ITT Course Curriculum: Secondary PGCE Science (Biology) 11-16 with QTS\*

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**How to use this ITT curriculum**

This ITT curriculum outlines what trainees on this course are expected to know and be able to do for each week they are on their ITT and the method by which trainee progression will be assessed. It is subject specific, informed by pertinent research and underpinned with the Core Content Framework and its associated evidence (as necessary for those seeking to be recommending for QTS at the conclusion of their ITT). It is sequential in its approach, mapped against the various components of the Core Content Framework and shows a purposeful integration of centre-based (university-based) learning into Professional Practice. There is no separate ‘Professional Practice’ curriculum for trainees to follow. Instead, there is one single one single curriculum which encompasses all the learning which should take place throughout the ITT course.

**If you are a trainee:** This is the curriculum you will follow each week throughout your ITT course both when you are at university and when you are on Professional Practice (these weeks are shown in orange). It provides the learning which will be delivered to you in your subject, the knowledge, and skills you will be expected to demonstrate each week and the questions which assist you, your tutor, and your mentor (during Professional Practice) in assessing if you are making progress or if further support is needed. **You need to complete every week of this curriculum to meet the necessary Standards required for QTS recommendation at the end of this course and to ensure you are able to transition into your Early Career Teaching (ECT) phase.**

**If you are a school-based expert colleague (mentor or lead):** This curriculum outlines what trainees in this subject should know and be able to do throughout their ITT. This includes the weeks when they are on Professional Practice being supported by their expert mentor (these weeks are shown in orange). There is no separate ‘Professional Practice’ curriculum, rather one single subject specific curriculum which encompasses every week of ITT allowing you to see the prior learning and what trainees can already do and understand prior to working with you. Throughout their course trainees will continue to have their learning delivered by Edge Hill colleagues (this will be online throughout Professional Practice). We ask our expert-colleagues to provide opportunities for trainees to demonstrate, practise, receive feedback, or get better at the skills which they are expected to be ‘able to do’ each week. We also ask mentors to assess the extent to which the trainee has made progress each week using the ‘key questions’ provided and completing the relevant section (2) on the Weekly Development Summary (WDS) during the weekly mentor meeting in addition to confirming on the form if the trainee is making sufficient progress. Additional support for mentors is available via the weekly communications and the [FoE mentor space.](https://sites.google.com/view/foementorspace/secondary-and-further-education/pp-paperwork)

* **Rationale of curriculum coverage and sequence including use of pertinent research**

The curriculum for PGCE Secondary Science (Biology) ensures complete coverage of the ITT Core Content Framework and its associated evidence basis (Department for Education, 2019) as appropriate for Secondary ITT.

The course commences with trainees engaging critically with the nature of science knowledge. Trainees identify with their subject and build a philosophical stance for the inclusion of science in the secondary school curriculum. Trainees critically analyse the contested aims and purposes of science education (OFSTED, 2021). This includes the influential ‘Big Ideas’ agenda (Harlen, 2015) and the long running ‘scientific literacy v future scientists’ tensions (Taber, 2014). This school curriculum context foreshadows the trainees’ upcoming professional placement. Trainees critically engage with the content, forms and sequencing of knowledge in the KS3/KS4 Science National Curriculum. This aligns with the assertion that ‘you cannot do science without knowledge… knowledge is an important step in progression to more complex understanding’ (Holman, 2018:24). Trainees analyse how a high-quality science curriculum carefully sequences the interplay between substantive and disciplinary knowledge (OFSTED, 2021). Trainees then critically engage with current pedagogies and debates in secondary science education. These include: social justice and curriculum access; how children learn science; effectiveness of practical work; children’s common misconceptions; questioning; numeracy and inclusion. These issues have been addressed by OFSTED (2021) as key indicators of a high-quality science education. This enables trainees to further develop their philosophy and knowledge of how science curriculum should be organised, how it can be learned in the classroom, barriers to learning science and how policy impacts on science education. The latter enables trainees to critically engage with education policy and raise their political consciousness. Trainees then critically explore how science knowledge is sequenced and developed through the key stages. This enables them to critique how science knowledge develops as children mature and links to cognitive load theory. Trainees then critically engage with issues of cross curricular links. This enables them to develop a broader perspective on science and links to subjects such as maths and english.

Early in the course trainees critically engage with their science teacher identity and related educational philosophies. This early point in the course will raise their identity consciousness and minimise the risk of them leaving teaching (Hammerness, 2008; Heikonen et al., 2017) A historical critique of education policy then enables the student to see their subject in a wider context of a policy and ideological struggle. Professional behaviours, safeguarding, well-being and laboratory safety are introduced before the trainees start their first placement. Later after more experience on placement the student investigates their identity as a potential researcher. Now more knowledgeable and experienced on placement this warrants a timely focus on their future professional and academic development.

Trainees develop on earlier work on the curriculum and how pupils learn science. Key learning theories are then analysed so that trainees begin to construct their understanding of how children can learn science. These theories enable trainees to develop coherent links between science specific content earlier in the course. Then trainees can connect science pedagogical approaches with the content of the science curriculum. At this point trainees practice and apply their knowledge of science pedagogy in terms of lesson planning, assessment and adaptive teaching. Trainees learn that effective assessment is particularly relevant in science due to the prevalence of science misconceptions held by children (OFSTED, 2021). The concept of cognitive load theory is critically analysed especially in a science learning context. Drawing on their earlier study trainees now learn how to plan learning episodes in preparation for the first placement. As the student builds knowledge on placement they will consolidate earlier themes and analyse areas such as questioning, pupil talk, feedback and behaviour management. Weekly tasks during university and placement ensure that the student is engaging academically with their increasingly wider classroom experiences and deeper pedagogical content knowledge.

* **Delivery of curriculum outcome(s) into composite and component elements**

To ensure that trainees know that common misconceptions develop when prior knowledge is weak and scientific understanding is naïve, this is broken down into: recognition of their own misconceptions; knowledge of common misconceptions held by children; how to structure tasks and questions that allow teachers and pupils to easily identify misconceptions and be able to address them using concrete examples. To ensure that trainees know that science practical work is an essential element of science learning, and it should be carried out in a purposeful manner-this is broken down into: critical reading of seminal literature on practical work (Millar and Abrahams, 2009; Abrahams, 2011; Abrahams and Reiss, 2012; Osborne, 2015; Abrahams and Fotou, 2018); performing laboratory practical work; evaluation of learning from practical work session; hands-on understanding of the strategies to ensure purposeful and effective practical work.

* **How the curriculum enables trainees to develop their sense of social justice including the importance of inclusion and representation in their subject**

Trainees critically explore the tensions behind the science curriculum with a focus on the ‘Science for All’ arguments. This approach reflects the Ambition for All agenda espoused by OFSTED (2021). Importantly this raises questions around social justice and access for all children to a high-quality science education. Equality, diversity and inclusion issues such as gender, class, EAL and FBV are addressed. These are salient in science education due to the dominant historical narrative of scientists as white western men. These issues become increasingly pertinent as the student engages more deeply with the science curriculum on placement.

* **Opportunities to revisit key learning**

In week 4 trainees are taught a range of theories linked to how pupils learn including Cognitive Load Theory. This is revisited in week 5, week 11 and week 24 where they develop this further and are taught strategies to reduce cognitive overload, the value of retrieval, spaced practice and interleaving to strengthen recall over time, breaking new content into smaller steps/the constituent parts and sequencing learning so pupils are secure in foundational knowledge before introducing more complex material.

References

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* DEPARTMENT FOR EDUCATION (DfE), 2019. *ITT Core Content Framework* <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974307/ITT_core_content_framework_.pdf> [Accessed 3 Aug 2022].
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* HARLEN, W., 2015. Towards big ideas of science education. *School Science Review*, 97 (359), pp. 97-107.

* HEIKONEN, L., PIETARINEN, J., PYHÄLTÖ, K., TOOM, A. and SOINI, T., 2017. Early career teachers' sense of professional agency in the classroom: associations with turnover intentions and perceived inadequacy in teacher-student interaction. *Asia-Pacific Journal of Teacher Education*, 45(3), pp. 250-266.
* HOLMAN, J., 2018. *Improving Secondary Science- Guidance Report*. Educational Endowment Foundation.
* MILLAR R. and ABRAHAMS, I., 2009. Practical Work: making it more effective. *School Science Review*.91 (334), pp. 59-64.
* OFSTED, 2021. *Research Review Series: Science*.GOV.UK [online]. Available from: <https://www.gov.uk/government/publications/research-review-series-science> [Accessed 9 Aug 2022].
* OSBORNE, J., 2015. Practical work in science: misunderstood and badly used? *School Science Review*.96 (357), pp. 16-24.
* TABER, K., 2014. Science for All? or science education for the good of all? in: M. WATTS, ed. *Debates in Science Education*. Routledge. pp.11-27.

| Week (starting 5.9.22) | For the subject they are training in trainees should know:  *(max 3 bullet points)* | For the subject they are training in trainees should be able to:  *(max 3 bullet points)* | Key questions  *(2-3 as indicators of progress)* | CCF | Method of Assessment |
| --- | --- | --- | --- | --- | --- |
| 1 | INDUCTION WEEK | | | | |
| 2  (w.b. 5.9.22) | * The place of Science in the National Curriculum (2014) and the knowledge content covered. The ‘Science for All’ debate raises issues of access to the curriculum and social justice such as science capital and gender. * What it means to be a professional in terms of standards and expectations. * An introduction to Safeguarding. To know the current legislation for keeping children safe in education (KCSIE 2022) and schools safeguarding policies. | * Identify substantive (conceptual) and disciplinary (procedural) knowledge content demands of the current Science National Curriculum (2014) * Recognise and demonstrate that teachers can influence pupils’ resilience and beliefs about their ability to succeed, by ensuring all pupils have the opportunity to experience meaningful success. * Identify science concepts which can be challenging for pupils to understand such as electrical circuits. * Understand that safeguarding and promoting the welfare of children is everyone’s responsibility to create a culture of mutual trust and respect to support effective relationships. | 1. Using the recommendations from the EEF Improving Secondary Science Guidance Report (Holman and Yeomans, 2018) and/or the Ofsted Research Review for Science (2021), what are the essential, knowledge and skills which are to be developed in the Science curriculum? Reflect on your strengths and areas of development in the science curriculum. 2. Explain what you understand about the expectations of a professional teacher 3. Knowledge-rich curriculum- what are we really talking about when referring to Science? | S&C.1  S&C.2  S&C.4  S&C.3  MB.4 | Audit and WDS |
| CCF evidence base | Ball, D. L., Thames, M. H., & Phelps, G. (2008) Content knowledge for teachers: What makes it special? Journal of Teacher Education, 2008 59: 389 DOI: 10.1177/0022487108324554 [Online] Accessible from: <https://www.math.ksu.edu/~bennett/onlinehw/qcenter/ballmkt.pdf>.  Biesta, G. (2009) Good education in an age of measurement: on the need to reconnect with the question of purpose in education.  Educational Assessment, Evaluation and Accountability, 21(1)  Coe, R., Aloisi, C., Higgins, S., & Major, L. E. (2014) *What makes great teaching. Review of the underpinning research*. Durham University: UK. Available at: http://bit.ly/2OvmvKO | | | | |
| 3 | * The importance of subject knowledge in motivating pupils, teaching effectively and being able to identify gaps in the substantive and disciplinary knowledge demands of the current Science National Curriculum. * There are various approaches to science lesson planning, but they have a common underpinning. In science all pupils bring an understanding of natural phenomena to the classroom. A major task of the science teacher is to plan to elicit this understanding and reshape it according to the correct scientific explanation. * Practical work in the school lab is an essential element of science learning but it should be planned and carried out in a purposeful manner. * The duty of a science teacher in adhering to the Equality Act 2010. | * Identify and address areas of development of subject knowledge in the Science National Curriculum. * Recognise progression and sequencing of knowledge and skills in science, both first and second-order concepts for pupils to master building on prior knowledge by organising this knowledge into increasingly complex mental models (or “schemata”) * Identify and reflect on approaches to eliminate discrimination and plan for a safe and inclusive learning environment especially when teaching emotional and controversial topics in science. | 1. How secure is your subject knowledge for the studies outlined in the Science National Curriculum? What are your areas of strength and those in need of development? 2. Why do we need to consider pupils’ prior knowledge when planning? 3. How can you ensure that all pupils can access the learning within the classroom? Reflect on what decolonisation and social justice looks like in science. | S&C.2  S&C.3  S&C.4  S&C.5  S&C.7  AT.1  AT.2  HPL.6  HE.1  HE.3 | Audit and WDS  Quiz:  Safeguarding  Feminista  Prevent |
| CCF evidence base | Deunk, M. I., Smale-Jacobse, A. E., de Boer, H., Doolaard, S., & Bosker, R. J. (2018) Effective differentiation Practices: A systematic review and meta-analysis of studies on the cognitive effects of differentiation practices in primary education. *Educational Research Review*, *24*(February), 31–54. https://doi.org/10.1016/j.edurev.2018.02.002.  Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008) Learning Styles: Concepts and Evidence. Psychological Science in the Public Interest, 9 (3).  Gathercole, S., Lamont, E., & Alloway, T. (2006) Working memory in the classroom. Working memory and education, 219-240. | | | | |
| 4 | * Common misconceptions develop when prior knowledge is weak and scientific understanding is naïve. The secondary science curriculum has many areas with potential misconceptions such as respiration, photosynthesis, the mass of the air and electricity. There is clear evidence that children develop frameworks of belief about natural phenomena that often conflicts with our accepted scientific understanding. * There are a range of theories linked to how pupils learn however Cognitive Load Theory has gained much attention recently. * Pupils have a range of needs and strengths and recognise some of the reasons for this and the importance of high expectations to stretch and challenge all pupils. DSLs and other specialist colleagues also have valuable expertise and can ensure that appropriate support is in place for pupils. | * Structure tasks and questions that allow teachers and pupils to easily identify misconceptions and knowledge-gaps and address them using concrete examples. * Plan a sequence of learning to deliver to peers building on the schema and add new learning/ knowledge using retrieval practice and spiral curriculum (Bruner, 1960) which helps pupils understand science concepts. * Support ALL pupils including those with a range of additional needs. Utilising, for example, the SEND Code of Practice, which provides additional guidance on supporting pupils with SEND effectively. * Identify what Safeguarding issues to look out for and explain generic safeguarding strategies and know the response to a range of behavioural/ safeguarding situations, for example FGM, Online Bullying, Radicalisation and Prevent | 1. How do you plan to check for prior knowledge and pre-existing misconceptions? 2. How does research and theories inform lesson planning? 3. Why is it important to work closely with colleagues/families and other professionals to support pupils with specific needs? | AT.1  AT.2  AT.3  AT.6  HPL.6  HE.2  HE.3  HE.5  S&C.4 | WDS  Quiz:  Safeguarding  Feminista  Prevent |
| CCF evidence base | Davis, P., Florian, L., Ainscow, M., Dyson, A., Farrell, P., Hick, P., Rouse, M. (2004) Teaching Strategies and Approaches for Pupils with Special Educational Needs: A Scoping Study. Accessible from: <http://dera.ioe.ac.uk/6059/1/RR516.pdf>.  Roediger, H. L., & Butler, A. C. (2011) The critical role of retrieval practice in long-term retention. Trends in Cognitive Sciences, 15(1), 20–27. https://doi.org/10.1016/j.tics.2010.09.003.  Willingham, D. T. (2010) The Myth of Learning Styles, Change, 42(5), 32–35. | | | | |
| 5 | * We are all language teachers, and science provides the perfect vehicle for teaching literacy by explicitly teaching reading, writing and oral language skills. High-quality classroom talk can support pupils to articulate key science ideas, consolidate understanding and extend their science vocabulary. This should also incorporate EAL learners and supporting their access to their science curriculum, but not as a homogenous group. * To access the science curriculum, early literacy provides fundamental knowledge; reading comprises two elements: word reading and language comprehension; systematic synthetic phonics is the most effective approach for teaching pupils to decode. * An important factor in learning is memory which can be overloaded. Rosenshine’s Principles of instruction and the response to Sweller’s Cognitive Load theory reduces cognitive overload in the classroom. | * Identify and address EAL pupils’ language needs utilising strategies that can support language development, for example Hester’s BEL stages * Break tasks down into constituent components when first setting up independent practice (e.g. using tasks that scaffold pupils through meta-cognitive and procedural processes) such as model exemplar answers to pupils with rationale provided, begin to scaffold and guide pupils through work/assessments against learning outcomes and develop strategies for prior knowledge retrieval. * Use retrieval, scale switching, spaced and interweaving in planning sequentially to helps pupils improve their memories. Using expositions in the form of analogies, knowledge organisers, storytelling, memory aids, worked examples to avoid cognitive overload. | 1.What are the literacy demands of science education? How could you introduce unfamiliar vocabulary in a new topic?  2. Read Green’s (2021) chapter on Cognitive Science and discuss the role of memory in science education.  3. What questions can you ask pupils to help them develop their own learning (metacognition)? | HPL.1  HPL.2  HPL.3  HPL.4  HPL.5  HPL.6  HPL.7  HPL.8  HPL.9  S&C.9  CP.7 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Preparing for Literacy Guidance Report. [Online] Accessible from: <https://educationendowmentfoundation.org.uk/public/files/Preparing_Literacy_Guidance_2018.pdf>  Kirschner, P., Sweller, J., Kirschner, F. & Zambrano, J. (2018) From cognitive load theory to collaborative cognitive load theory. In International Journal of Computer-Supported Collaborative Learning, 13(2), 213-233.  Rosenshine, B. (2012) Principles of Instruction: Research-based strategies that all teachers should know. American Educator, 12–20. https://doi.org/10.1111/j.1467-8535.2005.00507.x | | | | |
| 6  SEND Enhancement | * Pupils have a range of needs and strengths and begin to gain knowledge of the reasons for this. Teaching should be adapted to respond this these needs with a view to increasing pupil success. * Seeking to understand pupils’ differences, including their different levels of prior knowledge and potential barriers to learning, is an essential part of teaching Science. * Teaching assistants (TAs) can support pupils more effectively when they are prepared for science lessons by teachers, and when TAs supplement rather than replace support from teachers. | * Identify methods to adapt planning to respond to the needs and strengths of individuals, for example using effective modelling and scaffolding. This could include how teachers use data to inform planning. * Work with the SENCO and other professionals supporting pupils with additional needs, including how to make explicit links between interventions delivered outside of lessons with classroom teaching. * Discuss with expert colleagues how to share the intended lesson outcomes with teaching assistants ahead of lessons | 1. Why is it important to talk about *adaptive* teaching rather than *differentiated* teaching? Can you give an example of where you have seen pupils receiving different types of support within their learning? 2. Reflecting on your enhancement experience, how do expert colleagues adapt lessons whilst maintaining high expectations for all pupils? 3. Reflecting on your enhancement experience, how does the placement school group pupils and does this change regularly? | AT.1  AT.2  AT.3  AT.4  AT.5  AT.6  AT.7  HE.3  HE.6 | WDS |
| CCF evidence base | Education Endowment Foundation (2015) Making Best Use of Teaching Assistants Guidance Report. [Online] Accessible from:  https://educationendowmentfoundation.org.uk/tools/guidance-reports/ [retrieved 10 October 2018].  Tereshchenko, A., Francis, B., Archer, L., Hodgen, J., Mazenod, A., Taylor, B., Travers, M. C. (2018) Learners’ attitudes to mixed-attainment grouping: examining the views of students of high, middle and low attainment. Research Papers in Education, 1522, 1–20. <https://doi.org/10.1080/02671522.2018.1452962>. | | | | |
|  | **Introductory Placement Starts (Week 7)** |  |  |  |  |
| 7  Start of introductory phase on placement | * Teachers are key role models, who can influence the attitudes, values and behaviours of their pupils. * A culture of mutual trust and respect supports effective relationships between science teachers and their pupils using Bronfenbrenner’s ecological systems theory, especially when teaching emotional and controversial. topics such as reproduction and evolution. * A positive and safe learning environment rooted in routines and the building of trusting relationships benefits all pupils, but is particularly valuable for pupils with SEND. | * Create a culture of respect and trust in the classroom that supports all pupils to succeed (e.g. by modelling the types of courteous behaviour expected of pupils) and respond quickly to any behaviour or bullying that threatens emotional safety. * Use inspirational and consistent language that promotes challenge, aspiration, resilience, and praises pupil effort. Set tasks which stretch pupils, but which are achievable. * Generate a positive and respectful learning environment in which making mistakes, resilience and perseverance are part of a daily routine using Maslow’s Hierarchy of Needs. * Familiarisation with placement setting safeguarding procedure, including the name of the Safeguarding Lead. | 1. What have you learnt about the importance of having high expectations? Discuss and analyse with expert colleagues’ effective strategies for liaising with parents, carers and colleagues to better understand pupils’ individual circumstances and how they can be supported to meet high academic and behavioural expectations. 2. How do staff in your school ensure there is a culture of respect and trust? Have you seen any effective/ineffective examples of this? 3. What do you think a positive learning environment looks like in your subject? How would you plan for this? | HE.1  MB.2  MB.4  MB.5  MB.7  MB.1  MB.3  HE.5 | WDS |
| CCF evidence base | \*PISA (2015) PISA in Focus: Do teacher-student relations affect students’ well-being at school? Accessible from: <https://doi.org/10.1787/22260919>. | | | | |
| 8 | * There are common behavioural issues found in the classroom. Setting clear expectations can help communicate shared values that improve classroom and school culture. * Teachers have the ability to affect and improve the wellbeing, behaviour, motivation and learning of their pupils with high quality teaching and emotional intelligence through self-regulation * That Dweck’s’ (2006) Growth Mindset alongside a positive mental attitude is important in the classroom. Teachers can influence pupils’ resilience, motivation and beliefs about their ability to succeed, by ensuring all pupils have the opportunity to experience meaningful success and that pupils’ feelings are considered. | * Begin to know ways to foster relationships with pupils (e.g. learning pupil names and by discussing and analysing with expert colleagues effective strategies for liaising with parents, carers and colleagues to better understand pupils’ individual circumstances and how they can be supported to meet high academic and behavioural expectations. * Apply rules, sanctions, rewards, and praise in line with the school policy. Respond to any behaviour or bullying which threatens pupil’s emotional safety * Set clear behavioural expectations and routines which establish a consistent and inclusive learning environment. | 1. Have you been able to identify any inspirational or challenging language? What impact did this have on the learning in that classroom? 2. How can intrinsic and extrinsic rewards be used to support behaviour management in science? 3. Discuss and analyse with expert colleagues how routines are established at the beginning of the school year and maintained throughout, both in classrooms and around the school. | HE.1  HE.2  HE.4  HE.6  MB.1  MB.2  MB.3  MB.4  MB.5 | WDS |
| CCF evidence base | Chapman, R. L., Buckley, L., & Sheehan, M. (2013) School-Based Programs for Increasing Connectedness and Reducing Risk Behavior: A Systematic Review, 25(1), 95–114  Institute of Education Sciences (2008) Reducing Behavior Problems in the Elementary School Classroom. Accessible from https://ies.ed.gov/ncee/wwc/PracticeGuide/4.  Sibieta, L., Greaves, E. & Sianesi, B. (2014) Increasing Pupil Motivation: Evaluation Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/projects-and-evaluation/projects/increasing-pupil-motivation/ | | | | |
| 9 | **HALF TERM** | | | | |
| 10 | * Guides, scaffolds and worked examples can help pupils apply new ideas, but should be gradually removed as pupil expertise increases * Modelling helps pupils understand new processes, ideas and concepts; effective models make abstract science ideas accessible, for example the notion of force and its relationship to motion. Scientific models have limitations. * Identify essential concepts, knowledge and skills within a carefully sequenced and coherent curriculum. Provide opportunity for all pupils to learn and master essential concepts, knowledge and skills in that subject | * Use modelling, explanations and scaffolds, acknowledging that novices need more structure early in a domain. * Enable critical thinking and problem solving by first teaching the necessary foundational content knowledge. * Remove scaffolding only when pupils are achieving a high degree of success in applying previously taught material. Provide sufficient opportunity for pupils to consolidate and practise applying new knowledge and skills. | 1. What do you understand by modelling and how have you seen modelling used by other teachers? 2. Have you been able to identify how students are supported in mastering important concepts in your subject? What made this effective? Can you identify this in the department’s approach to T&L? | CP.3  CP.4  HPL.9  S&C.1  S&C.2  S&C.4  S&C.3  CP.4  CP.5 | WDS |
| CCF evidence base | Coe, R., Aloisi, C., Higgins, S., & Major, L. E. (2014) What makes great teaching. Review of the underpinning research. Durham University: UK. Available at: <http://bit.ly/2OvmvKO>  Education Endowment Foundation (2017) Metacognition and Self-regulated learning Guidance Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/  Rosenshine, B. (2012) Principles of Instruction: Research-based strategies that all teachers should know. American Educator, 12–20. <https://doi.org/10.1111/j.1467-8535.2005.00507.x> | | | | |
| 11 | * Prior knowledge plays an important role in how pupils learn; committing some key facts to their long-term memory is likely to help pupils learn more complex ideas. Subject examples and analogies are important to reinforce learning for example analogies and models for electrical circuits. * Where prior knowledge is weak, pupils are more likely to develop misconceptions, particularly if new ideas are introduced too quickly without clear exposition. * The value of retrieval and spaced practice and interleaving to strengthen recall over time- through exploring Rosenshine’s (2012) Principles of Instruction and retrieval-based strategies such as spaced practice especially for substantive concepts. | * Start expositions at the point of pupil understanding. Avoid overloading working memory by taking prior learning into account when introducing new content and breaking such content into smaller steps/the constituent parts. * Sequence learning so pupils are secure in foundational knowledge before introducing more complex material * Use modelling, scaffolding and explanations to assist with structuring learning, and recognise the need to remove this when pupils can apply such structures to prior learning | 1. What have you learned about how children learn and how have you applied this in practice? [Prompts – cognitive load, retrieval practice, spacing and interleaving]. 2. In what ways have aspects of learning been broken down into manageable chunks for the pupils – when have things needed to be broken down and why? 3. Explain the essential concepts, knowledge, and skills which are to be developed in the school’s Science curriculum. Explain the rationale behind the curriculum sequence so that pupils secure foundational knowledge before encountering more complex content. | HPL.1  HPL.2  HPL.3  HPL.4  HPL.5  HPL.6  HPL.7  HPL.8  CP.5 | WDS |
| CCF evidence base | Deans for Impact (2015) The Science of Learning [Online] Accessible from: <https://deansforimpact.org/resources/the-science-of-learning/>.  Gathercole, S., Lamont, E., & Alloway, T. (2006) Working memory in the classroom. Working memory and education, 219-240. | | | | |
| 12 | * Effective assessment is critical to teaching because it provides teachers with information about pupils’ understanding and needs (assessment data to inform planning). * There are differences between Assessment *of* learning and Assessment *for* learning- including purpose and type. Black and Wiliam’s approach to ‘Inside the Black box’- raising classroom standards by assessment. * Enquiries across sequences in science shape assessment e.g. cells, nutrition, energy, plants, variation and health. Why some whole school assessment strategies are problematic. | * Use spaced repetition, through planning retrieval practice and structured tasks to demonstrate assessment of prior knowledge, knowledge gaps and misconceptions * Practice science specific progression models to assess pupils both summatively and formatively. For example, questioning to elicit knowledge and understating of science concepts. * Plan formative assessment tasks linked to lesson objectives and think ahead about what would indicate understanding (e.g. by using hinge questions to identify knowledge gaps) | 1. Where have you been able to utilise summative and formative assessment? How effectively do you utilise your formative feedback to help pupils progress? 2. How does your department assess pupils? How is this reflected in your planning and teaching? 3. How do you plan for formative assessment tasks linked to lesson objectives? How could you develop this area of your practice? | A.1  A.2  A.3  A.4 | WDS |
| CCF evidence base | \*Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2004). Working inside the Black Box: Assessment for Learning in the Classroom. Phi Delta Kappan, 86(1), 8–21. Accessible from: <https://eric.ed.gov/?id=EJ705962>  Speckesser, S., Runge, J., Foliano, F., Bursnall, M., Hudson-Sharp, N., Rolfe, H. & Anders, J. (2018) Embedding Formative Assessment: Evaluation Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/public/files/EFA\_evaluation\_report.pdf [retrieved 10 October 2018].  Wiliam, D. (2017) Assessment, marking and feedback. In Hendrick, C. and McPherson, R. (Eds.) What Does This Look Like in the Classroom? Bridging the gap between research and practice. Woodbridge: John Catt | | | | |
| 13 | * High-quality classroom talk can support pupils to articulate key ideas, consolidate understanding and extend their vocabulary. * Questioning is an essential tool for teachers; questions can be used for many purposes, including to check pupils’ prior knowledge, assess understanding and break down problems. Questioning is an effective strategy to elicit pupils’ science misconceptions. * Paired and group activities can increase pupil success, but to work together effectively pupils need guidance, support and practice | * Include a range of types of questions in class discussions to extend and challenge pupils (e.g., by modelling new vocabulary or asking pupils to justify answers). * Prepare a range of target questioning techniques to enable the identification of knowledge gaps and science misconceptions and reframe questions to provide greater scaffolding or greater stretch. * Use concrete examples, analogies, chunking, metaphors and storytelling to support good exposition when introducing new content to avoid overloading the working memory. | 1. How can you identify gaps in understanding? Why are deliberate misconceptions and ‘hinge’ questions important? Why is it important to give manageable, specific and sequential instructions? 2. How do you feel you are developing in your use of questioning and effective classroom talk? Provide an example of when you’ve used a model to help explain a concept. 3. When have you used concrete representation of abstract ideas, such as through analogy or metaphor? | AS.1  AS.5  AS.6  CP.6  CP.7  CP.9 | WDS |
| CCF evidence base | Education Endowment Foundation (2016) A marked improvement? A review of the evidence on written marking. Accessible from: <https://educationendowmentfoundation.org.uk/public/files/Publications/EEF_Marking_Review_April_2016.pdf>.  Rich, P. R., Van Loon, M. H., Dunlosky, J., & Zaragoza, M. S. (2017) Belief in corrective feedback for common misconceptions: Implications for knowledge revision. Journal of Experimental Psychology: Learning, Memory, and Cognition, 43(3), 492-501. <http://dx.doi.org/10.1037/xlm0000322>. | | | | |
| 14 | * Pupils’ responses to feedback/ feedforward can vary depending on a range of social factors (e.g. the message the feedback contains or the age of the pupil). * Effective assessment is critical to teaching because it provides teachers with information about pupils’ understanding and needs. To be of value, teachers use information from assessments to inform the decisions they make; in turn, *pupils must be able to act on feedback* for it to have an effect (Hattie, 2007). * High-quality feedback can be written or verbal; it is likely to be accurate and clear, encourage further effort, and provide specific guidance on how to improve. | * Plan to scaffold self-assessments by sharing model work with pupils, highlighting key details using technology such as visualisers. * Utilise feedback that is specific and helpful when using peer- or self- assessment * Explicitly teach pupils metacognitive strategies linked to subject knowledge, including how to plan, monitor and evaluate, supports independence and academic success using DIRT | 1. How do you ensure that pupils respond to your feedback? How do you adapt your feedback, so all children make progress? 2. Reflect on how your placement makes marking manageable and effective. Think about how they record and utilise data to improve pupil outcomes, alternative approaches to providing feedback (e.g. whole class feedback or peer-assessment) 3. How do you ensure that your written and verbal feedback to pupils is high quality? | A.1  A.4  A.5  A.6 | WDS |
| CCF evidence base | Deans for Impact (2015) The Science of Learning [Online] Accessible from: <https://deansforimpact.org/resources/the-science-of-learning/>.  Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L. & Coe, R. (2015) Developing Great Teaching. Accessible from: https://tdtrust.org/about/dgt. [accessed 18 October 2018].  Education Endowment Foundation (2017) Metacognition and Self-regulated learning Guidance Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/  William, D. (2017) Assessment, marking and feedback. In Hendrick, C. and McPherson, R. (Eds.) *What Does This Look Like in the Classroom? Bridging the gap between research and practice*. Woodbridge: John Catt. | | | | |
|  | **Introductory Placement Ends** | | | | |
| 15 | * Pupils are likely to learn at different rates and to require different levels and types of support from teachers to succeed. * Adapting teaching in a responsive way, including by providing targeted support to pupils who are struggling, is likely to increase pupil success. * Adaptive teaching is less likely to be valuable if it causes the teacher to artificially create distinct tasks for different groups of pupils or to set lower expectations for particular pupils. | * Identify pupils who need new content further broken down and/or who benefit from additional adaptations * Support pupils with a range of educational needs including how to use guidance in the SEND code of practice. * Ensure that all pupils have the opportunity to meet high expectations, rather than artificially creating distinct tasks for specific classes/pupils. Plan and include questions and tasks to extend and challenge pupils. | 1. How have you adapted your teaching to ensure that pupils with specific needs are able to access learning within your classroom/lessons? How effective has this been? 2. What does challenging pupils look like in your Science lessons? How could you develop this? 3. How have you ensured high expectations for learning for all pupils? | AT.1  AT.2  AT.3  AT.4  AT.5  AT.6  AT.7  HE.3  HE.4 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit:  Special Educational Needs in Mainstream Schools Accessible from <https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/send> | | | | |
| 16 | * Positive framing plays an important part in developing a growth mindset. * Additional members of staff provide valuable support with individual/ groups of pupils. * The issues and challenges facing EAL and PP pupils and meeting individual needs without creating unnecessary workload avoiding different lessons for different groups of pupils. | * Develop activities that can stretch and challenge pupils of all abilities. * Use a variety of strategies to meets the needs of their pupils and critically reflect on their ability to model and scaffold. * Engage support staff effectively and develop strategies to support EAL pupils with language acquisition, for example breaking down of science vocabulary. | 1. How successful are you at making use of specialist support (such as TA’s) in your lessons? How could this be developed? 2. Critically reflect on your use of modelling and scaffolding. 3. What knowledge and understanding of teaching pupils for whom English is an additional language have you gained through your academic reading? How does this relate to your practice? | AT.1  AT.2  AT.3  AT.4  AT.5  AT.6  AT.7 | WDS |
| CCF evidence base | Deunk, M. I., Smale-Jacobse, A. E., de Boer, H., Doolaard, S., & Bosker, R. J. (2018) Effective differentiation Practices: A systematic review and meta-analysis of studies on the cognitive effects of differentiation practices in primary education. *Educational Research Review*, *24*(February), 31–54. https://doi.org/10.1016/j.edurev.2018.02.002. | | | | |
| 17 | **CHRISTMAS VACATION** | | | | |
| 18 |
| CCF evidence base | \*PISA (2015) PISA in Focus: Do teacher-student relations affect students’ well-being at school? Accessible from: https://doi.org/10.1787/22260919. | | | | |
| 19 | * How teachers can be generators of educational knowledge and how action research can be used as a tool to help develop pupil learning. * Reflective practice, supported by feedback from and observation of experienced colleagues, professional debate, and learning from educational research, is also likely to support improvement * Effective RSE supports people, throughout life, to develop safe, fulfilling and healthy sexual relationships, at the appropriate life stage | * Explain the RSE (2021) statutory guidance and how it would inform teaching the 4 core areas of the curriculum: Identity, gender and sexuality, Consent and healthy relationships, Anatomy, sexual health and fertility, and RSE in a digital context within a safe space. * Strengthen and extend pedagogical and subject knowledge by participating in wider networks and lesson preparation such as the Association for Science Education and STEM Learning, the Institute of Physics and the Royal Society of Chemistry. * Trial and critically evaluate new approaches in their practice with a view to developing practice. | 1. What ideas from research and first-hand experience have you used, adapted, and developed to inspire and motivate pupils in the Science classroom? 2. Think about something you have learnt – how would you do things differently next time?What research did you carry out to help you understand this further? What are your strengths and weaknesses? 3. What are effective tools in teaching RSE? | PB. 1  PB.2  PB.7  HP.1 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit: Accessible from: https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/ [retrieved 10 October 2018]. | | | | |
| 20 | * Every teacher has a responsibility to develop pupils’ literacy through the promotion of systematic synthetic phonics, particularly if teaching early reading and spelling. * To access the curriculum, early literacy provides fundamental knowledge; reading comprises two elements: word reading and language comprehension; systematic synthetic phonics is the most effective approach for teaching pupils to decode * High-quality classroom talk can support pupils to articulate key ideas, consolidate understanding and extend their vocabulary | * Teach unfamiliar vocabulary explicitly and plan for pupils to be repeatedly exposed to high-utility and high-frequency vocabulary in what is taught, for example Science DARTs, and the work of Wellington and Osborne (2001). * Model and require high-quality oral language, recognising that spoken language underpins the development of reading and writing (e.g. requiring pupils to respond to questions in full sentences, making use of relevant technical vocabulary). * Promote reading for pleasure (e.g. by using a range of whole class reading approaches and regularly reading high-quality texts to children | 1. Are we all literacy teachers? Note down some examples of your subject’s ability to contribute to literacy. 2. How could you introduce unfamiliar vocabulary in a new topic and reinforce ‘sticky’ substantive concepts in a new topic? 3. How can we approach promoting reading for pleasure and engagement with academic scholarship in the science classroom? | CP.7  S&C 9  S&C 10 | WDS |
| CCF evidence base | Machin, S., McNally, S., & Viarengo, M. (2018) Changing how literacy is taught: Evidence on synthetic phonics. American Economic Journal: Economic Policy, 10(2), 217–241. https://doi.org/10.1257/pol.20160514. | | | | |
|  | **Start of Developmental Placement (Week 21)** | | | | |
| 21  Start of consolidation phase | * Learning involves a lasting change in pupils’ capabilities or understanding (HPL) * Explicitly teaching pupils the knowledge, concepts and skills they need to succeed within science is beneficial. The notion of schema and schemata linked to subject knowledge, content, and learning is important in achieving this. * Bruner’s (1960) Spiral Curriculum linked to curriculum design and sequencing to secure foundational knowledge before encountering more complex content. | * Teach lessons for all pupils to learn and master essential concepts, knowledge, skills and principles of science building on prior learning and retrieval practices * Accumulate and refine a collection of powerful analogies, illustrations, examples, explanations and demonstrations. This should include using resources and materials aligned with the school curriculum (e.g. textbooks) * Critically review subject knowledge for this setting and create an action plan to aid development in weaker areas * Familiarisation with placement setting safeguarding procedure, including the name of the Safeguarding Lead | 1. Can you give an example of how a specific teaching technique has supported students to make progress? 2. When planning a sequence of lessons, how have expert colleagues ensured that pupils have secure foundational knowledge before moving on to more complex content? 3. How does the curriculum in your subject area promote the wider vision, values and skills of the school? What is the rationale behind the curriculum sequence and design in your subject area? | HPL.1  S&C.5 | WDS |
| CCF evidence base | Sweller, J. (2016). Working Memory, Long-term Memory, and Instructional Design. Journal of Applied Research in Memory and Cognition, 5(4), 360–367. <http://doi.org/10.1016/j.jarmac.2015.12.002>.  Van de Pol, J., Volman, M., Oort, F., & Beishuizen, J. (2015) The effects of scaffolding in the classroom: support contingency and student independent working time in relation to student achievement, task effort and appreciation of support. Instructional Science, 43(5), 615-641 | | | | |
| 22 | * Giving clear, manageable, specific and sequential instructions for tasks and behaviour which use consistent language and/or non-verbal signals promotes high expectations * Check pupils’ understanding of a task before it begins and address any misconceptions in a positive learning environment linked to Dweck’s (1996) idea of Growth Mindset * Reinforce established school and classroom routines maximises time for learning linked to Skinner’s (1953) theory of Operant conditioning linked to behaviour management. | * Manage pupil behaviour using a range of strategies including the school policy * Reflect on the need to set high expectations and the impact of this in the classroom * Identify and address misconceptions by re-teaching or providing additional resources/strategies to aid understanding. Essential at the lesson planning stage. | * What knowledge and understanding of the issues related to HE and MB have you gained through your academic reading? How does this relate to your current practice? * How have your expectations of pupils’ learning and progress developed and/or changed in light of your previous placement experience? * How can you ensure pupils are motivated? What have you done to get to know the pupils in your classroom as individuals? | MB.1  MB.2  MB.6  MB.7 | WDS |
| CCF evidence base | Kern, L., & Clemens, N. H. (2007) Antecedent strategies to promote appropriate classroom behavior. Psychology in the Schools, 44(1), 65–75. <https://doi.org/10.1002/pits.20206>.  Lazowski, R. A., & Hulleman, C. S. (2016) Motivation Interventions in Education: A Meta-Analytic Review. Review of Educational Research, 86(2), 602–640. <https://doi.org/10.3102/0034654315617832>.  Sibieta, L., Greaves, E. & Sianesi, B. (2014) Increasing Pupil Motivation: Evaluation Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/projects-and-evaluation/projects/increasing-pupil-motivation/ [retrieved 10 October 2018]. | | | | |
| 23 | * Teachers can make valuable contributions to the wider life of the school in a broad range of ways. This includes developing effective professional relationships with colleagues, in addition to parents, carers and families with a view to improving pupils’ motivation, behaviour and academic success * Teaching assistants (TAs) can support pupils more effectively when they are prepared for lessons by teachers, and when TAs supplement rather than replace support from teachers * SENCOs, pastoral leaders, careers advisors and other specialist colleagues also have valuable expertise and can ensure that appropriate support is in place for pupils | * Engage critically with research and using evidence to critique practice. * Reflect upon and work towards being an effective and professional team member in a Science department. * Contribute positively to the wider school culture and developing a feeling of shared responsibility for improving the lives of all pupils within the school (e.g. by supporting expert colleagues with their pastoral responsibilities, such as careers advice). | 1. How has your knowledge of teaching and learning developed so far? 2. Beyond teaching science, how might/ have you contributed to the wider school culture? 3. Describe how you’ve implemented science education research into your practice. | PB.3  PB.4  PB.5  PB.6 | WDS |
| CCF evidence base | Carroll, J., Bradley, L., Crawford, H., Hannant, P., Johnson, H., & Thompson, A. (2017) SEN support: A rapid evidence assessment. Accessible from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/628630/DfE\_SEN\_Support\_REA \_Report.pdf  \*Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L. & Coe, R. (2015) Developing Great Teaching. Accessible from: <https://tdtrust.org/about/dgt>.  Education Endowment Foundation (2015) Making Best Use of Teaching Assistants Guidance Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/ [retrieved 10 October 2018]. | | | | |
| 24 | * Important to sequence learning so pupils are secure in foundational knowledge before introducing more complex material * Use modelling, scaffolding and explanations to assist with structuring learning, and recognise the need to remove this when pupils can apply such structures to prior learning * Important to provide opportunities for all pupils to learn and master essential concepts, knowledge and skills in that subject | * Plan lessons to promote, practice and revisit key concepts and skills required in science that are taught within secondary education linked to Bruner’s (1960) Spiral Curriculum to master knowledge. * Critique the core subject concepts and skills to allow for contemporary in-roads into the subject. * Draw explicit links between new content and the core concepts and principles in science | 1. Give an example of when you have used a model to help explain a concept. 2. What are the essential skills, knowledge, concepts and principles in your subject area? Can you identify this in the department’s approach to T&L? 3. Have you been able to identify how students are supported in mastering important concepts in your subject? What made this effective? | CP.2  CP.8  S&C.1  S&C.3  S&C.5  S&C.7 | WDS |
| CCF evidence base | Deans for Impact (2015) The Science of Learning [Online] Accessible from: https://deansforimpact.org/resources/the-science-of-learning/. | | | | |
| 25 | **HALF TERM** | | | | |
| 26 | * Additional members of staff provide valuable support with individual/ groups of pupils in addition to flexibly grouping pupils within a class to provide more tailored support * Seeking to understand pupils’ differences, including their different levels of prior knowledge and potential barriers to learning, is an essential part of science teaching. * A predictable and secure environment benefits all pupils, but is particularly valuable for pupils with special educational needs. | * Develop activities that can stretch and challenge pupils of all abilities. This may include critically reflecting on the use of modelling and scaffolding. * Use a variety of questioning strategies * Develop strategies to support EAL pupils | * How successful are you at making use of specialist support (such as TA’s) in your lessons? How could this be developed? * Critically reflect on your use of modelling and scaffolding. * What knowledge and understanding of teaching pupils for whom English is an additional language have you gained through your academic reading? How does this relate to your current practice and/or setting? | AT.3  AT.5  AT.7 | WDS |
| CCF evidence base | Carroll, J., Bradley, L., Crawford, H., Hannant, P., Johnson, H., & Thompson, A. (2017) SEN support: A rapid evidence assessment. Accessible from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/628630/DfE\_SEN\_Support\_REA \_Report.pdf  Education Endowment Foundation (2015) Making Best Use of Teaching Assistants Guidance Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/ [retrieved 10 October 2018]. | | | | |
| 27 | * Effective assessment is critical to teaching because it provides teachers with information about pupils’ understanding and needs. * Good assessment helps teachers avoid being over-influenced by potentially misleading factors, such as how busy pupils appear. * Before using any assessment, teachers should be clear about the decision it will be used to support and be able to justify its use. | * Plan formative assessment tasks linked to lesson objectives and how to think ahead about what would indicate understanding (e.g., using hinge questions) and monitor pupil work during lessons, including checking for misconceptions. * Structure assessment tasks to check for prior knowledge, knowledge gaps, and pre-existing misconceptions * Draw conclusions about the level of pupil learning based on effective assessment tasks | 1. How have you developed in your understanding and ability to set formative assessment tasks linked to objectives? What are your areas of development? 2. How do you ensure that you are checking pupils have developed in their understanding rather than just checking they understand the task or completed the work? Why is this important? 3. Where have you been able to utilise summative and formative assessment? How effectively do you utilise your formative feedback to help pupils progress? | AS.1  AS.2  AS.3  AS.4 | WDS |
| CCF evidence base | Speckesser, S., Runge, J., Foliano, F., Bursnall, M., Hudson-Sharp, N., Rolfe, H. & Anders, J. (2018) Embedding Formative Assessment: Evaluation Report. [Online] Accessible from: https://educationendowmentfoundation.org.uk/public/files/EFA\_evaluation\_report.pdf [retrieved 10 October 2018].  Wiliam, D. (2017) Assessment, marking and feedback. In Hendrick, C. and McPherson, R. (Eds.) What Does This Look Like in  the Classroom? Bridging the gap between research and practice. Woodbridge: John Catt. | | | | |
|  | **End of Developmental Placement** | | | | |
| 28 | * Critically engage with research and use evidence to critique practice. Leading to an identification of areas for development and engage in appropriate CPD with clear intentions for pupil outcomes. * The importance of engaging parents/carers in the education of their children (including effective use of parents’ evenings) and the value of understanding pupils’ individual circumstances that ensure high academic and behavioural expectations and proactively highlight success. * Strategies to build effective working relationships by working with colleagues as part of a team | * Consider the development of professional relationships within your wider department and school teams, in addition to those with pupils/parents/carers * How action research can be used as a tool to help develop pupil learning. * Deliver high quality teacher exposition, with effective questioning and modelling on a consistent basis. | 1. How have you built relationships with parents and carers? How have you communicated with TAs to enable them to support learners in your lessons? 2. Talk about a time when you have shown your understanding of professional behaviour by reacting differently to the way you would have done early on your training. 3. What are your targets? How will you independently and with the support of others decide on, meet and plan further targets in the future? |  | WDS |
| CCF evidence base | Blatchford, P., Bassett, P., Brown, P., Martin, C., Russell, A., & Webster, R. (2009) Deployment and impact of support staff in schools: Characteristics, Working Conditions and Job Satisfaction of Support Staff in Schools. Retrieved from <http://eprints.uwe.ac.uk/12342/>  Wittwer, J., & Renkl, A. (2010) How Effective are Instructional Explanations in Example-Based Learning? A Meta-Analytic  Review. Educational Psychology Review, 22(4), 393–409. <https://doi.org/10.1007/s10648-010-9136-5>. | | | | |
| 29 | * The importance of personal well-being and workload for teachers. * The benefits of independent study for pupils. * Homework can improve pupil outcomes, particularly for older pupils, but it is likely that the quality of homework and its relevance to main class teaching is more important than the amount set. | * Plan to manage their work/life balance using strategies such as self-awareness, prioritising, building resilience, recognising stress indicators and time management. * Use a range of strategies that allows pupils to work independently in lessons and to use homework as a consolidation of their learning in lessons. * Critically reflect on performance as a beginning teacher and the targets for their consolidation placement. | 1. Do you promote equality in your practice? What evidence is there of this? 2. How well do you react to formative feedback? How have you acted on the feedback you have received this week? 3. What are your areas for CPD looking ahead to your consolidation placement? What opportunities exist outside of your ITT course to develop these? | CP.11 | WDS |
| CCF evidence base | Mitchell, D. (2014). What really works in special and inclusive education. Oxford: Routledge.  Skaalvik, E. M., & Skaalvik, S. (2017) Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. Social Psychology of Education, 20(1), 15–37. <https://doi.org/10.1007/s11218-016-9363-9>  Gibson, S., Oliver, L. and Dennison, M. (2015) Workload Challenge: Analysis of teacher consultation responses. Department for  Education. Accessible from:  https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/485075/DFE-RR456A\_- | | | | |
|  | **Start of Consolidation Placement (Week 30)** | | | | |
| 30 | * Teachers need to respond consistently and decisively to pupil behaviour (inc. the use of rewards, praise and sanctions) * Important to motivate pupils via the use of challenging content which builds towards pupils’ long-term goals and aspirations. This will include supporting pupils to journey from needing extrinsic motivation to being motivated to work intrinsically * Work alongside and learn from expert colleagues as part of a wider system of behaviour management | * Effectively apply a range of behaviour management strategies. Including the use of positive framing to set high expectations and develop motivated students. Consideration of the difference between intrinsic and extrinsic rewards * Bronfenbrenner’s (1979) ecological systems theory related to behaviour management and relationships. * Familiarisation with placement setting safeguarding procedure, including the name of the Safeguarding Lead. | 1. How does the behaviour policy in your school operate?  How well does it work? Are there exceptions? Does it reach all children? – If not, what adaptations might need to be made and why? 2. Based on your experiences and academic reading, what promotes high expectations and/or a high level of behaviour management? 3. What are your areas of development with regards setting high expectations and managing behaviour? What impact will these developments have on the learning in your classroom? | MB1  MB4  MB5  MB6  MB7 | WDS |
| CCF evidence base | Chapman, R. L., Buckley, L., & Sheehan, M. (2013) School-Based Programs for Increasing Connectedness and Reducing Risk Behavior: A Systematic Review, *25*(1), 95–114.  Institute of Education Sciences (2008) Reducing Behavior Problems in the Elementary School Classroom. Accessible from <https://ies.ed.gov/ncee/wwc/PracticeGuide/4>.  PISA (2015) PISA in Focus: Do teacher-student relations affect students’ well-being at school? Accessible from: <https://doi.org/10.1787/22260919>.  Slater, H., Davies, N. M., & Burgess, S. (2011) Do Teachers Matter? Measuring the Variation in Teacher Effectiveness in  England. Oxford Bulletin of Economics and Statistics, <https://doi.org/10.1111/j.1468-0084.2011.00666.x>. | | | | |
| 31 | * Anticipating common misconceptions within particular subjects is also an important aspect of curricular knowledge; working closely with colleagues to develop an understanding of likely misconceptions is valuable, particularly in the teaching of literacy. * Every teacher can improve pupils’ literacy, including by explicitly teaching reading, writing and oral language skills specific to individual disciplines. * Stimulate pupil thinking and check for understanding by providing scaffolds and collaborative/ paired work for pupil talk to increase the focus and rigour of dialogue. | * Collaborate with colleagues to effectively use resources and materials (such as shared planning or textbooks) * Ensure that learning is sequenced so that pupils’ master foundational concepts before moving on. * Anticipate, plan for and encourage pupils to share common misconceptions to they can be addressed, and pupils have relevant and accurate subject specific knowledge such as substantive concepts. * Promote/improve pupils’ literacy levels in science (inc. the use of subject specific language) using appropriate scaffolding and modelling. | * 1. How effective have you been in helping to address pupils’ misconceptions? How could you develop this? * Reflect on a topic you will be teaching during this placement, how will you help pupils develop their literacy skills within the context of this topic? * What are the key words and definitions (high frequency vocabulary) that pupils need to know and use for this topic? | S&C.4  S&C.10  CP.3  CP.4 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Preparing for Literacy Guidance Report. [Online] Accessible from: <https://educationendowmentfoundation.org.uk/public/files/Preparing_Literacy_Guidance_2018.pdf>  Zimmerman, B. J. (2002) Becoming a Self-Regulated Learner: An Overview, Theory Into Practice. Theory Into Practice, 41(2),  64–70. <https://www.jstor.org/stable/1477457?seq=1#page_scan_tab_contents>    Rich, P. R., Van Loon, M. H., Dunlosky, J., & Zaragoza, M. S. (2017) Belief in corrective feedback for common misconceptions:  Implications for knowledge revision. Journal of Experimental Psychology: Learning, Memory, and Cognition, 43(3), 492-501.  <http://dx.doi.org/10.1037/xlm0000322>. | | | | |
| 32 | **EASTER VACATION** | | | | |
| 33 |
| 34 | * Effective science teachers introduce new material in steps, explicitly linking new ideas to what has been previously studied and learned. * Explicitly teaching pupils metacognitive strategies linked to subject knowledge, including how to plan, monitor and evaluate, supports independence and academic success. * Practice is an integral part of effective science teaching; ensuring pupils have repeated opportunities to practise, with appropriate guidance and support, increases success. | * Balancing exposition, repetition, practice and retrieval of critical knowledge and skills. * Break tasks down into constituent components when first setting up independent practice (e.g. using tasks that scaffold pupils through meta-cognitive and procedural processes). * Use modelling, explanations and scaffolds, acknowledging that novices need more structure early in a domain. * Enable critical thinking and problem solving by first teaching the necessary foundational content knowledge. * Remove scaffolding only when pupils are achieving a high degree of success in applying previously taught material. | * 1. How can critical thinking be developed within science lessons? How could you model critical thinking to pupils?   2. Can you give examples of how you have developed metacognition and motivation with pupils? For example, how have you helped pupils to develop a weak argument into a stronger one?   3. How can you make models more useful for learning? For example, can you provide more than one model and how do you compare the models to the concept you are explaining? | CP.1  CP.2  CP.6  CP.8  CP.3  CP.4 | WDS |
| CCF evidence base | Kirschner, P., Sweller, J., Kirschner, F. & Zambrano, J. (2018) From cognitive load theory to collaborative cognitive load theory. In International Journal of Computer-Supported Collaborative Learning, 13(2), 213-233.  Jay, T., Willis, B., Thomas, P., Taylor, R., Moore, N., Burnett, C., Merchant, G., Stevens, A. (2017) Dialogic Teaching: Evaluation  Report. [Online] Accessible from: <https://files.eric.ed.gov/fulltext/ED581114.pdf> [accessed 16.08.22] | | | | |
| 35 | * Include a range of types of questions in class discussions to extend and challenge pupils (e.g. by modelling new vocabulary or asking pupils to justify answers). * Scaffolding and modelling helps to reduce cognitive load. * Trainees should know how to assess against a GCSE criteria. * Assessment should be part of the TLA cycle, drawing conclusions about what pupils have learned by looking at patterns of performance over a number of assessments (e.g. appreciating that assessments draw inferences about learning from performance). | * Use data to effectively enable pupils to learn and make progress checking for prior knowledge and pre-existing misconceptions. * Identify common strategies to provide feedback/feedforward to pupils. * Use subject examination material to structure assessment tasks | 1. How do assessment practices in your school motivate pupils to take ownership of their learning? How does it prepare them for GCSE or future study? 2. How do you plan to check for prior knowledge and pre-existing misconceptions? 3. How are you managing the workload of assessment? Have you been able to identify any effective practice which would make assessment less onerous? | CP.2  CP.3  CP.4  CP.5  AS.1  AS.2 | WDS |
| CCF evidence base | Christodoulou, D. (2017) Making Good Progress: The Future of Assessment for Learning. Oxford: OUP.  Hattie, J., & Timperley, H. (2007) The Power of Feedback. Review of Educational Research, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>  Coe, R. (2013) Improving Education: A triumph of hope over experience. Centre for Evaluation and Monitoring. Accessible from:  http://eachandeverydog.net/wp-content/uploads/2015/05/ImprovingEducation2013.pdf | | | | |
| 36 | * The importance of developing positive working relationships with pupils/parents/carers * How action research can be used as a tool to help develop pupil learning * Professional development is a sustained process over time that will impact positively on pupil outcomes. Teachers of Science need to decolonise own thinking, be sensitive and should model how to engage with emotional and controversial topics such as evolution and reproduction. | * Work effectively individually and as part of a team * Deliver high quality teacher exposition, with effective questioning and modelling on a consistent basis. * Trial and critically evaluate new approaches in their practice with a view to developing practice e.g. School Science Review journal. | 1. How effective is your communication to parents/carers in relation to pupil’s achievements and well-being? 2. Reflect on the CPD you have done to improve teaching outside of your programme of ITT? If not, what could this look like? What CPD may you find it useful to engage with in the future (during your ECT phase for example)? 3. How has your understanding of ‘professionalism’ developed since the start of your ITT programme? What insights have you made? | PB.7  CP.6  CP.7 | WDS |
| CCF evidence base | Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L. & Coe, R. (2015) Developing Great  Teaching. Accessible from: https://tdtrust.org/about/dgt. [accessed 18 October 2018]. | | | | |
| 37 | * The importance and development of professional identity and educational philosophies * Prominent models of reflection e.g., Gibbs (1988) * Know how asking questions and researching subject knowledge and content can aid their development as a teacher. | * Critically reflect on your own practice * Ask a range of questions (in relation to working with your mentor) to ensure progression of knowledge/pedagogies/application. | 1. ‘No one is born a great teacher. Great teachers continuously improve over time, benefitting from the mentoring of expert colleagues and a structured introduction to the core body of knowledge, skills and behaviours that define great teaching’ (DfE, 2019:3). Critically reflect on this statement. Do you agree? To what extent is this true for you? | PB.2  PB.7 | WDS |
| CCF evidence base | Basma, B. & Savage, R. (2018) Teacher Professional Development and Student Literacy Growth: a Systematic Review and Meta analysis. Education Psychology Review. 30: 457 https://doi.org/10.1007/s10648-017-9416-4. | | | | |
| 38 | * The importance of CPD beyond the PGCE: Looking ahead to Early Career Teaching, MA and Doctoral study * Reflective practice, supported by feedback from and observation of experienced colleagues, professional debate, and learning from educational research, is also likely to support improvement * Effective professional development is likely to be sustained over time, involve expert support or coaching and opportunities for collaboration | * Set targets and identity next steps for career/ECT progression. * Work with mentors to develop effective relationships and act on the coaching support. * Know that planning should always be underpinned by up-to-date science scholarship or teaching becomes inaccurate and stale. | 1. In preparation for your Professional Reflective Viva at the end of the course, what are the areas that you feel are a current strength for you? 2. How could you develop these existing strengths areas next year (for example as you transition in your ECT phase)? Looking at the expectations laid out in the Early Career Framework or speaking to the ECT lead in your setting may be helpful. | PB.7  PB.2  PB.1 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit:  Accessible from: <https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/> [date accessed 16.08.22] | | | | |
| 39 | * Ongoing CPD is important for professional and personal development in teaching e.g. Association for Science Education, STEM Learning, Institute of Physics, Royal Society of Chemistry. * Progression on ITE should underpin their development as Science ECTs. | * Set targets and identity next steps for career/ECT progression * Reflect on your ongoing contribution to the effective working of a science department * Use Association for Science Education and STEM Learning resources and materials to support further development. | 1.As you prepare for your Professional Reflective Viva, what are the areas that you need to develop or focus on as you progress as an ECT? How could you develop in these areas? Looking at the expectations laid out in the Early Career Framework or speaking to the ECT lead in your setting may be helpful. | PB.7 | WDS |
| CCF evidence base | Education Endowment Foundation (2018) Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit:  Accessible from: <https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/> [date accessed 16.08.22] | | | | |
| 40 | HALF TERM | | | | |
| 41 | * Areas of curriculum that are controversial e.g. evolution. * Awareness of standards required by classroom teachers. * Important that teachers use reflection models to critique performance. | * Critique the links you have established between theory and practice * Use research informed methods/results to offer insights into how curriculum and practice can be enhanced. * To ensure progression through Substantive and Disciplinary knowledge which is enquiry based and plans for and assesses progress in pupils’ understanding of science concepts and processes drawing from N.C, Ofsted Research Review Series: Science and relevant reports e.g. Improving Secondary Science- Guidance Report. | 1. Thinking back over the past 41 weeks of your ITE course, in what ways do you feel you have developed as a novice teacher in your subject? For example, as a novice teacher of Maths, Geography or Physical Education? Don’t forget to include your university learning, all your placement experiences, plus your own personal reflections. |  | WDS |
| CCF evidence base | Darling-Hammond, L. (2009) Professional Learning in the Learning Profession.  <https://edpolicy.stanford.edu/sites/default/files/publications/professional-learning-learning-profession-status-report-teacher-development-us-and-abroad.pdf> [date accessed 16.08.22] | | | | |
|  | **Consolidation Placement Ends** | | | | |