

# Inquiry and Subject Knowledge Enhancement



## Summary:

As part of a larger year long course to support non specialist teachers develop their subject and pedagogical content knowledge for teaching physics they are engaged in enquiry based activities.

## Aims:

This is designed to model good classroom practice as well as develop their own understanding of IBSE.

## Main activities:

Group work and discussion around stimulus materials and equipment



## Narrative:

The SKE course is designed for teachers to take at some point in their careers after they have qualified. It aims to support and develop their subject knowledge in subjects other than their specialism. This incidence will focus on teachers working with Physics although similar courses exist for mathematics and chemistry. As they work through all the content covered in physics taught to students 11-18, some sessions will be explicitly taught on an enquiry model and participants will be asked to

consider both how their own understanding of the physics ideas has developed as well as reviewing the activities themselves and how valuable they are felt to be for classes. In many cases the teachers will be provided with stimulus materials that may include text, images and practical equipment. Together with other prompts and suggestions from the tutor the participants will be asked to find ways in groups and individually to construct and articulate their

own understanding of the topic, as well as develop strategies and approaches for classroom teaching of these materials to students. They will then be provided with an opportunity to discuss and share their views and experiences to help move the group towards a common understanding. Appropriate outcomes will be shared within the group by the use of a course wiki and then more widely as they work back in the departments in their own schools.

### End user:

Experienced and novice teachers and students aged 11-18  
Involved actors: teacher trainers/CPD leaders and other teachers

**Location:** Out of school training venue

**Languages available:** English

### Where to find the application:

Materials will be webhosted in a secure wiki, contact UCAM team for details.

### Evaluation parameters:

Teachers complete formal evaluation questionnaires, and the course itself is evaluated and assessed within the network of Science Learning Centers.

### Duration:

It will happen on at least 2 occasions, possibly more in sessions during the year, with each session lasting between 45mins and 2hours

**Optimum number of participants:** 20/25

### Additional information or resources:

Details of the SKE program are available here [www.tda.gov.uk/teacher/returning-to-teaching/ske-for-returners.aspx](http://www.tda.gov.uk/teacher/returning-to-teaching/ske-for-returners.aspx) and details of the Science Learning Centre East of England here [www.sciencelearningcentres.org.uk/centres/east-of-england](http://www.sciencelearningcentres.org.uk/centres/east-of-england)

## Teachers' Competencies

1	subject matter/content knowledge	x
2	nature of science	
3	Multidisciplinary	
4	knowledge of contemporary science	
5	variety of (especially student-centred) instructional strategies	x
6	lifelong learning	x
7	self-reflection	x
8	teaching/ learning processes within the domain	x
9	using laboratories, experiments, projects	x
10	common sense knowledge and learning difficulties	x
11	use of ICTs	
12	knowledge, planning and use of curricular materials	x
13	Information and Communication Technologies with Technological Pedagogical Content Knowledge	



## Mapping best practices with main principles

### 1. Building interest in natural science phenomena and explanations:

This will allow non specialist teachers to engage with some of the phenomena and relationships that exist in physics which they may not be familiar and/or confident with from a teaching perspective.

### 3. Develop multiple goals:

- understanding big ideas in science including ideas of science, and ideas about science
- scientific capabilities concerned with gathering and using evidence
- scientific attitudes

The course will engage teachers and their students with some of the big ideas of science, including those of scientific inquiry.

### 4. Understanding students' concepts and learning style about of science phenomena:

By combining experience with both the content that they will have to teach and strategies and approach for doing so, it would be hoped that the teachers will engage with the underlying scientific ideas to a greater extent that may have been expected with normal instruction.

### 6. Understanding science as a process not as stable facts. Using up to date information of science and education:

By engaging in inquiry, teachers and their students will come to know that science is a process, as well as a body of knowledge.

### 7. Activities for gaining knowledge, not for entertainment, nor for simple imitating of results:

By learning through the process of inquiry, and by presenting activities which enable students to gain knowledge, teachers will understand how to provide opportunities which do not just require simple imitation of results.

### 8. Doing science: experimenting, analyzing, interpreting, redefining explanations:

By engaging with some of the same processes that their students may do, and perhaps with some of the same misconceptions that they have, it is hoped that a richer understanding of the content and processes of learning of and about science will occur.

### 9. Assessment: formative ~ of students' learning and the summative ~ of their progress:

The group based work and sessions designed to reflect upon practice are included in this program to facilitate the participants to engage in their own judgments of progress and developing understanding as well as that of each other in a supportive and non threatening environment.

### 10. Cooperation among teachers and with experts:

One of the key aspects and hopefully successes of this activity lies here – teachers work with fellow professionals with varying degrees of experience to share and develop their own understanding of both subject knowledge and pedagogical content knowledge.