematical sessions were continual, scaffolding upon the knowledge and understanding gained from the previous sessions. This links in with the conclusion from Bliss and Askew (1996) that scaffolding has a positive relationship with subject knowledge. This refers to the connection aspect of the knowledge quartet in which it is discussed that the ability to sequence the different tasks or topics, allowing for the learners to scaffold upon their knowledge is an aspect that contributes to effective teaching and thus, learning (Rowland et al, 2003). Throughout the mathematics sessions, it was ensured that the children had knowledge and understanding of an element from a topic before moving this learning forward. This allowed me to develop successive sessions aimed to advance the learning and the knowledge of the class. Therefore, the planning provided many connections to previous learning in which without such sessions, the current session would be ineffective. For example, during the placement, I ensured that the children were comfortable with multiplication and their times-tables before moving the learning on to division.

Although feedback provided from my classroom and university tutor highlighted my competence, confidence and effective subject knowledge throughout the area of mathematics, one session regarding fractions was very ineffective (see Appendix B for session plan). I believe that this was down to not the subject knowledge, but the pedagogical content knowledge used during the introduction of the session. Ambrose (2004) notes that student teachers assume that teaching mathematics is straightforward given that the teacher understands the mathematics they are teaching. Stipek et al (2001) refer to this belief as traditional knowing orientation. I believe that this was the case during the introduction of this method; by knowing the method of simplifying fractions to a good

standard, I believe that I took this for granted, struggling to explain the method of doing so to the children in an efficient manner. There is a link between this example and the theory of Shulman (1986) of pedagogical content knowledge – my underlying knowledge of simplifying fractions was not transferred clearly or efficiently to facilitate the learning of the students.

Reflecting back upon the session and referring to the 'Contingency' element of the Knowledge Quartet (Rowland et al., 2003), it was clear that I had overestimated the learner's knowledge and ability of simplifying such fractions. My pedagogical content knowledge was substandard in this example - I struggled to think of different ways in which to present the methodology of simplifying fractions, which would have made the main activities more accessible for the learners, however, I continued with the session regardless. By doing this, I was therefore hampering the learning of the children, thus, displaying an ineffective teaching strategy.

This was overcome, from myself deciding to revisit the same session during our next mathematics session, after researching the different techniques and methods that can be used to allow the children to develop their understanding on simplifying fractions. This time, more visual aids were used regarding the introduction of the session. The introduction of the lesson was extended also, with an increased emphasis of the simplifying process; ensuring that the learners were comfortable with the methodology. The visual aids along with the larger emphasis on the simplifying process during the introduction, significantly improved the children's understanding of the process. Here, there was an improvement in the 'Transformation' element when linking to the Knowledge Quartet, as I was now able to relate my subject knowledge with effective pedagogical approaches, enhancing the learning and knowledge of the children. Moreover, I had instantly recognised how the different use of pedagogy enhanced the children's knowledge and thinking, highlighting the point stated by Shulman (1986), that effective teaching occurs when one is able to display their subject knowledge through their ability to relate this to different pedagogical strategies.

It is reported that a similar reaction towards an unplanned stimulus and the ability to exploit opportunities to enhance learning can be a highly difficult tactic for newly qualified teachers to learn (Brown and Wragg, 1993). Hattie (2012) advocates that the ability to react and excellently seek feedback about own teaching is needed to become an effective teacher,

therefore, adapting my own planning from such observations can lead to more producing future teaching.

An example of where high subject knowledge reflected an effective outcome was recount writing in a series of English sessions. The children were asked to create a recount based upon their favourite aspect from a current trip. My foundation knowledge for this aspect derived from observing the classroom teacher working on recount writing with the children whilst on 'observation week' during the start of the placement. Therefore, the children and I were knowledgeable on the success criteria for recount writing prior to the session. The children were able to connect their knowledge and understanding from previous sessions and in fact the trip, allowing the opportunity for the children to scaffold upon their learning which creates effective teaching and learning (Rowland et al, 2003; Shulman, 1986). There was differentiation used throughout this learning – due to having a low ability of writing, HP and AL were initially given iPads, where they would use the 'Dictaphone' feature to talk their recount. The following session, when the class were finishing of their first-draft of the recount, I worked with HP and AL, going through the words in which was included within their recount. After this, HP and AL started to write basic sentences into their books, copying down and reading what they had included in the previous work. This reflects good pedagogical content knowledge, as I have delivered and planned for differentiated tasks to children of different abilities (Shulman, 1986; 1987). Furthermore, throughout these series of English sessions, my subject knowledge allowed the children to develop a variety of skills from the writing strand of the English programme of study for year 4 learners in Wales. For example, the children were given the opportunity to: use connectives, start writing in paragraphs, use subject-specific vocabulary and organise work in chronological order (Department for Education and Skills, 2015). Therefore, with using subject knowledge to facilitate the learning of the class through different skills listed as essential by the Welsh government, effective teaching and learning occurred. Nevertheless, as English is considered a 'broad' subject, Bearne and Reedy (2018) aver that it is difficult to finalise what effective subject knowledge throughout English is.

Another aspect in which I believe not my subject knowledge, but pedagogical content knowledge fell short was when using the 'Digital Competence Framework (DCF)'. This was brought to my attention when undergoing an end of week review with my classroom tutor

who mentioned that even though I was relating to the DCF during sessions plans, the use of ICT should be deployed in a more efficient manner. This links in with Donaldson (2015) whom suggests that the ability to use technology creatively is an increasingly vital component in the workplace, therefore, when allowing the learners to use technology creatively during sessions from a young age, you are supplying them with the foundation in which can be scaffolded upon.

This is seen as an important aspect of the curriculum throughout Wales since the introduction of the Digital Competence Framework and with Donaldson (2015) introducing Digital Competence as a cross-curricular responsibility. Donaldson (2015) notes that digital competence is increasingly important to learning and the wider life of the younger generation, therefore it should have the same status in Wales' new curriculum 'Successful Futures' as literacy and numeracy. By limiting the digital competence framework through my planning, I was therefore not displaying effective teaching and learning, even though there was subject knowledge base in that area. This links in with the transformation element of the knowledge quartet, that subject knowledge must be transformed from the knowledge itself to how that knowledge is used in a classroom environment effectively (Rowland et al., 2003).

### **Conclusion**

To conclude, throughout this piece of writing, two key theories have been the focus of critically analysing the relationship between subject knowledge and learning and teaching in a primary school. From summarising the key literature, in addition to the reflect process regarding personal teaching experiences, it is evident that teacher subject knowledge is significant to effective teaching and learning. However, there are other aspects to consider in relation to effective teaching and learning; pedagogical content knowledge, curriculum knowledge, knowledge of all learners and the knowledge of the contexts (Shulman, 1987).

Through the basis of Shulman (1986;1987) and Rowland et al. (2003), I will continue to analyse my own subject knowledge and pedagogical content knowledge to ensure there is a high level of teaching and learning within my personal practice. During the analysis and evaluation of personal experiences, subject knowledge has had a major impact on the

taught sessions, especially in relation to personal confidence levels and different pedagogical approaches.

With the new curriculum for Wales currently being piloted, it is vital that practitioners throughout Wales have both solid content and pedagogical knowledge in relation to mathematics, digital competence and language, literacy and communication as all three areas are cross-curricular (Donaldson, 2015). With this curriculum closely linking different subject areas, teachers (in particular those who specialise in one subject area) need to adapt pedagogical thinking, enabling learners to become creative, ambitious and enterprising individuals (Donaldson, 2015).

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**Appendix**

## Appendix A

|                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--|
| Canolfan Addysg Athrawon<br>De-Orllewin Cymru  The South West Wales<br>Centre of Teacher Education                                                                                                               |                                                                                                                                                                        |                                                                                                                                                                                           | <b>1B</b>                                              |  |
| <b>Session Plan – Key Stage 2</b>                                                                                                                                                                                                                                                                 |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
| Name of trainee: Bradley Walstow                                                                                                                                                                                                                                                                  |                                                                                                                                                                        | Session ref: L2-Topic. 05/11/18                                                                                                                                                           |                                                        |  |
| Personal target(s) in relation to QTS: <b>S3.3.7</b> They organise and manage teaching and learning time effectively.                                                                                                                                                                             |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
| Year group: 4                                                                                                                                                                                                                                                                                     | No. of learners: 27                                                                                                                                                    | ALN:                                                                                                                                                                                      |                                                        |  |
| Additional Adults:                                                                                                                                                                                                                                                                                | Mrs. Rees-Jones (To alternate observation between classroom and Library).                                                                                              |                                                                                                                                                                                           |                                                        |  |
| Learning objective(s): <ul style="list-style-type: none"> <li>To create a map of Caerleon from the information collected using the internet.</li> </ul>                                                                                                                                           |                                                                                                                                                                        | Success criteria: <ul style="list-style-type: none"> <li>To create a map of Caerleon using symbols and keys.</li> <li>To successfully locate specific items on the map online.</li> </ul> |                                                        |  |
| Links to previous learning: Topic- Romans. Previous knowledge of map making.                                                                                                                                                                                                                      |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
| Curriculum coverage (range, skills)<br>Ge LP 3- Use maps, imagery and ICT to find, present locational information, e.g draw sketch maps using symbols and keys.<br>Re RS 8- Find information and ideas from web pages, using different methods, considering which are the most effective methods. |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
| <i>Literacy(LNF)</i>                                                                                                                                                                                                                                                                              |                                                                                                                                                                        | <i>Numeracy (LNF)</i><br>Map making and reading.                                                                                                                                          |                                                        |  |
| <i>DCF</i><br>The use of iPads and computers as the basis of the research. To use the website 'Where's the path?' to explore satellite images of Caerleon.                                                                                                                                        | <i>Thinking</i><br>Consider why the Romans may have built a fort in Caerleon.                                                                                          | <i>ESDGC</i>                                                                                                                                                                              | <i>YCC</i><br>History of an iconic Welsh Town.         |  |
| <i>Key vocabulary(English/Welsh):</i><br>Amphitheatre, Caerleon, Map, Key<br>Wyt ti'n barod?                                                                                                                                                                                                      |                                                                                                                                                                        |                                                                                                                                                                                           |                                                        |  |
| Time                                                                                                                                                                                                                                                                                              | Session activities, organisation and management                                                                                                                        |                                                                                                                                                                                           | Key questions & Assessment for Learning opportunities  |  |
|                                                                                                                                                                                                                                                                                                   | Introduction<br>Introduce the children to the website 'Where's the path?'<br>Provide the children with the list of items for them to spot during the satellite images. |                                                                                                                                                                                           | Where is Caerleon?<br><br>Has anyone been to Caerleon? |  |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>Why do you think the Romans decided to build a fort in Caerleon?</p> <p>Self-assessment</p> |
|  | <p>Main activities</p> <p>Children to search online using the term 'Roman Forts Wales' to find maps that show the distribution of Roman Forts across Wales.</p> <p>Ask the children to work in pairs to locate the historic town of Caerleon.</p> <p>The children to use the website Where's the path? To explore satellite images of Caerleon, with a list of items for them to spot.</p> <p>Children to draw a labelled sketch map of Caerleon and label using symbols and keys.</p> |                                                                                                |
|  | <p>Plenary</p> <p>Class discussion on why the Romans chose to build a fort in Caerleon.</p>                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                |

## Appendix B

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| Canolfan Addysg Athrawon<br>De-Orllewin Cymru  The South West Wales<br>Centre of Teacher Education         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | <b>1B</b>                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Session Plan – Key Stage 2</b>                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Name of trainee: Bradley Walstow                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | Session ref: L47 – Maths. 07-12-18                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Personal target(s) in relation to QTS: <b>S2.1</b> They have a secure knowledge and understanding of the subject(s) they are trained to teach.                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Year group: 4                                                                                                                                                                               | No. of learners: 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ALN:  |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Additional Adults:                                                                                                                                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Learning objective <ul style="list-style-type: none"> <li>To Identify equivalent fractions and reduce a fraction to its simplest form.</li> </ul>                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | Success criteria: <ul style="list-style-type: none"> <li>To identify equivalent fractions.</li> <li>To reduce <math>\frac{1}{4}</math> s, <math>\frac{1}{6}</math> s, <math>\frac{1}{8}</math> s and <math>\frac{1}{10}</math> s to their simplest forms.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Links to previous learning: L45, L43. And lessons from previous weeks linked to division and multiplication.                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Curriculum coverage (range, skills)                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Recognise fractions that are several parts of a whole, entitles using known number facts, e.g. $\frac{1}{6}$ of 30cm.                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Recognise fractions that are several parts of a whole, e.g. $\frac{2}{3}$ and $\frac{3}{10}$ .                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Use mental strategies to recall multiplication tables for 2,3,4,5,6 and 10 and use to solve division problems.                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>Literacy (LNF)</i><br>Speaking - Communicate ideas and information to a wide range of audiences and a variety of situations.                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | <i>Numeracy (LNF)</i><br>*Mathematics session.                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>DCF.</i><br>Use of interactive ICT game.                                                                                                                                                 | <i>Thinking.</i><br>Thinking about how fractions and what fractions can be equivalent. Thinking about and expanding upon knowledge from previous sessions, particularly L45.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ESDGC | YCC                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>Key vocabulary (English/Welsh):</i><br>Eighth; equivalent; fraction; half; halve; non-unit fraction; numerator; quarter; seventh; simplified fraction; sixth; unit fraction; denominator |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Time                                                                                                                                                                                        | Session activities, organisation and management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                      | Key questions & Assessment for Learning opportunities                                                                                                                                                                                                                                                                                                                                                     |
| 10-15 minutes                                                                                                                                                                               | <p><b>Introduction</b></p> <p>Show the <a href="#">Fraction strips tool 4.6.4a</a>. Highlight <math>\frac{2}{3}</math>.</p> <p>Write <math>\frac{1}{3}</math> and read Two-thirds plus one-third equals one. Give children 5 minutes to write as many pairs of fractions with a total of 1 as they can. They can include fractions on the fraction strips/wall. Challenge children to include some trios of fractions with a total of 1, e.g. <math>\frac{1}{6} + \frac{2}{6} + \frac{3}{6}</math>.</p> <p>Ask children to work in pairs to list all the fractions on the strips/wall that are equivalent to one half. Now challenge them to work in pairs to write as many fractions equivalent to one half as they can in 2 minutes. Can they use big denominators and numerators?</p> <p>Take feedback and explain that all these fractions can be simplified to one half and that we normally write fractions in their simplest form, i.e. with the smallest denominator (bottom number).</p> |       |                                                                                                                                                                                                                                                                      | <p>How much more is needed to make one whole?</p> <p>Watch out for:</p> <p>Children who think that fractions with smaller denominators and numerators are smaller, e.g. think that <math>\frac{3}{4}</math> is smaller than <math>\frac{6}{8}</math>.</p> <p>Children who do not understand that <math>\frac{3}{4}</math> is three lots of one quarter, and so is related to <math>\frac{1}{4}</math></p> |

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|            | <p>Point to one quarter and ask if children can see any other fractions on the wall equivalent to one quarter, i.e. <math>\frac{2}{8}</math>. How many eighths are equivalent to three-quarters? Explain that we can simplify <math>\frac{6}{8}</math> to <math>\frac{3}{4}</math>, reducing it to its simplest form.</p> <p>Ask children to simplify the fraction <math>\frac{6}{10}</math>. Encourage them to divide the top and the bottom numbers by 2. Draw out that this can be simplified to <math>\frac{3}{5}</math>.</p>                                                                                                                                                                                                                            |                  |
| 45 minutes | <p>Main activities</p> <p><a href="#">Horseshoe table - Children colour in equivalent fractions in identical pairs of shapes on RS 150 Shapes with equivalent fractions.</a></p> <p>Support - Extend – Abacus 4, TB1 p.55</p> <p>Core - Extend – Abacus 4, TB1 p.55</p> <p>Extend – Abacus 4, TB1 p.56</p> <p>Extension: Fraction equivalency game.</p> <p><a href="https://www.mathplayground.com/Triplets/index.html">https://www.mathplayground.com/Triplets/index.html</a></p>                                                                                                                                                                                                                                                                           | Self-assessment. |
| 10 minutes | <p>Plenary</p> <p>In a class of twenty-eight children, fourteen have a pet. We can write this as a fraction: fourteen out of twenty-eight or fourteen twenty-eighths. How can we simplify this fraction? Twenty-one have brown hair. What fraction can we write? Twenty-one out of twenty-eight or twenty-one twenty-eighths. Can we simplify it? What fraction do not have brown hair?</p> <p>In a class of thirty children, ten like cycling and twenty like swimming. What fraction of the class like cycling? Ten out of thirty is ten-thirtieths. How else can we write this fraction?</p> <p>Fraction equivalency game.</p> <p><a href="https://www.mathplayground.com/Triplets/index.html">https://www.mathplayground.com/Triplets/index.html</a></p> |                  |

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