

## **MTH6110 Communicating and Teaching Mathematics: The Undergraduate Ambassadors Scheme**

### **The Special Project**

Each Undergraduate Ambassador (UA) will devise a special project on the basis of his/her own assessment of what will interest the particular students they are working with. The UA will have to show that he/she can analyze a specific teaching problem and devise and prepare appropriately targeted teaching materials (e.g., plans for coverage of topic items, integrating structured activities for students, and possibly developing basic assessment tools).

The choice of the project topic will need to be agreed between the mentor teacher and the UA. The idea for the project may be an original idea of the student, follow a suggestion of the mentor teacher or originate elsewhere. The module organizer will also have some involvement in the choice of project, although this may well be only minor. Some examples of projects are listed below.

While developing the special project and its related materials, the mentor teachers will act as the main source of guidance. The module organizer, academic staff and members of the School of Maths outreach team may provide additional support and guidance when necessary and appropriate.

Ideally, the UA will have the opportunity of using the project materials in school with a class or small group of students during their placement in the school.

The successful completion of the project will result in producing several outputs for reflection, assessment and use in teaching and learning. These outputs include any teaching materials developed, log book entries related to the project, the oral presentation, and the project report.

### **The Oral Presentation**

Each Undergraduate Ambassador will make a 10-minute oral presentation in the School of Mathematical Sciences describing a key component of their placement in local schools, the Special Project.

The assessment criteria for the oral presentation may include:

- Content - organization and structure of presentation
- Delivery - pace, clarity, interest, effective use of media, eye contact, . . . etc.)
- Timing - the presentation's effective use of the 10-minute time limit
- Quality and effectiveness of visual aids

### **The Project Report**

The report should include: a brief summary, an introduction describing the motivation and goals of the project, a description of how the project was developed, any teaching materials developed, a discussion of its use with students, and a summary of its impact. UAs should also reflect on the project, identify strengths and weaknesses and make suggestions for further refinement or adaptation for future use. The project report should appropriately reference any source material.

Ambassadors may present a first draft to your mentor teacher or the module organizer for formative feedback on the document. UAs should be mindful of time constraints of all parties and plan accordingly. Ultimately UAs must take responsibility for the content the report.

The report should be on A4 size paper, prepared using a computer and be 2,000-3,000 words in length. When submitted it should be in a simple binding (e.g., a ring or springback binder).

Two copies of the report should be handed in, a copy presented to the mentor teacher (if they'd like one), and a third copy to be kept by the UA.

The assessment criteria for the project may include:

Overall presentation of project (i.e., structure, grammar, conclusions, future work, . . . etc.)

The clarity of the project's goals.

Creativity and originality of prepared outputs.

Evidence of material which would engage the specific age group. (e.g., student interest).

Evidence of having carried out the planned project.

Evidence of an attempt to evaluate the impact of the project (e.g., was it successful? how do you know?).

The lasting impact of the project in the local school (e.g., will the school continue to use materials you've developed?)

Evidence of reflection on how the project could be adapted and improved in the future.

## 1 Examples of Project Topics

Below is a listing of example project topics of students who have enrolled in UAS modules at QMUL and elsewhere.

- Designing materials for revision C1 exam.
- Developing lessons in problem solving as a motivator in secondary school mathematics.
- Revisions and the role of individual attention.
- Football results as a motivating application of statistics.
- Teaching lessons to year 8 and 10, developing age specific lessons.
- Developing and implementing GCSE revision lessons for Year 11, Set B.
- Preparing four year 9 students for KS3 Sats exams plus organised a visit day to the University.
- Organising a team to take part in the National Team Mathematics Challenge.
- Designing materials to develop reasoning skills in mathematics for year 8 group plus organised a visit day to the University.
- Development of mathematics revision materials.
- Use of geometry software package “Super Logo” for year 8 extension pupils.
- Design, delivery and assessment of extended algebra coursework task to support AOI (reasoning) plus organised a visit day to the University.
- Developing problem solving skills in top set pupils through different learning styles.
- Developing and evaluating statistical starters for year 10.
- Developing thinking skills for year 7 pupils through investigating the “Towers of Hanoi” problem.
- Supporting understanding of trigonometry with lower ability year 11 pupils.
- Designing and implementing a project on crop circles with top set year 8 pupils.
- Developing work sheets on algebra for top and middle sets in year 8.
- Using software package “Geometer’s Sketchpad” to teach transformations to high ability year 8 group.
- Undertaking activities in probability with year 7 pupils looking at the “Monty Hall problem”.
- Investigation into learning styles for 2 groups of 4 students.
- Production and use of several starters.
- Use of computer software package “Autograph” to produce 2 resources on ODEs and the central limit theorem.
- Development of extension activity for able Year 7 pupils on Fibonacci numbers.
- Use of computer software package “Geometer’s Sketchpad” to investigate transformations with top set in Year 9.
- Production and use of starters and revision for Year 9 pupils.
- Project working with 2 groups of 6 “quiet” pupils from Years 7 and 9 in developing confidence and communication skills.
- Production and delivery of a whole lesson on revising simplification and substitution.
- Production and delivery of a whole lesson on revising topics in algebra.
- Developing problem solving skills with small groups of Year 7 and Year 9 pupils.
- Preparation and presentation to teaching staff on the use of the interactive whiteboard and laptops in mathematics.