



## Mathematics Enhancement Programme (MEP) *Secondary Demonstration Project*

This demonstration project, principally funded by *The Gatsby Charitable Foundation*, aims to implement the *Kassel Project* recommendations and to evaluate their effect on the raising of mathematical attainment and understanding.

### Recommendations

#### *Mathematics Curriculum*

1. More systematic treatment, with topics dealt with in depth, rather than jumping around.
2. Clearly specified schemes of work for all abilities.
3. More emphasis on practical numeracy, particularly for pupils who will not continue their mathematical studies beyond 16+.

#### *Mathematics Teaching*

1. More emphasis on a clear, precise description of the basic idea or concept being taught.
2. Correct, precise, orderly, spoken and written mathematics used at all times.
3. Limited but effective use of calculators.
4. Encouragement of mental skills and 'learning by heart' important facts and formulae.
5. The use of *relevant* applications for coursework and to motivate new topics.

#### *Teaching Style*

1. More whole-class teaching, less individualised work, but a planned combination.
2. Clear objectives and structure to all lessons.
3. Homework used as a crucial and critical component of learning.
4. Individual pupil mistakes used as teaching points with the whole class.
5. Teacher continually monitoring what every pupil is doing and encouraging contributions from as many pupils as possible, including pupils working at the board in front of the class.

#### *Assessment*

1. Regular testing, linked to schemes of work.
2. Modified tiering arrangements for GCSE, with all candidates taking 2 papers (for awards up to Grade C), one of which is non-calculator, and an extension paper for higher grades. (Currently this has not been approved by QCA.)
3. *Certificate of Educational Achievement in Mathematics* (WJEC) used for low ability pupils.
4. *GCSE Statistics* encouraged for suitable pupils.

### Implementation

In September 1996, 94 schools in England and Wales volunteered to start using the *MEP* teaching philosophy (based on the Hungarian interactive teaching style), framework (based on the Singapore model) and resource material with their Y10 pupils, supported by:

- *INSET* sessions
- videos of Hungarian mathematics lessons
- *Schemes of Work* for 4 ability levels: *Standard*, *Academic*, *Express* and *Special*
- *Teacher Support*: Background Notes, Lesson Plans, Activities, OH slides, Mental and Revision Tests
- *Pupil Texts* and differentiated *Practice Books*.

Although at first many teachers and pupils had difficulty adjusting to the *MEP* teaching philosophy, they persevered and at the *National Conference* held in July 1997, the overall response was very positive. This enthusiasm has continued into the Year 2000 and the 3rd cohort of pupils will take their GCSE exams in June 2000.

Two more national conferences were held in 1998 and 1999, attended by teachers not only from our secondary project schools, but also from feeder middle and primary schools. The general atmosphere was one of enthusiasm and cooperation.

## Evaluation

Results for the first cohort of Y10/11 pupils were encouraging and indicated enhanced GCSE grades, particularly where departments had been implementing our teaching philosophy in full, but preliminary results from the 2nd cohort of pupils who took GCSE exams in 1999 are even more impressive. Success in implementing the *MEP* recommendations appears to depend on:

- confident leadership from the Head of Department,
- a strong department, fully committed to the teaching philosophy, with all staff working together.

Summaries of responses to teacher and pupil questionnaires after the first year of *MEP* are available on the *MEP* web site at address:

<http://www.cimt.plymouth.ac.uk/projects/mep>

and a more detailed report, including analysis of progress from KS3 to GCSE and comparison with Kassel Project data on an international basis, will be available later in the year.

## Extensions

In September 1998 we started to implement comprehensive support for the *MEP* teaching philosophy in Year 7, including the development of pupil *practice books* and the dissemination of *teacher support* material through the internet. This was continued for Year 8 in 1999 and will extend into Year 9 this September. Material for Year 10 and Year 11 will, after revision, also be available on our web site.

In 1998, we began to extend *MEP* to primary schools feeding into some of our secondary project schools, with the aim of enhancing mathematics during primary years, emphasising a sound foundation for later studies and aiding a smooth transition from primary to secondary mathematics. The effect of *MEP* on these primary schools will be evaluated through the *International Project on Mathematical Attainment (IPMA)* which involves monitoring the mathematical progress of pupils in 14 countries. Year 1 pupils were tested in September 1998 and again in July 1999. We intend that this yearly testing will continue (as long as funds are available) at least until the end of Year 6, but ideally until pupils take their GCSE exams.

## Wider Dissemination

Local self-help groups have been set up, each led by teachers who are implementing *MEP* most effectively and who have agreed to take responsibility for inservice to support project schools in their area. We also plan to:

- put as much material as we can on the internet so that, for example, the *teacher support* is freely available to all;
- make *practice books* and *pupil texts* available at cost directly from CIMT;
- run inservice courses in various locations around the country to promote the teaching philosophy and to disseminate information on the resources available.

## Future Developments

We are particularly keen to reconsider mathematics provision for Y10 and Y11, particularly for low achieving pupils who are unlikely to reach the higher grades at GCSE. We feel that a much more practical approach which links mathematics, science and technology would be a more appropriate way forward for these pupils, rather than achieving very low grades on an essentially watered down academic GCSE course.

We also realise that it is essential that our work focuses on teacher training and are currently planning how we can set up *MEP* ITT courses for both secondary and primary.

## Additional Funding

The extension of *MEP* to feeder primary schools and *IPMA* are funded by *PricewaterhouseCoopers*. Additional funding for *MEP* has also been received from *British Steel*, *Esso*, *The Garfield Weston Foundation* and *The Esmée Fairbairn Charitable Trust*. We are very grateful for their support.