GRADUATE SCHOOL OF EDUCATION

PGCE SECONDARY SCIENCE 2019-2020

PRE-COURSE INFORMATION AND TASKS

GRADUATE SCHOOL OF EDUCATION
PGCE SECONDARY SCIENCE 2019-2020
PRE-COURSE INFORMATION AND TASKS

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.

Teaching is a multi-faceted profession with many different elements. This means that teachers need to be able to manage their time well and stay organised. You will need to use similar skills on the PGCE course, and we will, of course, support you to develop them. To start this process, we encourage you to think about how you will organise your time and course materials from the outset.

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 may, if there is sufficient interest, run a field trip at a Field Studies Council centre. In the past, we have visited Slapton Ley and Nettlecombe Court. This trip explores learning outside the classroom in all science subjects This course takes place over a weekend during the week that is February half-term for most of our partner schools. The cost for attending is likely to be around £70.
An **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.

The PGCE Secondary Science course is exciting, demanding and rewarding. Our aim is to support you to develop into inspiring, effective teachers of science with fantastic potential and the skills you will need to develop throughout your career as a teacher. You will become a teacher who is able to reflect on your teaching and that of others, as well as access, interpret and conduct research to inform and inspire your own teaching. You will be making a difference to young people's lives from the outset, and 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 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 the observations that you make during your preliminary school visits.
- Begin to develop self-selected aspects of your science subject knowledge.
- 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 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 either/both Darren Moore and Lindsay Hetherington (PGCE secondary science subject leaders).

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

Darren Moore (Science Subject Lead/Psychology)
D.Moore@exeter.ac.uk (Telephone: 01392 727405)
Lindsay Hetherington (Science Subject Lead/Chemistry)
L.Hetherington@exeter.ac.uk (Telephone: 01392 724826)
Luke Graham (Biology)
Ed Horncastle (Physics)
Justin Dillon (Science)
Nasser Mansour (Science)

PGCE SECONDARY SCIENCE PRE-COURSE TASKS
1. MATCHING EXPECTATIONS AND EXPERIENCE

Purpose: to reflect on the science-specific observations made whilst on your preliminary school visits.

Product: notes to be discussed and shared with tutors.

Before your preliminary experience, read and make notes on 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.

During your preliminary experience, make reflective notes on each of the following (max. 100 words, or equivalent) on each point:

1. How does the science teaching and learning in your preliminary schools relate to the reading?
2. What pleasantly surprised you about things you saw teachers and pupils doing in science, and why?
3. What puzzled you? Bear in mind that you don't yet know enough about the theory or the specific circumstances of the teachers, pupils or schools to be in a position to critique teachers' practice. Please focus on exploring things that left you thinking, 'that's surprising, I need to find out more about that…'
4. What effective behaviour management strategies did you observe, and would any of these be specific to science?
5. What does any primary science you observed suggest about opportunities and challenges when teaching Year 7?
6. How do teachers enthuse pupils about the science they learn?
7. What strategies did you observe teachers using to explain scientific ideas clearly?

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

PGCE SECONDARY SCIENCE PRE-COURSE TASKS
2: 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

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. 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, as well as more recently developed tools like Seneca Learning (see below). 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.
3. During the autumn term, we will ask you use your University IT account to access Seneca Learning so that course tutors can access results to inform and target their session planning. Seneca is a useful tool that, as you answer questions, 'learns' where your strengths and areas for development lie and targets questions to your needs. You can set up to access this independently ahead of the start of the course if you wish. www.senecalearning.com.

PGCE SECONDARY SCIENCE PRE-COURSE TASKS
3: COMPILING AN UP TO DATE CV

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.

PGCE SECONDARY SCIENCE PRE-COURSE TASKS
4: WHY TEACH SCIENCE?

Purpose: To reflect on the nature of science as a discipline and how it is developed and taught through the curriculum from Key Stage 2 to Key Stage 5. To begin to develop M-level skills of critical analysis and reflection in your writing.

Product: Drawing on your preliminary experience, and any wider reading you undertake, write a max. 750 word piece entitled: 'Science in the Curriculum: What is Science, why should young people learn science, what should they learn, and when should they learn it?' You should consider reasons for and against teaching about the nature of science in the school curriculum.

You will be asked to email this to your tutor in the first week of the University term. It will be your first opportunity to get some feedback on your writing, building towards your M-level assignments.

PGCE SECONDARY SCIENCE
USEFUL PRE-COURSE READING

There are many books written about the teaching and learning of science. Listed below are 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. Many of these are available as e-books through the University of Exeter library for you to access once you are registered on the course. 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 read:

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

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.

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) (2005) *Analysing Exemplary Science Teaching*. (Maidenhead: Open University Press)

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

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)

Sotto, E. (2007) *When teaching becomes learning*, 2nd Edition. London, Continuum