

# Involving parents in secondary mathematics





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# Introduction

This booklet contains a report and recommendations from the National Strategies' Parents' pilot project in secondary mathematics. It contains examples and guidance to help teachers plan and run parent-child mathematics workshops in secondary schools. The pilot project involved schools in LAs around England in running their own workshops, with mathematics consultants supporting these events and identifying and sharing successful practice. The experience of the schools involved in the pilot was overwhelmingly encouraging; parents, pupils and teachers were very positive about the events they attended, and were keen to do more.

This pilot project has drawn upon the established good practice of a number of organisations which have cooperated with the National Strategies in its development.

It has been used to initiate work with a number of English local authorities (LAs) and schools. We are particularly grateful for the support and involvement of Ocean Maths ([www.ocean-maths.org.uk](http://www.ocean-maths.org.uk)) and the LAs listed below:

- Coventry
- Devon
- London Borough of Croydon
- London Borough of Ealing
- North Lincolnshire
- North Yorkshire
- Rochdale
- Southend-on-Sea
- Suffolk
- West Sussex

Further information about the Ocean Mathematics Project can be found in chapter six of 'The Independent Review of Mathematics Teaching in Early Years Settings and Primary Schools Final Report' – Sir Peter Williams June 2008, pages 70 and 72. This report can be found on the website 'TeacherNet' and may be downloaded using the following link and searching for the reference number: DCSF-00433-2008.

[www.teachernet.gov.uk](http://www.teachernet.gov.uk)

The National Strategies' Parents' pilot project was set up in September 2008, to investigate ways of helping schools to strengthen parental involvement in mathematics in secondary schools. The project team members were LA mathematics consultants. They worked with teachers in a variety of schools around the country to help plan and run workshops that would bring parents into schools to share engaging and enjoyable mathematical activities with their children.

## A message from the project team

We recognised from the outset that secondary schools already knew the importance of working in partnership with parents and carers. Schools successfully communicate with and involve parents in a variety of ways, including parents' meetings, newsletters, websites and the dedicated work of PTAs in communities throughout the country.

However, we also knew that, despite the universal recognition of its importance, mathematics is

sometimes seen as a difficult, even intimidating subject. The challenge of establishing good parental involvement in secondary mathematics would involve generating a positive and cooperative feeling about the subject. We would need to get parents and children working together on mathematics, and show them that it could be more than just useful and valuable – it could also be enjoyable and satisfying in its own right.

The project involved mathematics consultants, teachers, parents, carers and children in ten LAs around the country. Teachers planned workshops where parents came to the schools to find out more about school mathematics, and to work with their children on engaging and enjoyable mathematical activities. The aim was to build solid links and positive attitudes that would endure well beyond the initial events.

The experience of the project has been overwhelmingly positive. There has certainly been a lot of hard work and much to learn; we hope that this booklet allows us to share our practical experiences and help your own developments get off to a flying start. Above all else, teachers found the experience rewarding.

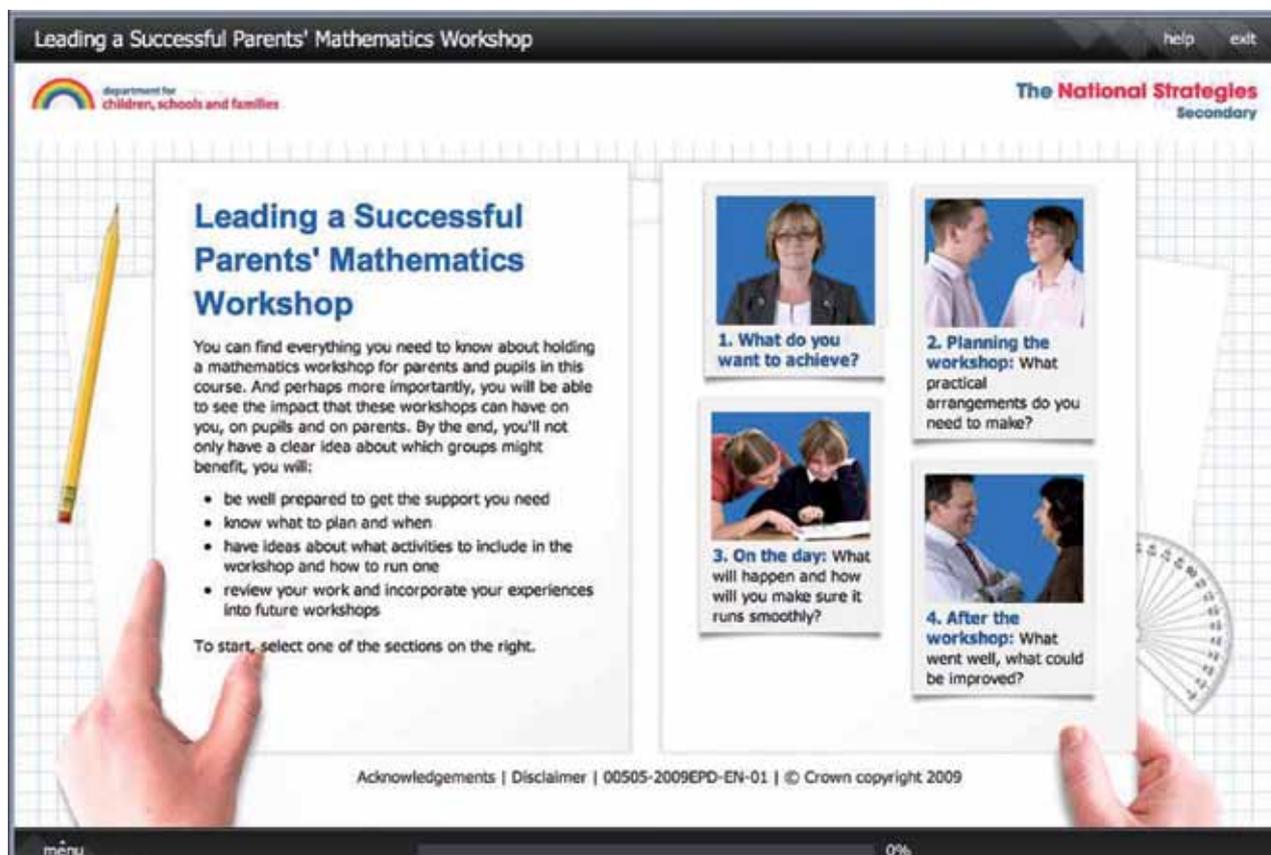
We would like to acknowledge the contribution of all those involved in the project so far. In particular, we were fortunate to be able to draw upon the experience of Ocean Mathematics, an independent educational charity that has pioneered work in parental involvement in mathematics. Their advice and encouragement were invaluable.

### **A note about 'parents'**

Throughout this booklet, we refer to involving 'parents' in their children's mathematics. In fact, one interesting lesson from the project schools is that other relatives (for example, grandparents or older siblings) and carers often attended the school events with great success. References to 'parents' should be taken to include these other adults.

## How to use this booklet

This booklet provides the basic guidance that schools will need to make a start with running their own parents' workshops for mathematics. It contains practical advice, example activities, case studies, organisational schedules and checklists. Further information and resources are available on the accompanying DVD and website.



The website is available at [www.standards.dcsf.gov.uk/nationalstrategies](http://www.standards.dcsf.gov.uk/nationalstrategies). Search using the following ref: 00505-2009EPD-EN-01.

This booklet contains the basic information that you need. It includes findings from the pilot project, (including reactions from parents, pupils and teachers), example activities, and checklists and guidance on running your own events.

The accompanying DVD includes video footage illustrating some of the key points from the booklet, as well as more sample materials, checklists and forms for schools to use and adapt.

The website includes the full content of the DVD, but will also be used to host further material as the project continues.

## Why involve parents in mathematics?

Successful schools recognise that good relationships with parents are a key factor in improving a child's success in mathematics. Maintaining personal contact throughout the child's time at secondary school and developing a shared understanding of mathematical learning can have a significant positive impact on a child's success both within and beyond the classroom.



## What do parents gain from the workshops?

Parents involved in the pilot events were overwhelmingly positive about the experience, despite the apprehension some of them felt beforehand. Common benefits included:

- improved confidence in using their mathematical skills;
- an insight into engaging teaching approaches, current technology and today's mathematics classroom;
- quality time working with their child;
- developing a rapport with the teachers in the school;
- practical ways to support their child's mathematical understanding.

**I feel like I  
can contribute to  
my son's maths  
now**

**I enjoyed it – it got  
teamwork going**

**Today I  
realised that it's okay  
to get it wrong – it's  
part of the learning**

**I was very impressed  
to see how enthusiastic and  
supportive the teacher was  
with my child**

**I enjoyed  
getting an insight into  
today's classrooms**

**The whole session  
was good and I do not  
usually enjoy maths!**

## What do pupils gain from the workshops?

The pupils who took part in the pilot events were just as enthusiastic as their parents. Among the benefits identified were:

- an opportunity to have fun learning mathematics while spending quality time with their parents;
- seeing their teachers and parents interact;
- greater enthusiasm and motivation;
- raised awareness of real-life mathematics;
- consistency between methods taught at home and at school.

**It was fun and even better  
with my dad here**

**I think I'll talk more about  
maths now at home**

**One thing I really enjoyed  
about today was working  
with my friend's parent**

**I think this morning has  
made me enjoy maths  
more than before**

**I really enjoyed working  
with my mum, she is cool!**



## What do schools gain from the workshops?

The schools involved in the pilot project reported a wide range of positive features, both during and after the parents' workshops, including:

- more positive attitudes towards mathematics from parents and children;
- improved quality of homework through increased parental involvement;
- a shared understanding of what the school is trying to achieve;
- increased parental understanding of the importance of mathematical reasoning;
- strengthened links with key stakeholders (e.g. parents, governors, local business).

**I've noticed a real  
difference with students  
in terms of their homework**

*Head of mathematics*

**As a new teacher I have  
found it easier to contact  
parents now that I have a  
face to put with the name**

*Mathematics NQT*

**It's always nice to  
see people excited  
about maths**

*Mathematics teacher*

**Parents and students  
were really talking about  
maths**

*Deputy headteacher*

**I am excited about the  
potential of parental  
involvement in supporting  
pupils to make even  
better progress  
in mathematics**

*Headteacher*

**My Year 7 class have been  
better behaved since  
the workshop and I  
have more confidence to  
try out new things**

*Non-specialist teacher  
of mathematics*

## Evidence base

Schools in nine LAs across England ran parents' workshops as part of the pilot project. There were a variety of schools involved, including 11–16 and 11–18 comprehensives and a selective school, and both mixed and single-sex schools.

Most of the workshops were for pupils in Year 7; some focused on more able, some were mixed-ability groupings and others were targeted at intervention. Where workshops were held for other year groups, these tended to focus on Year 11 GCSE students who were near the borderline between grades C and D. Generally, the parents of around 30 pupils were invited, although in some schools up to 60 pupils and their parents were involved.

Workshops took place at a time most convenient for the schools and the sessions included weekday and weekend mornings, evenings, and (in one school) over two separate sessions of an enrichment day. Pupils were involved in deciding the most appropriate time of day in some cases. All workshops were between one and two hours in length, including refreshments.

Some workshops were led by one or two key people within the mathematics department with the support of senior leaders while others worked collaboratively across the whole department and school. During the workshops, some schools involved older students, governors or teaching assistants to support pupils during the activities. Additional members of staff such as senior leaders, year heads and other heads of department visited some sessions to raise the profile of the workshops.

## Workshop approaches

Although this booklet contains a considerable amount of guidance, there is no one 'correct' way to run a parents' event. Teachers in the pilot schools experimented with various approaches, including:

- focusing on one area of mathematics, to give an in-depth understanding of a particular topic;
- visiting several different areas of mathematics, to provide a broader familiarity across the mathematical curriculum;
- concentrating on games, puzzles and problem-solving skills;
- development of revision and examination techniques, and identification of common misconceptions;
- clarifying progression within calculation;
- promoting talk and discussion for learning, and developing the use of correct vocabulary.

Perhaps most importantly, schools thought carefully about the difference between the style and content of a workshop and a 'normal' lesson. Many of the same principles do apply – like a good lesson, a workshop should be lively, engaging, and provide opportunities for discussion. But the focus needs to be firmly on providing opportunities for parents and pupils to work together, rather than on attempting to teach significant new mathematics to either pupils or parents.

Where workshops were most successful, teachers were very clear about the purpose of the events and the rationale for selecting a group to participate. They then carefully matched the organisation and content of the events to the needs of the audience. All the workshops were carefully evaluated using a selection of questionnaires, brief written comments, telephone calls and discussions with parents and pupils.

# Case studies

The accompanying website and DVD contain several case studies setting out the experience of schools involved in the pilot project, including video material describing one school's experience in planning, running and evaluating a workshop. The example provided here is from another school – an 11–18 mixed comprehensive on the south coast of England. In 2008, just over 30% of students at the school achieved 5+ A\*–C grades at GCSE including English and mathematics.

## Background

The teachers in the mathematics department were keen to participate in the Parents' pilot project as they felt that many pupils – and their parents – had negative views of mathematics. The subject leader wanted to help parents to feel more confident about supporting their children with homework and with discussing mathematics and the ways that it is used in everyday life. She also saw this as a way of raising aspirations, and she believed that if the parents felt more confident then the children would take mathematics more seriously and want to study it at higher levels.

## Planning the workshop

The department ensured that the senior leadership team (SLT) was supportive of this initiative from the outset and decided to target a Year 7 class for the first workshop. The teachers decided to hold the session in the library for two hours at the start of the morning, with a working coffee break within the session. Letters were posted home and a teaching assistant followed these up with telephone calls to remind the parents to return the reply slip. The Year 7 mathematics teacher discussed the forthcoming session with the class to stimulate interest and ensure that they encouraged a parent to attend.

## On the day

Three members of the department worked with the LA consultant to choose practical and engaging activities for the workshop. They included a range of mathematical games, puzzles, visualisations and practical group work activities. The session was led by the subject leader with the other two teachers introducing some activities. The department presented a certificate for parents and a games package to take away to enable the lively discussion that had taken place to continue at home.

There was 70% attendance by parents and the feedback was very positive. The parents valued the opportunity to work collaboratively with their own children and many went away thinking that mathematics was fun and not always 'difficult'. Pupils and parents gained an insight into each other's ability and how, by approaching activities in a logical and systematic way, they could tackle problems and find solutions more effectively.

## Follow-up

The teachers report that there is now a definite 'buzz' when Year 7 are taught in the department and lots of pupils in other groups have asked when their own parents can attend a workshop. Pupils who took part in the first one are asking when it can be repeated!

By attending the workshop and working with their children, parents become more aware of how mathematics is taught in school. Several parents have since commented that their mathematical confidence improved and that they were better able to support their children in mathematics. Working

together built trust, respect and confidence and was enjoyable and satisfying for all concerned.

Further sessions for the other Year 7 groups are being organised. Other members of the department are now being involved in the planning and running of these sessions for their own teaching groups.

## Feedback

Comments were collected from teachers, parents and pupils.

### Parents said:

- Excellent idea and there should be far more of this with other subjects.
- Perfect for parent and child to work together.
- Educational and enjoyable. An insight into the educational process today.
- I thought it was very good and challenging for parents.
- Enjoyed the whole session and I do not normally enjoy mathematics! Thanks.
- A good idea. Could be done a few times a year.
- Can I take the resources home?
- We should do more of this together (parent and child).
- I enjoyed the session, as it is rare to spend time alone with my daughter concentrating on an activity together.
- I really enjoyed that, it was great, now I am off to dig up the road on the seafront.

### Pupils said:

- I liked it because I got to show my mum my mathematics skills and work with her.
- Good but challenging at times.
- I liked all the puzzles and the stuff I did with my mum.
- Good fun!

### Teachers said:

- I was nervous before we started but I really enjoyed that, it was fascinating to see the interactions between the pupils and their parents.
- It was lovely to hear the buzz of mathematical discussion throughout the room.
- It was really interesting to see the way that one pupil and his father were deep in discussion about the mathematics in the activities.

# Planning a parents' workshop

This section presents some of the most important findings from the pilot project in the form of recommendations around key areas that you will need to consider when planning your own events. These findings form the basis for the planning checklists provided in the following section.

Of course, choosing suitable activities for the workshop is a prime consideration. We deal with this in the Selecting activities section.

## Staff roles and responsibilities

It is vital to involve the SLT from the outset as they will authorise cover, allocate rooms, finances and administrative support. Clearly defined responsibilities will help the smooth running of the event. You will need to decide on a workshop coordinator to make practical arrangements and a lead teacher to run the workshop. The coordinator might be a senior leader, a teacher, or a teaching assistant and their role is to take charge of the practical organisation of the event including setting dates, organising publicity, running planning meetings, and coordinating room changes, cover and so on. The lead teacher (not necessarily the subject leader) should be responsible for the overall planning and delivery of the workshop itself, including the selection of appropriate activities.

## Choosing a suitable group of pupils

It is particularly important to ensure that your first workshop is successful and well-attended, so start with a group where you are confident of securing good parental participation. This could be a tutor group or a mathematics teaching group, although some pilot schools reported that it was best to work with a teaching group, as they were used to working together on mathematics and the workshop could have a positive impact on their subsequent lessons. Some schools have worked with groups of Year 7 pupils, where the workshops build on the relationships between parent and school established through existing transition work; others have worked with Key Stage 4 groups, responding to parents' concerns around examination preparation.

## Communication and publicity

Initial contact with parents could be in the form of a flier. You may want to follow this up with a lively and welcoming letter (examples are provided on the website and DVD) to encourage parents to attend and to explain the aims and benefits of the workshop. In the pilot project, some schools increased attendance by including a personalised letter from the pupil to the parent with the formal invitation. Follow-up telephone calls to confirm attendance have proved worthwhile, although the person making the calls does need to be well briefed about the workshop, and you will need to consider what time of day is best to call. If the workshop is to be during the school day, ensure the letter is sent early enough for parents to arrange time off work, negotiate a late start to their working day or organise childcare. You might need to consider translated letters where appropriate. Other channels of communication used in the pilot project included school websites and virtual learning environments, school calendars, open/parents' evenings, text alerts and email.

## Practical arrangements

Choose the venue carefully. First consider the size of the room – for a group of 30 pupils, some of whom may have two parents attending, the total number of staff, pupils and visitors could easily reach 60 or more. A normal classroom may not be large enough, and the school hall, a drama studio or resource centre may be more suitable. Securing the best location may need several months of advance notice! You will also need to consider the proximity to noisy facilities (such as the school canteen), ease of access within the school site, availability of toilets, the overall appearance of the venue (including any displays) and how presentable it is, as well as the acoustics.

One of the most difficult decisions will be what time of day to run the workshop. Pilot schools experimented with various arrangements. Workshops during the school day allow all pupils to attend with or without their parents. After-school or weekend workshops can increase the parental attendance but may exclude unaccompanied pupils. In general, morning workshops seem to make it easier for many parents to fit the workshop in around other daily commitments, but you will need to consider your local circumstances carefully. Whatever arrangement is chosen, give parents as much notice as possible. The typical duration for a workshop is about one hour, although some pilot schools did run longer, carefully structured sessions.

The layout of the tables and chairs is crucial. Try to avoid making the venue look like an old-fashioned classroom, and make sure that there is space for parents and pupils to work together on practical activities. A 'groupwork' set-up, with groups of about four people sitting around tables, generally works well.

Invite key staff from the school such as the headteacher and head of year to drop in. Consider how to manage the pupils whose parents are not able to attend; will they sit with other parent-pupil pairs or could there be sixth formers, teaching assistants or other adults available to pair them with?

Any information technology requirements (for example use of interactive whiteboards, or access to the school network) must be carefully planned and checked, especially as the larger spaces in schools may not be as well equipped as classrooms. Test everything in the actual location well in advance, and make sure that you have a back-up plan; what will you do if the projector bulb blows, or if the online game you planned to use is unavailable?

It may seem that there is a bewildering range of things to organise and remember in preparation for your first parents' workshop. The checklist in the next section provides an aide-memoire for the key points. You will probably want to use a list like this as the basis for your own action plan. An example of such a plan (from the case study school in the previous section) is also provided.

## On the day

The workshop location should be clearly signposted, and arrangements made to guide parents (including late arrivals) to the venue. When parents arrive they should be made welcome and allocated seats. Provide an enjoyable starter activity to establish a positive atmosphere from the start. Domestic arrangements concerning toilets, fire alarms, refreshments, etc. should be made clear once everybody has arrived. Make the end time clear, and stick to it! The workshop itself should be flexible and relatively informal; remember that the primary purpose is to facilitate joint working between parents and pupils, and avoid unnecessary intervention from the teacher. It is a good idea to have spare chairs at each table so that staff who are helping can sit down rather than dominate the group. Encourage discussion, for example, you may wish to ask parents how they use mathematics in their everyday lives. In addition pupils could be encouraged to say which aspect of mathematics they enjoy.

Guidance on suitable activities is provided in the Selecting activities section. You should plan the distribution and collection of resources so that activities follow each other smoothly without unnecessary gaps.



## Evaluation and follow-up

Evaluation of the feedback from parents and pupils is an essential part of planning future workshops and time should be set aside for this. Schools have employed a variety of techniques from evaluation forms with 1 to 5 scales to informal feedback on sticky notes focused by prompts such as 'What went well?' and 'Even better if...'. It is useful to have an independent observer – this could be a member of the SLT or a teacher from another subject – to give objective feedback on the workshop. Several schools have followed up the parents who did not attend with a letter or telephone call to emphasise the positive aspect of the day and to encourage them to attend future events.

# Planning sheets

This section contains a planning checklist and an example planning format, both of which are also provided in electronic form on the accompanying DVD and website. You may find it useful to adapt the electronic versions to your own needs.

## Planning checklist

This checklist is organised as a series of suggested reminders, and summarises many of the issues discussed in the previous section.

### Staff roles and responsibilities

Make sure that roles and responsibilities in planning the workshop are clear:

- consider SLT involvement
- identify lead teacher/workshop coordinator
- agree roles for other teachers, pastoral and support staff and school caretakers.

### Choosing a suitable group

Select the group for your initial workshop carefully:

- year group
- ability
- number of invitations (including parents/siblings/grandparents, etc.)
- accommodating unaccompanied pupils.

### Communication and publicity

Effective communication and publicity are vital:

- setting a date
- time of day
- fliers and invitation letters
- permission slips
- time between invitation and workshop
- publicity (e.g. parents' evening)
- follow-up telephoning/texts/emails
- register.

## Organising the room

Choose and organise the venue with care:

- displacement of classes
- sufficient space
- seating arrangements
- interactive whiteboard
- displays.

## Resources

You will of course need to organise the resources you need for the workshop:

- paper
- pencils
- sticky notes for feedback
- wipe-boards, pens and erasers
- worksheets/card sorts
- certificates (parents and/or pupils)
- follow-up activity.

## Domestic arrangements

Ensure that parents and pupils know where to go, and are made to feel welcome and comfortable:

- arrival of parents
- arrival of pupils
- escorts, signage and disabled access
- starter activity while pupils/parents arrive
- fire and emergency procedures
- refreshments – what, where, when?
- access to toilets.

## Costs and budget

Keep track of costs, and decide who pays!

- refreshments
- resources
- staff cover (if required)
- staff time (telephoning, administration, planning meetings).

## Evaluation and follow-up

Simple steps to identify what worked, and what could be even better:

- monitoring of attendance (register)
- evaluation by pupils and parents (use sticky notes)
- review meeting – lead teacher/workshop coordinator, SLT and others
- additional activities, e.g. homework or further events.

## Action planning form

An example of the action plan drawn up by one of the case study schools is provided on the website and DVD. You may find it useful to adapt this checklist to suit your own needs.

First steps (up to one year before the event)	
Action	Notes
Contact or visit another school with previous experience of parents' workshops.	Useful for ideas and actively getting the process started.
Speak to head and line manager. A possible PM target?	Needs positive support and commitment. Good for dept and whole school – puts mathematics in the limelight!
Set date. Enter in departmental development plan and school timetable.	Arrange date ASAP to avoid clashes.
Decide time (morning or afternoon). Decide year group, set, etc.	8:30am start? Possibly Year 7 as enthusiastic and more parents dropping off at school, etc. ?
Decide venue – will need four to a table and possibly 12–15 tables – cosy and inspiring.	A venue that can accommodate all students and their parents, e.g. a class of 30 means seating for up to 60.
Book the venue, e.g. Library. Book refreshments – budget implications.	Book with the correct person, e.g. librarian/PE dept, with diaries. Keep copy! Remember – will be important that you are not interrupted and distracted by outside factors.
Getting organised (up to six months before the event – but at least a term in advance)	
Action	Notes
Appoint parents' project manager (PPM). Appoint/designate clerical assistance to coordinate practical arrangements.	Discuss in meeting as it is vital one person takes overall charge and therefore reviews, monitors and paces development.
Organise a range of activities in discussion with colleagues. Decide certificate/presents for parents. Order resources, e.g. dice, counters, linking cubes, 2 colours of sticky notes.	All part of the process. Have more activities not fewer; might need to change according to set, etc. at short notice. Certificate signed by PPM and head?
Organise timetable which includes PPM and possibly 1–2 teachers and any TAs.	Need at least three adults. Always include the teacher whose class it is as they will always know the names of the students – also a positive way to communicate.
Involving the department (about three months ahead)	
Action	Notes
Prepare presentation for discussion at meeting with department/class teacher. Get resources ready in wallet and place in workroom for safe keeping.	Try and think of all resources as long-term and fixed for a year – laminate, glue and scissors. No running around when you are really busy!

# Selecting activities

Schools in the pilot scheme found that it was worth setting aside time to meet together to select suitable activities for workshops.

## What activities work well?

Open-ended activities that were fun, accessible and challenging worked best. You will need to choose a variety of short interactive tasks which encourage paired work and discussion. Ensure that the mathematical content does not exclude participation; remember that some parents may be anxious about doing mathematics. The purpose of the workshop is to encourage and support collaboration between parents and pupils rather than teach new mathematics.

## Choosing the activities

It works best when members of the department meet together, each contributing some possible activities from a range of mathematical topics. These can then be discussed to choose the most effective tasks.

Ensure that high-quality presentation is used and that all activities and additional resources are organised carefully.

## Organising the structure

Have a starter activity or game on the tables (Nim or a four-in-a-line game work well) to engage pairs as soon as they arrive.

To maintain momentum, engage parents and pupils in mini-plenaries at the end of each task. Planning the questions for this should be part of the planning meeting. Rich questions and mini-whiteboards are effective ways to encourage feedback from both parents and pupils.

Don't try to fit in too many activities. In a one-hour workshop, after allowing for arrivals and introductions, you will probably be able to include about four 10-minute activities – any more can make the workshop rather fragmented, while any fewer can result in a lack of pace. It is also sensible to have some extra activities available, in case something finishes quickly or a piece of technology fails.

You may wish to organise a pack for parents to take away; this might include games, counters and dice or follow-up homework activities.

## Example activities

Here are two examples of activities that worked well in pilot schools. Electronic versions of these and other activities are included on the website and DVD, along with an example of a workshop programme from a pilot school.

## Which times table?

This proved to be a popular and successful activity for pairs or small groups.

 ×  = 	 ×  =  
 ×  =  	 ×  =  
 ×  =  	 ×  =  
 ×  =  	  ×  =  
 ×  =  	  ×  =  
 ×  =  	  ×  =  

## Instructions

Cut the sheet into separate cards, shuffle and place them in envelopes.

Give one envelope to each pair, with the following instructions:

- The cards represent a multiplication table.
- All of the numbers have been replaced by symbols.
- Can you work out which multiplication table this is?

This activity was particularly effective because it was accessible, practical and encouraged discussion. It used and reinforced knowledge of multiplication tables and introduced symbolic notation in an interesting, non-threatening way.

## Variations

You may like to use more interesting symbols – for example, national flags work well.

There is no reason why you have to use a complete multiplication table – you could design a set of cards that uses a variety of calculations. Just make sure that it is possible to solve the puzzle from the information provided!

## Build it!

This is a game for pairs. You will need four interlocking plastic cubes per person.

- Partners sit back to back.
- One partner builds a solid with four cubes and then describes it to the other.
- The other partner has to build a copy of the solid without seeing the original.

Parents and pupils really enjoyed this activity – it was easy to engage with, encouraged discussion and allowed ample scope for moving on to more difficult challenges without any emphasis on right or wrong answers.

## Variations

Make the challenge easier or harder by decreasing or increasing the number of cubes.

Add (or remove) the condition that the duplicate must be the same colour as the original.

Set a time limit – one minute to produce a four-cube model results in a fast-paced (and usually quite loud!) discussion.



## Further developments

Organising a parents' workshop may seem like a daunting prospect. However, the experience of schools in the pilot project was that the effort was well worthwhile, and that the experience gained in running the initial event made it far easier to organise subsequent ones. Some of the pilot schools are now going ahead with an expanded programme – for example, running a workshop for each tutor group in Year 7.

You will also want to build upon the success of your workshops by ensuring that they are not 'one-off' events. A good workshop can establish links with parents that can be built upon later – for example by setting occasional homework tasks (perhaps including games or discussion tasks) that pupils can share with their parents.

The National Strategies will continue to promote and support the establishment of effective parental links in mathematics. Our intention is to develop the website to include further advice and resources for schools, as well as information for parents, to enable them to provide informed support for their children's mathematical education.



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