

GRADUATE SCHOOL OF EDUCATION

PGCE SECONDARY SCIENCE

2018-2019

PRE-COURSE INFORMATION

AND TASKS



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**Welcome to the Exeter PGCE in Secondary Science**

The PGCE Secondary Science Tutors welcome you to the PGCE Secondary Science programme and look forward to meeting you in September. This pack contains information about the programme and some tasks that you should carry out before you join us in Exeter. The University input is at its most intensive in the first term and to prepare you for school-based work in the following terms we have to cover many things. It is therefore very important that you begin your studies during this pre-course phase.

**Some general principles**

The Secondary PGCE Science course is designed to help you understand how pupils learn science and how you can teach it effectively, safely and in an interesting way to all the pupils you will meet in schools. Both of the major course components (i.e. the university-based work and school-based work) are essential to your development as a science teacher. ***We*** do a great deal to ensure that the components are inter-related. ***You*** have a major role in being analytical, creative and critical by using what you learn in one component to raise questions and generate possible answers about the things you see and do in the other.

The PGCE programme, like teaching, is one in which paperwork plays a significant part, and it would be wise to get yourself organised before the term starts (especially if you know that organisation is not your strong point!) Beware of throwing out official documentation as it often contains important information, and treat yourself to a collection of files or folders – you will need them! Very few people like paperwork, but our experience with successive groups of PGCE students is that mastering your personal organisation and time management earlier saves a huge amount of stress later. Our principle is that you should control the paperwork, rather than let it control you.

While most teaching occurs in our well-equipped science labs, one day in the Autumn Term will involve a field trip to a Forest School. There is no charge for this, trainees typically share transportation. Details will be given in advance. As an **optional** part of the course we hope to run a field trip at the Field Studies Council centre at Slapton Ley, near Kingsbridge. This will probably take place over the weekend of 16-17 February which is the beginning of half-term week for most of our partner schools. Please try to keep this weekend free so that you are able to come on this course. The cost for attending is likely to be around £50.

Another **optional** component of the course is a first aid training course leading to a ‘First Aid at Work’ certificate. The cost of this course is approximately £65.

We are asking quite a lot of you in terms of preparation, and the course itself is demanding, but don’t be daunted by it - you will receive plenty of support and (we hope) plenty of satisfaction. We expect that you will leave the course thinking differently about science education, acting effectively in the provision of science education for pupils and reflecting on what you do so that you can continue to grow as a science teacher throughout your career. We hope you enjoy the PGCE as the start of this professional journey.

**Some specific tasks**

You will get far more out of the course if you arrive with some understanding of the issues and ideas concerning the teaching of science. This booklet comes with details of six tasks that we would like you to complete before the Autumn term begins. **N.B. These science specific tasks are additional to the generic PGCE Secondary tasks that you will receive**. The science specific tasks require you to:

* Reflect on your personal starting points before you start your preliminary school visits.
* Reflect on the observations that you make during your preliminary school visits.
* Begin to develop self-selected aspects of your science subject knowledge.
* Do some pre-course reading.
* Begin to compile a ‘Learning Journal’.
* Prepare an up to date CV.

**KEY ACTION POINTS** - use this list to check that you have done all you need to do before the course starts in Exeter.

* Carry out the six science specific tasks.
* Carry out the generic tasks relating to your preliminary school visits detailed in the secondary pre-course information that you will receive.
* Keep all correspondence from the University for future reference.
* Begin to organise paperwork relating to the course.

**On the first day of the course in Exeter please make sure that you bring with you the products of both the science specific and generic tasks.**

**PRE-COURSE CONTACTS**

If you want more information about the course or about anything in this booklet please get in touch with Darren Moore (PGCE secondary science subject leader).

With best wishes on behalf of the Secondary Science PGCE tutors.

Darren Moore

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### PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 1. REFLECTING ON YOUR PERSONAL STARTING POINTS

**Purpose**: to reflect on your personal starting points.

**Product**: notes for your eyes only.

**Before you undertake your preliminary school visits** begin to map out some of your thinking about teaching and the role of science in the curriculum. We will NOT collect this in - you will have full control over what you share about this task when we talk about preliminary school visits. We ask you to do this to help you become aware of your starting points and help you to map changes in your thinking as a result of your time in school and whilst on the PGCE.

Complete the following sentences in as many ways as you wish in order to make explicit to yourself what you think is important about teachers’ and pupils’ work in school.

* In primary school, I think teachers in science should .......
* In primary school, I think pupils in science should .......
* With 11-16 year olds, I think teachers in science should .......
* With 11-16 year olds, I think pupils in science should .......
* At post-16 level, I think teachers in science should .......
* At post-16 level, I think pupils in science should .......
* Science should be a core subject in the school curriculum because …..
* I want to be a science teacher because …..

**AFTER you have done this thinking** read the following:

Sotto, E. (2007) *When teaching becomes learning*, 2nd Edition. London, Continuum (ISBN 0826489095) Chapters 3-4

Eric Sotto has a wide range of teaching experience in a variety of settings. His book offers an engaging and sometimes challenging account of teaching and learning based on personal experience and on scholarly sources.

Osborne, J. & Dillon, J. (2010) *Good practice in science teaching: what research has to say.* 2nd Edition. Maidenhead, Open University Press (ISBN 033523858) Chapter 1

Osborne and Dillon provide a thorough overview of some key topics in science education and explore the research evidence about their significance and impact on teaching and learning.

Wellington, J. & Ireson, G. (2018) *Science learning, science teaching*. 4th Edition. London: Routledge (ISBN 1138654108) Chapters 1-3

Designed for science teachers who wish to reflect on and improve their practice and providing key information for science trainees, this new edition considers a range of pedagogical issues.

## PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 2. MATCHING EXPECTATIONS AND EXPERIENCE

**Purpose**: to reflect on the observations made whilst on your preliminary school visits.

**Product**: notes to be discussed.

1. During and after your preliminary school visits refer back to the notes that you made for task 1. Compare what you thought was important and what you expected to happen with what you actually saw in school and what you read in Sotto (2007) and Wellington & Ireson (2018). Write some notes on the following:

**Things that pleasantly surprised you** about the things you saw teachers and pupils doing in science.

**Things that puzzled you.** It is too early to be realistically critical of teachers’ practice since you don’t know enough about the theory, or the detailed circumstances of their pupils and their schools to have a properly informed view. However, you can profitably write about things that left you thinking, “I’m surprised by that. I need to find out more about it”

**The ways in which you were encouraged to reconsider your statements** about what teachers and pupils ‘ought’ to do in science and about the role of science in the curriculum. Note down any changes in the way you think about teaching and science education.

1. Think about the extent to which the practice you see relates to the key research-based concepts discussed by the authors in Osborne and Dillon’s book (2010).

We will discuss your experiences and thoughts during the first week of the University Term.

We will also collect in and briefly comment on your summary notes about significant changes in your original thinking.

## PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 3: BEGINNING THE PROCESS OF DEVELOPING YOUR SCIENCE SUBJECT KNOWLEDGE

You will need to refer to the National Curriculum for Science for this task. The links below will help you find copies of the national curriculum for Key Stage 3 and Key Stage 4 You can download pdf versions from: <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239134/SECONDARY_national_curriculum_-_Science.pdf> and [http://webarchive.nationalarchives.gov.uk/20130904084026/https://media.education.gov.uk/assets/files/pdf/s/science%20-%20key%20stage%204%2004-02-13.pdf](http://webarchive.nationalarchives.gov.uk/20130904084026/https%3A//media.education.gov.uk/assets/files/pdf/s/science%20-%20key%20stage%204%2004-02-13.pdf)

**Purpose**

To familiarise yourself with the National Curriculum for Science and begin to develop your knowledge of what students in secondary schools need to learn in science lessons.

**Products**

1. Begin to consider how you will revise your own subject knowledge in areas where you identify gaps. People revise in different ways. Time spent considering methods that may be most effective is well spent. Trainees use resources such as student textbooks, revision aids (e.g. <https://www.bbc.com/education/subjects/zrkw2hv>), teaching resources (e.g. <https://www.stem.org.uk/secondary-science>) and exam board resources for key stage 4. People record their developing knowledge in different ways, for instance written notes, mind maps, exam answers, creating lesson plans.
2. Later in the Summer we will send you a subject knowledge audit so you can formally assess your subject knowledge and identify where you need to improve during the Autumn Term. Time spent developing your subject knowledge ahead of this is of course a good idea.

## PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 4: PRE COURSE READING

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There are many books written about the teaching and learning of science. Listed below is a selection of titles recommended by the course tutors. Do not attempt to read them all but choose some that you feel are of particular interest to you in order to begin developing the knowledge and understanding that you will need to become an effective, reflective and critical science teacher. You will be able to buy some of the titles listed at a discounted rate if you join the Association for Science Education. Details of how to do this will be provided during the first week of the taught course.

 **We recommend that you all get a copy of:**

Toplis, R. (Ed) (2015) *Learning to Teach Science in the Secondary School (4th edition)* (London: Routledge) and / or

Wellington, J. and Ireson, G. (2018) *Science Learning, Science Teaching (4th edition)* (London: Routledge)

 **Subject specific titles**

**Biology**

Reiss, M. (Ed) (2011) *Teaching Secondary Biology* (2nd Edition) (London: Hodder Education)

**Chemistry**

Taber, K. (Ed) (2012) *Teaching Secondary Chemistry* (2nd Edition) (London: Hodder Education)

**Physics**

Sang, D. (Ed.) (2011) *Teaching Secondary Physics* (2nd Edition) (London: Hodder Education)

**Psychology**

Jarvis M (2011) *Teaching 14-19 psychology: issues & techniques*. (London, Routledge)

 **More generic titles**

Alsop S., Bencze L. and Pedretti E. (eds) (2004) *Analysing Exemplary Science Teaching*. (Maidenhead: Open University Press)

Kind, V. and Taber, K. (2005) *Science: Teaching School Subjects 11-19*. (London: Routledge)

# Oversby, J. (Ed) (2012) ASE Guide to Research in Science Education. (Association for Science Education)

Ratcliffe, M. and Grace, M. (2003) *Science Education for Citizenship*. (Buckingham: Open University Press)

Hollins, M. (Ed) (2010) *ASE Guide to Secondary Science Education* (Hatfield, Association for Science Education)

Reiss, M. (2000) *Understanding Science Lessons.* (Buckingham, Open University Press)

Wellington, J. and Osborne, J. (2001) *Language and Literacy in Science Education*. (Buckingham, Open University Press)

Driver, R. (2014). *Making Sense of Secondary Science: Research into children's ideas.* (London: Routledge)

## PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 5: BEGINNING A ‘LEARNING JOURNAL’

Reflection and the Learning Journal

Many of the generic and science specific pre-course tasks require you to reflect on your observations and experiences. The Exeter Model of Initial Teacher Education and Training is rooted in the importance of professional, critical reflection. To support your development as reflective teachers and learners we ask you to keep a ‘Learning Journal’ throughout the course. Please begin compiling this journal before joining us in October.

The Learning Journal is designed to develop a critical reflectivity, and to capture feelings, reactions, ideas, moments of inspiration before the rational, academic ‘editor in the head’ rejects them. The course itself and experience in school often provoke feelings of surprise, doubt, tension or pleasure which should be articulated and considered. Your journal is a personal diary of your development over the PGCE year. You will not be asked to hand it in but you will need to refer to it when writing assignments and completing formal critical reflection. To develop the quality of written reflection in your journal, you will need to consider different levels of reflection. These may be:

* descriptive and essentially non-reflective writing e.g. giving an account which relies mainly on a description of events and actions e.g. recounting the content of a lesson you have observed by giving details of the activities without reflecting on their significance.
* descriptive reflection considering what is seen as ‘best possible’ practice e.g. by analysing your own performance in the professional role and justifying any actions taken.
* dialogic reflection which involves examining competing claims and viewpoints and exploring alternative solutions e.g. exploring alternative ways to solve problems in a professional situation.
* critical reflection which involves ‘problematising’ the goals and practice of teaching and education e.g. thinking about the effects upon others of your actions, taking account of social, political and/or cultural forces.

Your journal will reflect the range of influences on your thinking that will doubtless include formal aspects of university and school-based work, but also conversations with colleagues, friends or family or stories you have heard in the media.

## PGCE SECONDARY SCIENCE PRE-COURSE TASKS

## 6: COMPILING AN UP TO DATE CV

Finally please compile an up to date CV before the start of the Autumn term. This should include full details of your own education and qualifications, details of jobs you have had, experience of working with young people and your own interests. You will be asked to send this to your personal tutor during the first week of the University Term.