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Foreword

Dear Colleague

Your work as subject leader and the support you give to teachers and other staff in your school are key factors in ensuring that the National Numeracy and Literacy Strategies become further embedded in effective classroom practice and in successful school management.

We believe that you should have access to high quality training to support you in this role. Funding has been provided in 2002 for all primary mathematics and literacy coordinators to participate in LEA-run coordinator conferences. The National Literacy Strategy and the National Numeracy Strategy have jointly produced materials designed to support these events.

You have a critical role in further raising standards of teaching and of children's attainment in mathematics and literacy. The purpose of these conferences is to support you and to help you do your job more effectively, whether you are highly experienced or very new to the role. In the Autumn terms of 2000 and 2001, there were conferences for headteachers on the next stages of the National Literacy Strategy and the National Numeracy Strategy respectively. We wish to sustain our focus on the leadership of the Strategies in schools with events designed to support coordinators in their crucial contribution to improvement.

One of the messages we included in the conferences for headteachers was the importance of supporting and working closely with mathematics and literacy coordinators. We are keen that the various activities and exercises in which you engage during this training, and in future events, are shared with your headteacher, and that you discuss and agree with them any action required to make further improvements in your school.

We should like to take this opportunity to thank all of you who are working so hard to assist teachers and support staff in raising standards and improving the quality of literacy and mathematics teaching for the children in your school.

Yours sincerely

Tim Coulson
National Director
National Numeracy Strategy

Stephen Anwyll
National Director
National Literacy Strategy

Coordinator handbook

Introduction

This handbook is designed to provide support as you lead and coordinate literacy and mathematics across the school. It is designed as a working document and will contain national materials, LEA guidance and your own papers. The handbook can supplement your existing materials and you may wish either to incorporate materials from this file into your own school documentation or adopt the format and structure of this handbook and add your own materials.

The structure, organisation of information and a number of key components of the handbook are common across literacy and mathematics. The handbook includes four elements:

- a self-evaluation grid;
- a coordinator planner;
- training materials;
- supporting information.

Detailed introductions for each of the elements are included in the handbook.

Getting to know the materials

The training and support that is provided to introduce the handbook begins with self-evaluation as a critical aspect of continuing professional development and includes sharing good practice, working with colleagues to identify and resolve shared challenges and the use of action planning to deliver identified objectives. The self-evaluation grid and national training materials have been designed to support your work in four key areas.

- 1 Establishing priorities, analysing results and reviewing progress
- 2 Continuing to improve the quality of teaching and learning
- 3 Management and deployment of resources
- 4 Professional development into practice

The four key areas provide a general framework for much of your role.

The table on the next page indicates how the training materials we have prepared from the NLS and NNS relate to the four key areas and outlines the range of materials available.

| Key area | | Mathematics modules | | Literacy modules | |
|----------|--|---------------------|---|------------------|---|
| 1 | Establishing priorities, analysing results and reviewing progress | 1a | Establishing priorities | 1a | Establishing priorities |
| | | 1b | Reviewing results, analysing data | 1b | Reviewing results, analysing data |
| 2 | Continuing to improve the quality of teaching and learning | 2a | Revisiting the plenary | 2a | Revisiting the plenary |
| | | 2b(i) | Planning for progression | 2b | Planning for progression |
| | | 2b(ii) | Developing the teaching of problem solving | | |
| 3 | Management and deployment of resources | | | 3a | Creating an effective learning environment |
| | | 3b | Managing the deployment of additional adults | 3b | Managing the deployment of additional adults |
| 4 | Professional development into practice | 4a | Planning for effective professional development | 4a | Planning for effective professional development |

Section 1: Self-evaluation grid

Rationale for the self-evaluation grid

The self-evaluation grid forms part of a professional development programme for literacy and mathematics coordinators. It is both a tool for personal and school reflection and self-evaluation, and a basis for future subject development. The grid is an intrinsic part of the specific training modules within the coordinator programme. Participants will have been asked to complete the grid prior to attending training.

The grid identifies four key areas of subject leadership and is closely aligned to the TTA published '**National Standards for Subject Leaders**' document (1998) and the '**Effective Leadership and Management**' self-evaluation form produced by the National College for School Leadership for the National Numeracy Strategy.

The principle of self-evaluation upon which the grid is based reflects the emphasis on self-evaluation and review embedded within and promoted by the Ofsted *Handbook for Inspecting Primary and Nursery Schools*, the NCSL approach to improving management and also other publications and research evidence related to effective school improvement processes.

The grid should be completed by both the literacy and mathematics coordinators, in partnership with the headteacher, before attending the first training module. This evaluation process will help the coordinators, supported by the headteacher, to share their perceptions of where they are on the continuum of development in the four identified key areas of leadership in their individual subjects.

The self-evaluation grid will also be available on the National College for School Leadership website (www.ncsl.org.uk).

What does the grid focus on?

The grid focuses on the identified four key areas of subject leadership:

- **Key area 1**
Establishing priorities, analysing results and reviewing progress
- **Key area 2**
Continuing to improve the quality of teaching and learning
- **Key area 3**
Management and deployment of resources
- **Key area 4**
Professional development into practice

Schools and LEAs may wish to add further areas to the grid as part of their development of school and subject self-evaluation, and according to specific local priorities.

How does the grid work?

Under each of the key areas, there are four columns which represent a continuum of development and effectiveness. Within each column there are written prompts which serve to provide a moderated illustration of the elements which will be present at each stage of development. By highlighting the relevant prompts, or parts of the prompts, across the grid, coordinators can identify their school's current strengths and areas for development.

The table below illustrates the stages of the continuum represented on the grid.

| | Focusing | Developing | Establishing | Enhancing |
|----------------------------|---|--|---|---|
| Key area identified | At this stage, the coordinator recognises that the school is at the beginning of a process. The coordinator identifies what is happening already but recognises that much remains to be done. | At the developing stage, the school has started to address some aspects of the key area, but there is a need for further development to secure and consolidate practice and process in identified aspects. | At this stage, there still remain some issues to address in terms of whole-school consistency and cohesion but many things are now in place and are becoming embedded. There has been significant development of the quality of provision and a real impact on standards. | At this stage, the identified aspects of the subject are embedded fully in whole-school approaches and practice. There is whole-school consistency and cohesive practice and the impact on standards and progress is evident. |

These prompts provide moderation to support self-evaluation.

It is important to recognise that whole-school development is not always a straightforward linear process – schools are changing communities and judgements about positions on the developmental continuum may change as a consequence of changing contexts. It is also important to stress that the purpose of this activity is to acknowledge not only what has been achieved but importantly also to provide a basis for future development, whatever prompts are highlighted at this stage. Planning for development from the current position is the key issue.

It is also important to acknowledge the different school contexts in which coordinators work. For example, some coordinators have regular release time to carry out their responsibilities; others have very limited time in which to carry out their coordinating role. In some schools there is a very close relationship between the senior management team and literacy/mathematics coordinators; in other schools, coordinators are more isolated and have less opportunity to impact on policy and whole-school development.

How do I use the grid?

A version of the self-evaluation grid is available to download on the CD-ROM that accompanies this handbook.

- Use the grid to support reflection on your school's current stages of development in each of the four key areas.
- Work with your coordinator colleague, and headteacher wherever possible, to share perceptions and analyse patterns of development across both literacy and mathematics in these key areas.
- Highlight those prompts, or parts of the prompts, which best reflect your perception of where your school is now in each of the four key areas.
- Discuss any obvious issues arising from this initial self-evaluation in terms of patterns of strength and areas for development in the two subjects in the light of your whole-school context.
- Bring the grid to the coordinator training to support you in reflection and action planning in order to consolidate your practice or move forward along the continuum of development.
- Following the coordinator training, coordinators and headteachers will find it helpful to reflect on appropriate priorities and key action points to secure further subject development within the context of whole-school improvement.
- From the self-evaluation process, it will be possible to see clearly the relative strengths and areas for development in the leadership and management of the two core subjects of English and mathematics and to decide on priorities for action in the context of whole-school as well as subject needs.
- It is expected that the self-evaluation grid should take no more than an hour to complete and discuss.

Generic prompts to support completion of the self-evaluation grid

- As an immediate, instinctive response, where do I place the school on this grid? Are we focusing, developing, establishing or enhancing?
- Which parts of the written prompts can I highlight with confidence?
- How do I know? What is my evidence base for highlighting the prompts?
- Are there areas I would prefer to underline at this stage and re-visit after further reflection and discussion?
- How far would other staff agree with my perceptions and evaluations?

Raising standards in literacy and mathematics

Self-evaluation to establish priorities

The purpose of the self-evaluation grid is to support coordinators in recognising the current stage of development and identifying key priorities for development across the school.

- **Key area 1: Establishing priorities, analysing results and reviewing progress**
- **Key area 2: Continuing to improve the quality of teaching and learning**
- **Key area 3: Management and deployment of resources**
- **Key area 4: Professional development into practice**

| | Focusing | Developing | Establishing | Enhancing |
|--|--|--|--|---|
| Key area 1: Establishing priorities, reviewing progress and analysing results | | | | |
| 1a Establishing priorities, action planning and review | An audit of literacy/mathematics provision, professional development needs and quantitative outcomes, in terms of standards and progress, has been carried out. As a result, key priorities for action have been identified. | Using the audit, an agreed action plan that addresses identified priorities and appropriate resources has been developed and is being implemented. | The impact of the action plan is monitored and evaluated. The plan is refined following the outcome of evaluation. | The school's priorities for improving literacy/mathematics are part of the whole-school improvement programme with clearly identified subject-specific priorities and systematic review and evaluation. |
| 1b Knowing about standards | Teachers assess children's work regularly and national/other tests are in place. There is access to relevant data on standards, e.g. baseline assessment, data on statutory and optional tests, ongoing teacher assessments and work samples. There is limited confidence in the use of this data. | There is a systematic structure for assessing children's work and progress. Data is starting to be used to inform judgements on standards across the school, noting patterns in children's achievement. | There is work across the school to moderate teacher assessments and to analyse data to inform teachers' planning, set targets and monitor progress in a comprehensive and systematic manner. | School assessment systems are rigorous and effective. There is close co-operation between the headteacher, staff and governors in using data to raise standards in literacy/mathematics. |
| 1c Target setting | There is as yet no systematic whole-school approach to the setting of numerical and curricular targets to track children's progress and raise standards in literacy/mathematics. | Teachers are supported in setting realistically challenging numerical targets for each year group. They are supported in tracking children's progress by setting curricular targets based on a clear identification of learning needs. | There is an effective process for setting and reviewing numerical and curricular targets in each year group. All teachers are able to use targets to track children's progress, inform their teaching and raise standards. | There is an effective, coherent and manageable whole-school system for setting and revising targets against children's progress. |

| | | | | |
|---|--|---|---|---|
| 1d Monitoring and evaluating the development of literacy/mathematics | A start has been made in monitoring and evaluating a range of aspects of subject responsibility. | There is a clear structure for monitoring and evaluating literacy/mathematics in order to identify key priorities for improving standards of teaching and learning. | The outcomes of the monitoring and evaluation of aspects of literacy/mathematics are used to inform future school improvement planning. | Monitoring and evaluating is embedded within the school improvement plan and is effective in celebrating success and identifying areas for further improvement. |
|---|--|---|---|---|

| Key area 2: Continuing to improve the quality of teaching and learning | | | | |
|--|---|---|--|--|
| | Focusing | Developing | Establishing | Enhancing |
| 2a Evaluating the quality of the teaching of literacy/mathematics and giving appropriate feedback | Classroom observations and/or scrutiny of children's work has raised awareness of: <ul style="list-style-type: none"> • the quality of teaching of literacy/mathematics across the school; • the strengths and weaknesses of teachers' subject knowledge. | There is a developing programme to monitor the quality of teaching of literacy/mathematics. Weaknesses in teaching are recognised and staff are given feedback. Actions to be taken are identified and incorporated into the literacy/mathematics action plan or school improvement plan. | Systems are in place for monitoring and evaluating the quality of teaching. This is impacting positively on classroom practice. Some areas of weakness in teaching remain but are being addressed through feedback and professional development. | There is systematic and structured evaluation of literacy/mathematics teaching across the school. The literacy hour and daily mathematics lesson are taught well. Weaknesses in subject knowledge, and teaching and learning are being addressed effectively. There is appropriate feedback, support and related training for all staff. |
| 2b Support for planning; monitoring the process; evaluating outcomes | Teachers' weekly plans are sampled. | Teachers are supported in their planning and given feedback to help them to moderate and amend as appropriate. | Medium- and short-term plans are reviewed and teachers are supported in ensuring plans match the expected levels of achievement of children. | Colleagues are supported in producing plans which are coherent, succinct and effective in addressing learning needs. Plans are evaluated in the light of learning outcomes. |

| | | | | |
|--|---|---|--|--|
| <p>2c Using ICT to support literacy/mathematics</p> | <p>Staff are aware of the need to incorporate ICT as an appropriate resource to support the teaching of literacy/mathematics.</p> | <p>Staff are aware of NLS/NNS training materials and a range of other ICT resources to support the teaching of literacy/mathematics. With the ICT coordinator, the professional development needs of teachers in the use of ICT to support teaching have been identified.</p> | <p>There is close collaboration with the ICT coordinator to support teachers in planning for the appropriate use of ICT in the teaching of literacy/mathematics and in monitoring and evaluating the use of ICT in a range of literacy/mathematics teaching.</p> | <p>ICT is being effectively integrated into teachers' planning for literacy/mathematics. Joint evaluations show that ICT is being used effectively in literacy/mathematics teaching.</p> |
|--|---|---|--|--|

| Key area 3: Management and deployment of resources | | Focusing | Developing | Establishing | Enhancing |
|---|---|---|---|--|---|
| 3a | Establishing an effective learning environment | <p>The importance of an effective environment to support the teaching and learning of literacy/mathematics in all classrooms is recognised.</p> | <p>Through classroom observations and an audit of resources, key areas for action have been identified in order to promote an effective environment which will support children's learning of literacy/mathematics.</p> | <p>A systematic plan is in place to support improvement of the environment in which children learn literacy/mathematics.</p> | <p>The school environment makes a key contribution to literacy/mathematics learning for all children.</p> |
| 3b | Deployment of additional adults | <p>The expertise and skills of additional adults are matched to identified needs for support in literacy and mathematics across the school.</p> | <p>Support systems are developing between additional adults and teachers for planning support and reviewing the progress of individuals/groups of children.</p> | <p>The impact of support by teachers and additional adults is evaluated against both quantitative and qualitative learning outcomes.</p> | <p>Monitoring of the impact of additional adult support shows that a difference is made to children's attainment and progress. There is a clear understanding between the teacher and additional adult of the learning needs of children.</p> |

| Key area 4: Professional development into practice | | | | |
|---|--|--|---|---|
| | Focusing | Developing | Establishing | Enhancing |
| 4a Identifying CPD (Continuing professional development) needs | Information about training is selected and staff are encouraged to attend relevant courses. | Staff are helped to be more selective about the type of professional development in which they participate and relate this closely to the literacy/mathematics action plan. | A CPD policy which relates to individual and school needs with clear links to the development of literacy/mathematics is in place. Most staff are committed to the policy and understand how it will impact on their own professional development. | The planned CPD programme supports school, LEA and national priorities and meets the needs of all staff. The impact of the CPD programme is monitored and evaluated systematically. |
| 4b Supporting colleagues | Resources to support colleagues in improving the teaching of literacy/mathematics are managed and organised. Individuals are supported on request to help them to improve the quality of the teaching of literacy/mathematics. | A planned programme of support is being developed in order to address whole-school and individual needs. This support programme includes trainee teachers and other additional adults. | There is a coherent support programme in place and all staff are involved in a review and evaluation of the professional development and support they have received. When appropriate the impact of professional development is evaluated through visits to classrooms and informal feedback. A planned programme of support has been devised, responding to whole-school and individual needs. | All staff are supported in developing high quality teaching and learning in literacy/mathematics. Evaluation of the support shows positive impact on teaching and learning. |

Section 2: Coordinator planner

Rationale for the coordinator planner

The coordinator planner forms part of the coordinator's handbook, which itself is part of a wider support programme for literacy and mathematics coordinators.

This document is designed to supplement existing school materials.

It is intended to help coordinators to identify key leadership and management tasks across a year and as such will support ongoing audit and action planning processes.

What does the planner focus on?

- The planner focuses on the key tasks which a coordinator will need to address over an academic year.
- It highlights the expected key activities across each half term and shows the ongoing monitoring and evaluation aspects of the coordinator role as a key area.

How does it work?

- The first exemplar gives a generic overview of the key coordinator tasks for the year.
- The second exemplar shows how an individual coordinator has completed the planner, with key tasks identified which meet the specific needs of the school.
- There is a blank planner pro forma on the CD-ROM which may be of use to you in planning your key actions across the year.

How do I use the planner?

- Use the planner to supplement the action plans you may already have produced as part of your coordinator role and to help you prioritise and plan for specific actions during each half term.
- Read the first section of the planner to identify the key coordinator tasks for the year.
- Compare these generic tasks with the priorities for your school and your role within the school.
- Use the exemplar planner as a guide as to how you might complete the planner to meet the needs of your school.
- Complete the planner and share with the headteacher and key colleagues to gain an overview of the main activities across other core subjects and key priorities in your school.
- Amend key activities as needed in the light of the whole-school improvement plan and following discussion with colleagues.

Coordinator Planner: MATHEMATICS Putting the audit and action plan into practice

The planner identifies the key tasks for raising standards over four terms

| Academic year/s: | Summer term | | Autumn term | | Spring term | | Summer term | |
|--|-------------|---|---|---|--|--|-------------|---|
| | April – May | June – July | Sept – Oct | Nov – Dec | Jan – mid-Feb | Mid-Feb – April | April – May | June – July |
| Auditing and action planning; setting priorities | | <p>Coordinate whole-school mini audit of mathematics.</p> <p>Identify key priorities – update mathematics action plan in the light of findings.</p> <p>Agree with headteacher CPD programme with coordinator support for coming academic year based on the mini audit.</p> | <p>Identify key priorities for mathematics development for, e.g. whole school; key stage; year group in revised audit and action plan.</p> <p>Share revised school action plan, to include CPD and coordinator support programme, at staff meeting.</p> | | <p>Mid-year review of action plan priorities. Adjust plan in the light of feedback from monitoring of teaching and learning.</p> | <p>Audit of mathematics resources to inform the whole-school budget-setting process.</p> | | <p>Coordinate whole-school mini audit of mathematics.</p> <p>Identify key priorities – update mathematics action plan in the light of findings.</p> <p>Agree with headteacher CPD programme with coordinator support for coming academic year based on the mini audit.</p> |
| Analysis of data and work scrutiny; curricular target setting | | <p>Analyse outcomes of end of KS1 and KS2 and optional tests.</p> <p>Ensure that teachers make assessments against key objectives and pass on to next year group. Collect copies to identify any specific curricular targets.</p> <p>Ensure all relevant assessment and test data have been passed on to class teachers and other relevant staff, e.g. the SENCO.</p> <p>Consider whole-school/year group curricular targets as a result of analysis and audit.</p> | <p>With headteacher, use school data and the Autumn Package to discuss standards and setting of numerical targets.</p> <p>Agree procedures for monitoring children's progress across the term/year.</p> <p>Ensure that teachers have identified curricular targets in key mathematical areas for each year group.</p> <p>Check these targets are reflected in medium- and short-term plans.</p> | <p>Ensure that children's progress is tracked on a termly basis against key objectives and other sources of reference, e.g. teacher assessments and scrutiny of work as appropriate.</p> <p>Discuss with teachers a review of year group curricular targets</p> | | | | <p>Analyse outcomes of end of KS1 and KS2 and optional tests.</p> <p>Ensure teachers make assessments against key objectives and pass on to next year group. Collect copies to identify any specific curricular targets.</p> <p>Ensure all relevant assessment and test data has been passed on to class teachers and other relevant staff, e.g. the SENCO.</p> <p>Consider whole-school/year group curricular targets as a result of analysis and audit.</p> |

| Academic year/s: | Summer term | | Autumn term | | Spring term | | Summer Term | |
|--|--|---|---|--|---|---|---|--|
| | April – May | June – July | Sept – Oct | Nov – Dec | Jan – mid-Feb | Mid-Feb – April | April – May | June – July |
| Whole-school planning | Ensure that medium-term plans are in place in all year groups. Support planning as needed. | With teachers undertake end-of-year evaluation of medium-term plans – to inform audit, action plan and curricular targets. Ensure annotated medium-term plans are passed to teacher in next year group to consider what has been taught and learned and what needs to be focused on next. | Ensure that medium-term plans are in place in all year groups. Support planning as needed and focus on specific year groups. | Encourage teachers to consider termly modification of medium-term plans. | Ensure that medium-term plans are in place in all year groups. Support planning as needed and focus on specific year group. | Encourage teachers to consider termly modification of medium-term plans. | Ensure that medium-term plans are in place in all year groups. Support planning as needed and focus on specific year group. | Ensure that teachers carry out end-of-year evaluation of medium-term plans – to inform audit and action plan targets. Ensure annotated medium-term plans are passed to teacher in next year group to consider what has been taught and learned and what needs to be focused on next. |
| Children identified for additional support | Review procedures for selection of children receiving additional support – discuss with, e.g. SENCO, EMAG staff. | Review impact of intervention programmes – check school improvement plan includes capacity to deliver intervention programmes during next academic year. | Coordinator supports headteacher in ensuring resources and capacity to deliver intervention programmes are in place. Organise training for teachers and/or teaching assistants as needed. | Ensure screening processes for additional support programmes are in place. | Review impact of additional support programmes. | With headteacher and class teachers/teaching assistants review progress of children receiving additional support. | Review procedures for selection of children receiving additional support – discuss with, e.g. SENCO, EMAG staff. | Review impact of intervention programmes – check school improvement plan includes capacity to deliver intervention programmes during next academic year. |
| Coordinator support and continued professional development programme; monitoring of teaching and learning | | Review impact of this year's support and CPD programme. | Agree with headteacher specific CPD programme and focus of support for the year, linked to mini audit. Agree monitoring programme with headteacher in accordance with the action plan. | | | | | Review impact of this year's support and CPD programme. |

Exemplar Coordinator Planner: MATHEMATICS Putting the audit and action plan into practice

The planner identifies the key tasks for raising standards over four terms

| Academic year/s: | Summer term | | Autumn term | | Spring term | | Summer term | |
|--|---|--|---|---|--|---|-------------|---|
| | April – May | June – July | Sept – Oct | Nov – Dec | Jan – mid-Feb | Mid-Feb – April | April – May | June – July |
| Auditing and action planning; setting priorities | | <p>Coordinate whole-school mini audit of mathematics.</p> <p>Identify key priorities – update mathematics action plan in the light of findings.</p> <p>Identify area for development – the plenary (whole-school focus).</p> <p>Agree with headteacher CPD programme with coordinator support for coming academic year based on the mini audit and other data.</p> | <p>Identify key priorities for mathematics development for, e.g. whole school; key stage; year group in revised audit and action plan.</p> <p>Share revised school action plan, to include CPD and coordinator support programme, at staff meeting.</p> | | <p>Mid-year review of action plan priorities. Adjust plan in the light of feedback from monitoring of teaching and learning and evaluation of CPD programme.</p> | <p>Audit of mathematics resources to inform the whole-school budget-setting process.</p> <p>Check that progress towards meeting curricular targets is not hampered by lack of affordable resources.</p> | | <p>Coordinate whole-school mini audit of mathematics.</p> <p>Identify key priorities – update mathematics action plan in the light of findings.</p> <p>Agree with headteacher CPD programme with coordinator support for coming academic year based on the mini audit and other data.</p> |
| Analysis of data and work scrutiny; curricular target setting | <p>Check teachers use the plenary to monitor progress in meeting curricular targets.</p> | <p>Analyse outcomes of KS1 and KS2 and optional tests.</p> <p>Teachers record assessments against key objectives and pass on to next year group. Collect copies to identify any specific curricular targets.</p> <p>Ensure all relevant assessment and test data have been passed on to class teachers and other relevant staff, e.g. the SENCO.</p> <p>Consider whole-school/year group curricular targets as a result of analysis and audit.</p> | <p>With headteacher, use school data and the Autumn Package for discussion of standards and setting of numerical targets.</p> <p>Agree procedures for monitoring children's progress across the term/year.</p> <p>Collate curricular targets in key mathematical areas for each year group.</p> <p>Check these targets are reflected in medium- and short-term plans.</p> | <p>Ensure that children's progress is tracked on a termly basis against key objectives and other sources of reference, e.g. teacher assessments and scrutiny of work as appropriate.</p> <p>In the first and last lesson within a unit of work the plenary will be used to assess children's knowledge and understanding.</p> <p>Discuss with teachers a review of year group curricular targets.</p> | | <p>In the first and last lesson within a unit of work the plenary will be used to assess children's knowledge and understanding.</p> | | <p>Analyse outcomes of end of KS1 and KS2 and optional tests.</p> <p>Ensure teachers make assessments against key objectives and collect together.</p> <p>Ensure all relevant assessment and test data has been passed on to class teachers and other relevant staff, e.g. the SENCO.</p> <p>Consider whole-school/year group curricular targets as a result of analysis and audit.</p> |

| Academic year/s: | Summer term | | Autumn term | | Spring term | | Summer term | |
|--|--|--|--|---|--|--|--|---|
| | April – May | June – July | Sept – Oct | Nov – Dec | Jan – mid-Feb | Mid-Feb – April | April – May | June – July |
| Whole-school planning | Check that medium-term plans are in place in all year groups. Support planning as needed. | With teachers undertake end-of-year evaluation of medium-term plans – to inform audit, action plan and curricular targets. | Check medium-term plans are in place in all year groups. Support planning as needed and focus on specific year group. All teachers to plan the plenary in more detail – assessment opportunities highlighted. Headteacher and coordinator to monitor short-term plans. | Encourage teachers to consider termly modification of medium-term plans. | Check medium-term plans are in place in all year groups. Support planning as needed and focus on specific year group. All teachers to plan the plenary in more detail – assessment opportunities highlighted. Headteacher and coordinator to monitor short-term plans. | Encourage teachers to consider termly modification of medium-term plans. | Check medium-term plans are in place in all year groups. Support planning as needed and focus on specific year group. Ensure annotated medium-term plans are passed to teacher in next year group to consider what has been taught and learned and what needs to be focused on next. | Ensure that teachers carry out end-of-year evaluation of medium-term plans – to inform audit, action plan and curricular targets. |
| Children identified for additional support | Review procedures for selection of children receiving additional support – discuss with, e.g. SENCO, EMAG staff. | Review impact of intervention programmes – check school improvement plan includes capacity to deliver intervention programmes during next academic year. | Coordinator supports headteacher in ensuring resources and capacity to deliver intervention programmes are in place. Organise training for teachers and/or teaching assistants as needed. | Ensure screening processes for additional support programmes are in place. Additional adults to observe/support identified children in the plenary to assess knowledge and understanding. | Assess impact of additional support programmes. Additional adults to observe/support identified children in the plenary to assess knowledge and understanding. | With headteacher and class teachers/TAs review progress of children receiving additional support. Additional adults to observe/support identified children in the plenary to assess knowledge and understanding. | Assess impact of intervention programmes – check school improvement plan includes capacity to deliver intervention programmes during next academic year. | |
| Coordinator support and continued professional development programme; monitoring of teaching and learning | | Review impact of this year's support and CPD programme. Each teacher observed teaching a plenary over the term. | Agree with headteacher specific CPD programme and focus of support for the year linked to mini audit. Staff meeting time agreed with headteacher, focusing on issues relating to the development of the plenary. Headteacher and coordinator observation of lessons to focus on the plenary. Agree monitoring programme with headteacher in accordance with the action plan. | | Planned INSET day – extending and developing the use of the plenary. Teachers feed back on progress to date. | Agreed coordinator 'in-class' support for NQT to develop the plenary (release time for coordinator agreed with headteacher). | Review impact of this year's support and CPD programme. Outcomes of monitoring relating to the plenary discussed at staff meeting. | |

Introduction to the training modules

Rationale for the training materials

The training modules provided in this handbook are designed to support your ongoing professional development. The table below provides an overview of the modules. Some modules have been prepared jointly by the National Literacy and Numeracy Strategies and include common material. Other modules have been designed to support coordinators in developing specific aspects of their respective subjects.

The materials are designed to supplement existing training and support materials that you have received from the LEA, the TTA and training you may have received from colleagues in the HEI sector or other providers.

What does the training focus on?

The training resources complement the structure and organisation of the self-evaluation grid and seven modules of training are provided to support your work in the four key areas.

| Key area | | Mathematics modules | | Literacy modules | |
|----------|--|---------------------|---|------------------|---|
| 1 | Establishing priorities, analysing results and reviewing progress | 1a | Establishing priorities | 1a | Establishing priorities |
| | | 1b | Reviewing results, analysing data | 1b | Reviewing results, analysing data |
| 2 | Continuing to improve the quality of teaching and learning | 2a | Revisiting the plenary | 2a | Revisiting the plenary |
| | | 2b(i) | Planning for progression | 2b | Planning for progression |
| | | 2b(ii) | Developing the teaching of problem solving | | |
| 3 | Management and deployment of resources | | | 3a | Creating an effective learning environment |
| | | 3b | Managing, the deployment of additional adults | 3b | Managing the deployment of additional adults |
| 4 | Professional development into practice | 4a | Planning for effective professional development | 4a | Planning for effective professional development |

How are the modules organised?

All modules follow a common format and structure. They are designed to build on the self-evaluation grid and support the identification of key points for action to be included in your coordinator planner.

The organisation of the modules into training days, sessions or stand-alone units will be decided by the LEA NLS and NNS line managers and consultants who have been briefed on the materials.

Key area
1 | **Establishing priorities,
analysing results and
reviewing progress**

Module 1a

Establishing priorities

90 minutes

Module OHTs and briefing notes

Objectives and overview

5 minutes

Objectives

OHT 1a.1

- To identify achievements to date and the role the coordinator has played in helping schools raise standards in literacy and mathematics
- To identify national priorities for raising standards in literacy and mathematics

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Literacy and mathematics coordinators

Notes:

National priorities

HMI reports on the NLS and NNS National picture

OHT 1a.2

NLS

- The Strategy continues to be the major influence on teaching, reading and writing in English primary schools.
- The quality of the teaching continues to improve although some weaknesses remain.
- Boys continue to do less well than girls at both key stages.
- The systematic and daily teaching of phonics is not secure and needs closer monitoring and attention.

The National Literacy and Numeracy Strategies

NNS

- The daily mathematics lesson is firmly established.
- Improvements in the quality of teaching have been consolidated although some weaknesses remain.
- Better use is being made of teaching assistants.
- Many headteachers continue to provide effective leadership, but in some schools they are not involved sufficiently in monitoring the quality of teaching or in supporting the mathematics coordinator.

Literacy and mathematics coordinators

Notes:

For coordinators in special schools and settings:

- NLS and NNS are firmly embedded in special schools.
- Good practice is becoming widespread and is beginning to raise standards.
- Pupil achievement has risen most in English and mathematics, reflecting schools' successful implementation of the NLS and NNS.
- Schools are continuing to refine the match of activities to pupils' needs, especially those of the least able.

Notes: _____

| Progress data KS1 – KS2 | | | | | | | OHT 1a.3 |
|----------------------------|----|------------------|-----|-----|----------------------|-----|----------|
| | | 2001 KS2 English | | | 2001 KS2 Mathematics | | |
| | | 3 | 4 | 5 | 3 | 4 | 5 |
| 1997 KS1 Av Level | 1 | 46% | 31% | 1% | 50% | 28% | 1% |
| | 2C | 27% | 63% | 8% | 34% | 56% | 7% |
| | 2B | 11% | 69% | 19% | 21% | 63% | 16% |
| | 2A | 2% | 52% | 45% | 6% | 57% | 36% |
| | 3 | 0% | 25% | 74% | 1% | 31% | 67% |

The National Literacy and Numeracy Strategies Literacy and mathematics coordinators

Notes: _____

The following are national priorities for the NNS and NLS:

| | |
|--|--|
| OHT 1a.4 | |
| National priorities | |
| NNS | NLS |
| <ul style="list-style-type: none"> • Improving planning and teaching • Springboard programmes • More able children • Strengthening teachers' subject knowledge • Building local capacity through support for LMTs | <ul style="list-style-type: none"> • Management and leadership in schools • Improving teaching further • Strengthening teachers' subject knowledge • Literacy support programmes |
| <i>The National Literacy and Numeracy Strategies</i> | Literacy and mathematics coordinators |

For coordinators in special schools and settings:

| | |
|---|--|
| NLS | NNS |
| Areas requiring further attention | Areas requiring further attention |
| <ul style="list-style-type: none"> • <i>The progressive teaching of phonics</i> • <i>The development of writing</i> | <ul style="list-style-type: none"> • <i>Effective teaching and learning strategies for the plenary session</i> • <i>The grouping of pupils</i> • <i>Providing appropriate levels of work, differentiated for the individual needs of pupils within those groups</i> • <i>Limited subject knowledge</i> |

Notes: _____

Part B(i) Course material (for mathematics coordinators)

More on NNS priorities

- In the mental and oral starter insufficient attention is given to identifying and developing children's mental calculation strategies.
- Insufficient attention is given to the teaching of problem solving.
- The plenary remains the weakest part of the lesson: links to assessment need to be strengthened.
- In too many classrooms expectations remain low.
- Planning needs to be focused more on the learning objectives with less reliance given to commercial schemes and worksheets.
- Teachers' subject knowledge needs to improve in key aspects of mathematics.
- Planning for progression from mental to written methods of calculation needs to be better understood.

Notes: _____

HMI reports on the NNS/NLS Management and leadership in schools

OHT 1a.5

NNS

- Many improvements but with important areas requiring further attention
- Monitoring teaching and learning
- Focus on accurate diagnosis of children's learning needs
- Management of intervention programmes
- Deployment of teaching assistants

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Literacy and mathematics coordinators

The role of the coordinator

Notes

- Knowing what is being taught and how well it is taught is important if coordinators are to support teachers in improving the quality of teaching and learning.
- A key factor in the further improvement of literacy and mathematics teaching is the effective use of assessment of children's progress.
- Springboard programmes are most effective when targeted at supporting those children who, with additional teaching, can catch up with their peers. Coordinators have an important role in the management of intervention programmes.
- Many teachers will require guidance from their coordinator on how they might make effective use of a teaching assistant during the literacy hour and the daily mathematics lesson.
- Headteachers have a crucial role to play in ensuring the NLS and NNS continue to raise standards. Coordinators have an important role to play in supporting headteachers in managing the Strategies.
- Identified gaps in teachers' subject knowledge should inform in-service sessions as part of the school's CPD programme.
- Working with the whole staff to agree on progression in key areas of literacy and mathematics helps teachers plan and strengthens the continuity in children's learning.

Notes: _____

Part B(ii) (for literacy coordinators)

Key questions for discussion on return to school

Questions for coordinators to consider:

- How might coordinators, in their schools, make effective use of the support being provided by the NNS/NLS?
- Do coordinators have any good models for the use of these materials that they can share with their colleagues?

Key points for action:

More on NLS priorities

- The plenary is still problematic for many teachers, with the link to lesson objectives and learning outcomes needing to be strengthened.
- In guided reading, the links to independent work and the development of comprehension strategies, need to be strengthened.
- The priority area remains the teaching of writing. The training materials (DEW and GFW) need to be more widely disseminated and used to support teaching.
- Too many teachers are not making explicit links between the daily word level activities and the process of reading and writing
- The pattern indicates that tasks are often not well matched to the needs of children.

OHT 1a.6 shows issues that have been raised about the leadership and management of the Strategy in schools.

HMI reports on the NNS/NLS Management and leadership in schools

OHT 1a.6

NLS

- Many improvements but with important areas requiring further attention
- The analysis and interpretation of numerical data to set curricular targets
- Monitoring teaching and learning
- Management of intervention programmes

The National Literacy and Numeracy Strategies

Literacy and mathematics coordinators

Notes: _____

Reviewing results, analysing data (mathematics)

75 minutes

Module OHTs and briefing notes

Introduction: Objectives and overview

| | |
|--|---------------------------------------|
| Objectives | OHT 1b.1 |
| <ul style="list-style-type: none">• To analyse the Autumn Package and schools' PANDA, and explore how they might be used effectively to set targets and raise standards• To help coordinators become more skilled in analysing performance data• To clarify the role of coordinators in supporting their schools with the analysis of performance data | |
| <i>The National Literacy and Numeracy Strategies</i> | Literacy and mathematics coordinators |

In this session, coordinators will be guided through some of the key documents available to support them in the analysis of data.

Knowing about standards

| | |
|---|---------------------------------------|
| Sources of data | OHT 1b.2 |
| <ul style="list-style-type: none">• Observation of pupils working• Pupils' written work• Half termly teacher assessments• Annual teacher assessments • Baseline assessment• NC statutory tests at the end of Year 2 and Year 6• QCA optional tests in Year 3, Year 4 and Year 5• Other annual tests, e.g. NFER • Autumn Package• PANDA | |
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Notes: _____

The session focuses on the information contained within the Autumn Package, and in particular the school PANDA.

Purposes of the Autumn Package:

The Autumn Package (of Pupil Performance Information):

- aims to support headteachers in reviewing their schools' performance by providing information that teachers and governors can use with the process of target-setting and school improvement;
- is based on a national summary of test results and teacher assessment, value-added information and different benchmarking tables;
- as well as a paper version, contains a CD-ROM incorporating electronic versions as well as an Interactive Autumn Package.

Autumn Package

OHT 1b.3

• **Introduction**

- Section 1: 2001 National Summary Results
- Section 2: National value-added information
Value-added lines and progress charts
- Section 3: National Benchmark Information
Prior attainment benchmark tables
Free school meal benchmark tables
- Section 4: Performance and Assessment Report (PANDA)
- Section 5: Ready reckoner
- Section 6: Useful contacts

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What is the Autumn Package for?

OHT 1b.4

- To provide a basis for performance comparisons and self-evaluation by looking at school and pupil results
- To increase understanding of performance issues within the school
- To assist schools in target setting
- To assist in discussions with individual pupils/teachers/parents

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Notes: _____

| An anonymous primary school | | | | | | | | | | OHT 1b.6 |
|--|-----|-----|-----------|-----|---------------------------------------|-----|-----------|----|----|----------------|
| Percentage of pupils achieving level 2 or above | | | | | | | | | | |
| | 95% | UQ | | 60% | | 40% | | LQ | 5% | Interpretation |
| Reading (tests/tasks) | 100 | 94 | | 90 | 90 | 84 | | 78 | 62 | C |
| Writing (tests) | 100 | 95 | | 92 | 86 | 86 | | 80 | 63 | C |
| Mathematics (tests) | 100 | 99 | | 96 | | 91 | 90 | 87 | 75 | D |
| Science (TA) | 100 | 100 | 97 | 95 | | 90 | | 85 | 68 | B |
| ...A*.....A.....B.....C.....D.....E.....E* | | | | | | | | | | |
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This type of table can be useful in helping schools to identify individual pupils or groups of pupils who made relatively good or relatively poor progress.

It is useful to consider progress of different groups such as boys, ethnic minorities, ability ranges, particular classes. It is also useful to compare progress in different subjects. Emphasise that it is important to try to identify why pupils have made better or worse progress than expected, and then identify any action that is needed.

Notes: _____

Using National Benchmark Information

How do we compare with similar schools?

Notes: _____

Coordinators' role in the analysis of performance data

This session helps to clarify the specific role coordinators have in supporting schools in the analysis of performance data.

The coordinator's role needs to focus on:

- **What is important in raising standards?**
Your role in supporting your school to analyse data using the Autumn Package is only one step in judging how well a school is doing. It does not tell you or the school what needs to improve.
- **What are the next steps?**
Following on from analysis – focus on specific areas of support relating to elements of the school's underachievement. Consider supporting the whole school with key actions, particularly in the setting of curricular targets.

Notes: _____

Key questions for discussion on return to school

Systematically analysing data can help schools to:

- set realistic but challenging school/group/individual targets, including interim targets;
- help teachers to identify what pupils need to be able to do in order to reach their curricular targets;

- identify groups of pupils or individuals who would benefit from intervention programmes such as Further Literacy Support or Springboard. This will help schools use their resources more effectively.

Key points for action:

Handout 1b.1

Coordinators' role in the analysis of data: Statement cards

| | |
|----------|---|
| A | Collect all pupil performance data for a school. |
| B | Analyse pupil performance data in school over time. |
| C | Use item analysis data in tests. |
| D | Analyse pupil performance data in relation to the Autumn Package. |
| E | Identify school in relation to benchmarking data. |
| F | Set curricular targets in mathematics. |
| G | Record progress of different groups of pupils (EAL, gifted and talented, Travellers ...). |
| H | Monitor the progress of pupils with SEN. |
| I | Set numerical targets in mathematics for the school. |
| J | Use measures to judge progress. |
| K | Collate and analyse Optional Test data. |
| L | Identify target groups for intervention programmes. |

Analysis of performance data

- Put a '1' to indicate who should in your opinion take the lead in each case.
- Put a '2' to indicate anyone who should be involved or consulted.

| | Statement | Coordinator | Headteacher | Key teacher | Class teacher | Consultant |
|---|---|-------------|-------------|-------------|---------------|------------|
| A | Coordinators should collect together all pupil performance data for a school. | | | | | |
| B | Coordinators should be aware of the pupil performance data in their school over time. | | | | | |
| C | Coordinators should help their intensive schools with item and error analysis data. | | | | | |
| D | Coordinators should understand where their school is in relation to benchmark schools. | | | | | |
| E | Coordinators should identify the school in relation to benchmarking. | | | | | |
| F | Coordinators should help individual teachers set curricular targets in mathematics. | | | | | |
| G | Coordinators should have a record showing the progress of different groups of pupils (EAL, gifted and talented, Travellers ...) in each of their classes. | | | | | |
| H | Coordinators should support teachers in exploring the progress of pupils with SEN. | | | | | |
| I | Coordinators should help the headteacher in setting numerical targets in mathematics for the school. | | | | | |
| J | Coordinators should help to judge whether the school is adding value. | | | | | |
| K | Coordinators should collate and analyse Optional Test data. | | | | | |
| L | Coordinators should identify target groups for intervention programmes. | | | | | |

- Discuss any principles that emerge about the allocation of responsibility.

Key area
2

**Continuing to improve
the quality of teaching
and learning**

Objectives for the module

Module OHTs and briefing notes

Returning to the self-evaluation grid

| | |
|---|---------------------------------------|
| Objectives | OHT 2a.1 |
| <ul style="list-style-type: none"> • To support coordinators in identifying the key features of effective plenary sessions • To make suggestions for how schools can improve the effectiveness of the plenary session | |
| <i>The National Literacy and Numeracy Strategies</i> | Literacy and mathematics coordinators |

Notes: _____

| | | |
|--|---|---------------------------------------|
| HMI reports on the NLS and NNS Teaching issues for schools | | OHT 2a.2 |
| NLS | NNS | |
| Areas requiring further attention | Areas requiring further attention | |
| <ul style="list-style-type: none"> • managing and developing the literacy hour • the teaching of wrong – in particular at the sentence level • the teaching of phonics and spelling • use of independent time and group work | <ul style="list-style-type: none"> • managing the main and plenary part of the lesson • making more effective use of teaching resources • the quality and consistency of children’s progress | |
| <i>The National Literacy and Numeracy Strategies</i> | | Literacy and mathematics coordinators |

Notes: _____

Features of effective plenary sessions

Option 1

Focus on the plenary – the literacy hour

| | |
|---|---|
| Objectives <ul style="list-style-type: none">• To identify the features of effective plenary sessions• To introduce a framework to support monitoring and evaluation of the plenary <p><i>The National Literacy and Numeracy Strategies</i></p> | OHT 2a. 3 Literacy and mathematics coordinators |
|---|---|

When planning plenaries teachers need to:

- take account of the plenary and provide a range of opportunities for children to review their learning, clarify their new understanding, discuss what they have been taught;
- identify questions that will help the children to consolidate and extend their literacy skills and recognise the progress they have made towards meeting the lesson’s objectives and any targets that have been set;
- build links between the plenary and other elements of the lesson.

Notes: _____

During the plenary, teachers need to:

- challenge children to justify and refine their ideas and findings;
- provide feedback which aims to clarify, refine and extend children’s thinking, reasoning and communication skills;
- assess the learning against the lesson objectives and log this information to inform future plans.

Notes: _____

After the plenary, teachers need to:

- review the success of the plenary and briefly record information gathered on particular children;
- use the information to inform future plans.

Notes: _____

Features of effective plenary sessions

Option 2

Focus on the plenary – the daily mathematics lesson

When planning plenaries teachers need to:

- take account of the plenary and provide a range of opportunities for children to review their learning, clarify their new understanding, discuss what they have been taught;
- identify questions that will help the children to consolidate and extend their mathematics skills and recognise the progress they have made towards meeting the lesson's objectives and any targets that have been set;
- build links between the plenary and other elements of the lesson.

Notes: _____

During the plenary, teachers need to:

- challenge children to justify and refine their ideas and findings;
- provide feedback which aims to clarify, refine and extend children's thinking, reasoning and communication skills;
- assess the learning against the lesson objectives and log this information to inform future plans.

Notes: _____

After the plenary, teachers need to:

- review the success of the plenary and briefly record information gathered on particular children;
- use the information to inform future plans.

Notes: _____

Planning for plenaries leaflet

Copies of the plenary leaflet were given out at the headteachers' conferences and many coordinators may already have seen the leaflet. The text from the planning plenaries leaflet can be located in this handbook.

Notes on the observation of the video sequence: _____

Key points for action

Note the following:

- effective plenaries have to be planned;
- questioning children is an important part of a plenary;
- probing questions assess what learning has taken place;
- the plenary is the opportunity to gather assessment information that will inform future planning.

Features of effective plenary sessions

Option 3

Focus on the plenary – highlights from the literacy and mathematics plenary sessions

It is important to remember that the prompts apply to a range of plenaries. There is no expectation that teachers planning and teaching should show all aspects in one plenary.

When planning plenaries, teachers need to:

- take account of the plenary and provide a range of opportunities for children to review their learning, clarify their new understanding, discuss what they have been taught;
- identify questions that will help the children to consolidate and extend their literacy and mathematics skills and recognise the progress they have made towards meeting the lesson's objectives and any targets that have been set;
- build links between the plenary and other elements of the lesson.

Notes:

During the plenary, teachers need to:

- challenge children to justify and refine their ideas and findings;
- provide feedback which aims to clarify, refine and extend children's thinking, reasoning and communication skills;
- assess the learning against the lesson objectives and log this information to inform future plans.

Notes:

After the plenary, teachers need to:

- review the success of the plenary and briefly record information gathered on particular children;
- use the information to inform future plans.

Notes: _____

Observation of the video sequence: _____

Key questions for discussion on return to school

- What is it that you feel you need to emphasise to your colleagues about what makes an effective plenary?
- What is it that you will ask their colleagues to do in order to improve their plenaries?
- What support could you give to their colleagues in planning better plenaries?

Key points for action: _____

Handout 2a.1

Features of effective plenary sessions

When planning plenaries teachers need to:

- take account of the plenary and provide a range of opportunities for children to review their learning, clarify their new understanding, and discuss what they have been taught;
- identify questions that will help the children to consolidate and extend their literacy and mathematics skills and recognise the progress they have made towards meeting the lesson's objectives and any targets that have been set;
- build links between the plenary and other elements of the lesson.

During the plenary, teachers need to:

- challenge children to justify and refine their ideas and findings;
- provide feedback which aims to clarify, refine and extend children's thinking, reasoning and communication skills;
- assess the learning against the lesson objectives and log this information to inform future plans.

After the plenary, teachers need to:

- review the success of the plenary and record briefly information gathered on particular children;
- use the information to inform future plans.

Handout 2a.2

Framework for monitoring and observing the plenary Generic questions/question stems

| Ways of thinking | Examples of question prompts |
|--|---|
| <p>Returning Returning to the learning in the literacy hour:</p> <ul style="list-style-type: none"> • recall • revisit • reflect • clarify | <ul style="list-style-type: none"> • What, when, where, who? related to – characters, settings, key events, time scale/sequence • Also questions related to – name/genre of text, features of text, layout/presentation • Basic recall/recasting of information |
| <p>Connecting Encouraging children to link the learning from this lesson to prior knowledge:</p> <ul style="list-style-type: none"> • highlight • classify and categorise • identify patterns • summarise | <ul style="list-style-type: none"> • From what you have read so far, can you predict...? • What are the features of...? • What are the similarities or differences...? • Can you summarise...? • Can you describe/identify... • What sort of order/sequence is used...? • How does this relate to...? • Can you group/sort/classify... • Do you know another time when you...? • Compare... with... • Can you distinguish between...? |
| <p>Generalising Building on previous learning to establish new conclusions and theories:</p> <ul style="list-style-type: none"> • conclude • codify • reason • justify | <ul style="list-style-type: none"> • If you were making a checklist for... what would you include? • Why did the author use...? • What do you now know about...? • What type of text/poem is this? • How do you know? • What generalisations can we make about when we use...? • How would you plan...? • How can you improve...? |
| <p>Accommodating Taking new learning and using it to test prior knowledge and new or unresolved questions:</p> <ul style="list-style-type: none"> • speculate • hypothesise • imply • apply | <ul style="list-style-type: none"> • If we apply our checklist to this text, what judgements could we make about... (structure/language features)...? • If we wanted to create a similar style or effect in our own writing. What would we need to include...? • How can we use what we have learned about ... when we write... in... (cross-curricular application)...? • What alternatives or alterations could you suggest? • What problems could you encounter as an author when writing...? • Does the text meet the intended audience and purpose? • How could you change the text form and language to suit a different audience? |

Handout 2a.3

Video observation

Focus on the plenary – the literacy hour

| | Comments |
|--|----------|
| <ul style="list-style-type: none">• Before the plenary <p>How did the teacher prepare the children for the plenary?</p> <p>How were the activities in the lesson structured and planned to support the plenary?</p> | |
| <ul style="list-style-type: none">• During the plenary <p>How did the plenary help the children secure their learning?</p> <p>What opportunities were there for the teacher to assess and monitor learning?</p> <p>How did the children demonstrate their new learning and understanding?</p> | |
| <ul style="list-style-type: none">• After the plenary <p>Following this plenary what are the implications for future planning?</p> <p>How could future plenary sessions be used to deepen the understanding developed in this lesson?</p> | |

Suggestions for improving the plenary part of the lesson

Handout 2a.4

| Aspects to consider when planning and teaching the plenary | Examples of these aspects observed in a plenary | Aspects that could feature more in future plenaries |
|---|---|---|
| <p>Making links</p> <ul style="list-style-type: none"> • To the objective/s for the lesson/s • To previous lessons • To future lessons/units of work • To position of lesson in overall unit • To other aspects of mathematics • To other subjects in the curriculum • To what will be taught next to give children a clear idea • To what has been completed at home • To other ways of recording • Between informal/formal methods of recording and presentation • To the next stage of refining methods | | |
| <p>Assessing</p> <ul style="list-style-type: none"> • Against key teaching and learning points • Key points and methods to remember; revise; practise • Key words, facts, ideas, notation • Consolidating knowledge and understanding • Clarifying children's developing knowledge and skills • Recognising and correcting errors and misconceptions • Checking and extending children's use of vocabulary • Learning against targets (individual or group) • Learning against key objectives • Formative assessment to inform planning • The role of additional adults | | |
| <p>Questioning</p> <ul style="list-style-type: none"> • Targeted • Prompting • Probing • Open • Challenging assumptions and conclusions • Prompting children to ask their own • Testing generalisations and hypotheses • Solutions and strategies • To address errors and misconceptions • To gauge children's responses: <ul style="list-style-type: none"> what they know what they have learned what they need to practise further | | |

It is important to note that not all aspects outlined above would be seen in any one plenary session.

Module 2b(i)

Planning for progression from mental to written methods of calculation

75 minutes

Module OHTs and briefing notes

Objectives and overview

Objectives

OHT 2b(i).1

- To assist coordinators in identifying the current needs of their school with regard to progression from mental to written methods of calculation
- To explore how the school audit and self-evaluation grid for mathematics might be used to inform the school development plan

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OHT 2b(i).2

- Feedback from their headteacher on the subtraction session from the headteachers' conference
- Issues arising from the current audit
- Issues raised by school, perhaps at joint planning meetings

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Notes: _____

Progression from mental to written methods in the context of subtraction

OHT 2b(i).3

- 1 $2.6 - 1.7$
- 2 $£16.00 - £9.49$
- 3 Find the difference between 970 and 436
- 4 $500.07 - 100.38$
- 5 Seema buys an item costing $£37.99$ and two items costing $£9.99$ each. She pays her bill with three $£20$ notes. How much change will she get?

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Notes: _____

OHT 2b(i).4

- How familiar the range of strategies is to teachers in their school
- To what extent they consider that the progression from mental to written methods is fully understood in their school
- Whether the school is consistent on:
 - when children should apply mental methods
 - the use of informal jottings
 - which expanded methods are used
 - vertical layout
 - the use of a calculator

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Notes: _____

OHT 2b(i).5

- What are helpful models to give children when teaching subtraction?
- What are the essential prerequisites, knowledge and skills children need if they are to use written methods of calculation with confidence?

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Notes: _____

Key questions for discussion on return to school

- Has the school a coherent policy on progression from mental to written methods of calculation and are all staff, including teaching assistants, aware of it?
- What opportunities exist for all staff to develop and evaluate existing policies on calculating strategies?
- Does the school have a policy on the use of calculators as a teaching aid and as a calculating aid? How is this integrated into planning?
- What time can be devoted to allow the coordinator to lead any mathematics INSET or in-class support for teachers on securing coherence of progression?
- Are all staff clear about the importance of encouraging children to use calculating strategies, deciding whether a mental method, written method or calculator method is the most appropriate?
- How do National Numeracy Strategy and local training programmes support and meet the school and individual teacher needs?
- How and when can training be disseminated?
- How might the planned outcomes and identified priorities best be incorporated within the whole-school development plan?

Key points for action:

Subject management

- Has the school a coherent policy on progression from mental to written methods of calculation and are all staff, including teaching assistants, aware of it?
- What opportunities exist for all staff to develop and evaluate existing policies on calculating strategies?
- Does the school have a policy on the use of calculators as a teaching aid and as a calculating aid? How is this integrated into planning?
- What time can be devoted to allow the coordinator to lead any mathematics INSET or in-class support for teachers on securing coherence of progression?
- Are all staff clear about the importance of encouraging children to use efficient calculating strategies, deciding whether a mental method, written method or calculator method is the most appropriate?
- How do National Numeracy Strategy and local training programmes support and meet the schools' and individual teachers' needs?
- How and when can training be disseminated?
- How might the planned outcomes and identified priorities best be incorporated within the whole-school development plan?

Developing the teaching of problem solving

75 minutes

Module OHTs and briefing notes

Introduction: Objectives and overview

Objectives

OHT 2b(ii).1

- To identify the nature of problems and the key skills required to solve them
- To explore the particular problem-solving strategies of sorting, listing, analysis and reasoning
- To consider how the teaching of problem-solving strategies can be improved throughout Key Stages 1 and 2

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The session will:

- explore different types of 'mathematical problems' that children are engaged in at Key Stages 1 and 2;
- show how these skills can be taught and discuss the implications for improving the teaching of problem-solving skills;
- consider some problems to examine differences and similarities between them in order to exemplify some key problem-solving skills.

There will also be some demonstration of how ICT can support the development of children's problem-solving skills.

The particular problem-solving skills to be considered in this session will be sorting, listing, analysis and reasoning.

Exploring problems to identify key problem-solving skills

OHT 2b(ii).2

Problem 1

'John has 30 marbles. He divides them equally into 5 bags. How many marbles are there in 3 of John's bags?'

Problem 2

'If the full-time score in a hockey match is 3–4, how many different half-time scores could there be?'

Problem 3

'A goldfish costs £1.80 and an angel fish costs £1.40. Nasreen paid £20 for some fish. How many of each fish did she buy?'

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Notes:

Problem 1: _____

Helping children to solve problems **OHT 2b(ii).3**

A. What do we have to find out?
Read the question and have a quick go at solving it.

B. What do we know now?
What have we found out? What mathematics will we use?

C. What else can we find out from the information in the problem?
Is there anything we have missed?

D. What will we do next?
Which of these might help?
*Drawing pictures
Using equipment
Making lists and tables
Trial and improvement*

E. Is our chosen method helping?
Do we need to rethink our strategy?

F. Have we got an answer?
Have we thought of all the possibilities? Are we sure?

G. We have an answer – is it reasonable?
How do we know?

H. Have we solved the problem?

The National Literacy and Numeracy Strategies Literacy and mathematics coordinators

Notes:

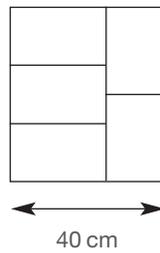
Problem 2: _____

Notes:

Problem 3: _____

Problem 4

OHT 2b(ii).4



The diagram shows 5 congruent rectangles joined together to make a large rectangle. If the length of one of the sides of the large rectangle is 40 cm, what are the dimensions of the small rectangles?

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Notes:

Problem 4: _____

Year 6 lesson – PowerPoint presentation

The children are asked to record as many half-time scores as they can think of. The teacher then asks the children to sort their half-time scores; they can sort them into as many or as few groups as they wish.

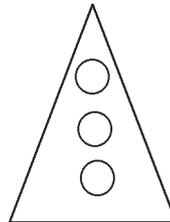
- Slide 1 describes the problem.
- Slide 2 shows 17 out of the possible 20 half-time scores.
- Slide 3 shows how the 17 half-time scores have been sorted.
- Slides 4 & 5 show how this sort can be analysed to find the missing half-time scores.

- Slide 6 shows the full set of 20 half-time scores.
- Slides 7 & 8 show two different types of sort: all possibilities are included.
- Slide 9 shows a different sort, which, when animated, shows the additional half-time scores for a full-time score of 4-4.
- Slides 10 & 11 show how the sort on Slide 9 can be analysed to work towards a general solution.
- Slide 12 (animated) shows how to use the sort to obtain the half-time scores.
- Slide 13 shows the final set of half-time scores, as on Slide 9.
- Slide 14 (animated) shows the general solution.

Notes:

Year 3 lesson – PowerPoint presentation

The problem



Here is a clown's hat. It has three pom-poms on the front and each pom-pom can be one of three colours, red, blue or green. How many different clown's hats can be made?

Explain that:

- Slide 15 describes the problem.
- Slide 16 shows 19 out of the possible 27 clowns hats.
- Slide 17 shows how the 19 clowns hats have been sorted according to the top pom-pom.
- Slide 18 shows the partial set of blue tops.
- Slide 19 shows how the set of blue tops can be sorted to find the missing hats.

Slides 20 & 21 show some other sorts as shown in the table below. (Note that the sorts do not show all 21 possibilities.)

Notes:

| | | OHT 2b(ii).5 |
|------------------------|--------------------------|--------------|
| Goldfish at £1.80 each | Angel fish at £1.40 each | |
| £1.80 | £1.40 | |
| £3.60 | £2.80 | |
| £5.40 | £4.20 | |
| £7.20 | £5.60 | |
| £9.00 | £7.00 | |
| £10.80 | £8.40 | |
| £12.60 | £9.80 | |
| £14.40 | £11.20 | |
| £16.20 | £12.60 | |
| £18.00 | £14.00 | |
| £19.80 | £15.40 | |
| | £16.80 | |
| | £18.20 | |
| | £19.60 | |

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Notes:

Key questions for discussion on return to school

- Children need to be taught the skills of problem solving.
- They need to be guided systematically through word/story type problems to be able to select the correct operation and the sequencing of operations for multi-step problems.

- A key skill in many problems is the ability to sort, classify and list, and therefore children should be given the opportunity to practise and develop these skills.
- The skill of analysis and reasoning often builds on sorting and the use of key questions to analyse information is an essential part of teaching.

Key points for action:

Half-time scores

$0-1$

$2-1$

$0-2$

$3-2$

$1-0$

$1-1$

$2-2$

$3-4$

$2-4$

$2-0$

$1-3$

$0-0$

$3-1$

$3-3$

$1-4$

$2-3$

$3-0$

Handout 2b(ii).2

Page 1 of 2

| Planning sheet | | Unit 7 | Day 1 | Term – Summer | Year 6 |
|---|---|--|---|--|---|
| Oral and Mental | | Main Teaching | | | |
| Objectives and vocabulary | Teaching activities | Objectives and vocabulary | Teaching activities | | Teaching activities/ Focus questions |
| <p>Use tests of divisibility and short division to find factors of 5-digit numbers.</p> <p>Resources White boards</p> <p>Vocabulary factor divisibility prime</p> | <p>• On the board write: 12330. Q: What numbers are factors of 12330? Establish that children can use the tests of divisibility for 2, 3, 5 and 10. Write these factors on the board.</p> <p>Q: Is 30 a factor of 12330? Agree that it is, as 3 and 10 are factors. Add 30 to list on the board.</p> <p>Q: Is 50 a factor of 12330? Agree that while 5 and 10 are factors, 50 is not a factor.</p> <p>Q: How can we find other factors of 12330? Collect responses and add any confirmed factors to list on the board. Discuss children's methods. Ask children to divide 12330 by 30, and show their methods and solutions on their white boards. Establish that the answer is 411 and add it to the list on the board.</p> <p>Q: What factors does 411 have? Agree that 3 is a factor and $411 = 3 \times 137$. Add 137 to the list.</p> <p>Q: What are the factors of 137? Encourage children to check with division.</p> | <p>Identify and use appropriate operations to solve problems involving numbers.</p> <p>Explain methods and reasoning.</p> <p>Resources Rectangular cards or paper PowerPoint Slides 1 to 13</p> | <p>• Ask the class: Q: If the final score in a hockey match is 3–4, how many different half-time scores could there be?' Children work in pairs to write down possible half-time scores on small rectangular pieces of card or paper. Ask the children to sort out all the half-time scores that are draws.</p> <p>Q: How many different half-time scores can be draws? Establish that there can be 4 draws. Tell them to label this group 'Draws'.</p> <p>• Ask the children to sort their remaining cards into groups and give each group a name. They can have as many or as few groups as they wish. Invite a pair of children to explain one of their groups and to say how many there are in the group. Ask the class:</p> <p>Q: How do we know we have all the half-time scores for this group? Get the children to find half-time scores from their sets that fall in this group and identify any missing scores for the group. Repeat this for different groups presented by pairs of children.</p> <p>• Explain that you are now going to show them how some half-time scores have been sorted. Show Slides 1 and 2 of the PowerPoint presentation to remind the children of the problem and to show a number of half-time scores. Show Slide 3. Establish that the children understand the grouping by asking them to show a half-time score and say which group it falls into. Animate Slide 3 and point out that some of the scores are missing.</p> <p>Q: Which half-time scores are missing? Discuss children's suggestions and reasons. Animate Slides 4 and 5 to demonstrate how this sort can be used to find missing half-time scores. Show Slide 6 to demonstrate the full set of half-time scores.</p> <p>Q: Can we confirm that for a full-time score of 3-4 there are only 20 possible half-time scores? Discuss children's responses and establish that we need to be sure that when we sort, our groupings will include all possibilities. Demonstrate this by showing how the half-time scores for this problem have been sorted in different ways.</p> | <p>Return to the 20 half-time scores the children grouped for the full-time score 3-4 by showing Slide 12.</p> <p>Q: How can we use our cards to find the number of half-time scores for a final score of 2-4? Collect responses and establish that the number of half-time scores can be represented in a rectangular pattern. Animate Slide 12 to confirm that the number of half-time scores is 15. Show Slide 13 and repeat for other full-time scores on the grid.</p> <p>Q: Can you see any pattern and identify a rule for the number of half-time scores for given full-time scores? Encourage children to explain their generalisations by using full-time scores greater than the ones on Slide 13. Finish the lesson by showing Slide 14 to establish the general rule: if the full-time score is n-m, the number of possible half-time scores is $(n+1)(m+1)$.</p> | |

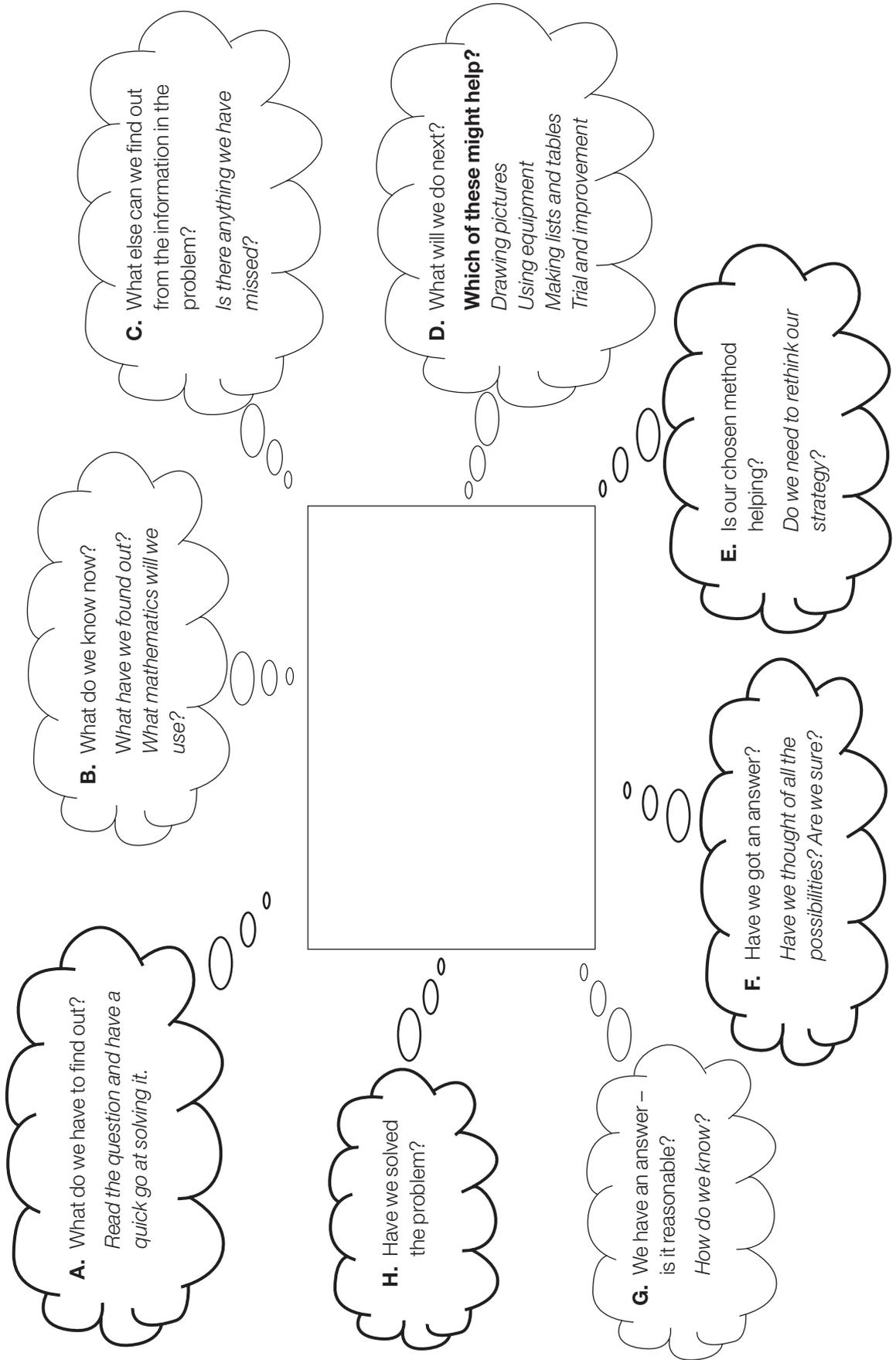
Handout 2b(ii).2

Page 2 of 2

| Planning sheet | | Unit 7 | Day 1 | Term – Summer | Year 6 |
|--|--|---------------------------|---------------------|---|---------|
| Oral and Mental | | Main Teaching | | | Plenary |
| Objectives and vocabulary | Teaching activities | Objectives and vocabulary | Teaching activities | Teaching activities/ Focus questions | |
| <p>Establish that only numbers to 11 need be tested as 11×11 is 121 and $12 \times 12 = 144$. 137 is odd so only odd numbers need be tested. 3 and 5 are not factors so only 7 and 11 need be used and they are not factors.</p> <p>Q: What type of number is 137? Agree that it is a prime number. Return to the list of factors.</p> <p>Q: Have we got all the factors of 12330? Establish that there are others but we can get all these from the key factors: 2, 3, 5, 137.</p> <p>Add other factors to the list using these numbers, e.g. 9, 15, 45, 274.</p> <p>Repeat with other 5-digit numbers such as 12660, 19320.</p> | <p>Animate Slides 7 and 8 and establish that the headings for each sort will include all possibilities</p> <p>Q: How have the half-time scores been sorted? Discuss the different sorts. Confirm that the total number of half-time scores for each of the sorts is 20.</p> <p>Ask the children to sort their half-time scores using any of the 3 sorts demonstrated and use the patterns in the sort to identify any missing half-time scores. Ensure that they have got all 20 half-time scores.</p> <ul style="list-style-type: none"> Show Slide 9 and ask the children to sort their cards in the same way. <p>Q: How have the half-time scores been sorted? Discuss the patterns in the sort and the way in which the cards have been sorted.</p> <p>Q: How many more half-time scores could there be if the final score was 4-4? Establish that there would be another 5 half-time scores. Demonstrate this by animating Slide 9.</p> <p>Q: What do you notice about the pattern now? Establish that the pattern is square and the diagonal contains all the half-time draws.</p> <p>Q: How many half-time scores could there be if the full-time score was 4-4? Establish that there are 25 possible half-time scores.</p> <p>Q: How many half-time scores could there be if the final score was 3-3 or 2-2? Animate Slides 10 and 11 and point out that the half-time scores in each case are square numbers.</p> <p>Q: How many half-time scores could there be if the full-time score was 9-9? Take responses and establish that this is the square number 100.</p> | | | | |

Helping to solve problems

OHT 2b(ii)-3



Goldfish at £1.80 each**£1.80****£3.60****£5.40****£7.20****£9.00****£10.80****£12.60****£14.40****£16.20****£18.00****£19.80****Angel fish at £1.40 each****£1.40****£2.80****£4.20****£5.60****£7.00****£8.40****£9.80****£11.20****£12.60****£14.00****£15.40****£16.80****£18.20****£19.60**

Key area
3

**Management and
deployment of resources**

Working with additional adults

75 minutes

Module OHTs and briefing notes

Introduction: Objectives and overview

Objectives

OHT 3b.1

- To consider the effective deployment of additional adults to meet the teaching and learning needs of all children
- To consider the professional training needs of additional adults to ensure appropriate support for children in the daily mathematics lesson

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By 'additional adults' we mean teaching assistants, together with additional adults who support the teacher during the daily mathematics lessons and Springboard sessions.

Self-evaluation grid

OHT 3b.2

- Where did you locate yourself on the self-evaluation grid?
- What evidence do you have for this judgement?
- What do you think your future priorities are?

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Question

What is the most effective way for an additional adult to support a teacher in the daily mathematics lesson?

Supporting teachers in working effectively with teaching assistants

In your role of coordinator, it will be important to plan in-service training for colleagues on effective ways of working with teaching assistants during the daily mathematics lessons.

Notes: _____

An exemplar of a recording sheet is provided, which coordinators might find useful to discuss with teachers as a means of sharing information with additional adults, and as a vehicle for additional adults to record their observations.

Notes: _____

It is important that the recording sheet should not be seen as an alternative to discussions teachers might have with support staff.

| | |
|--|---------------------------------------|
| Self-evaluation grid | OHT 3b.2 |
| <ul style="list-style-type: none">• Where did you locate yourself on the self-evaluation grid?• What evidence do you have for this judgement?• What do you think your future priorities are? | |
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Notes: _____

Additional adults supporting intervention programmes

| | |
|--|---------------------------------------|
| | OHT 3b.3 |
| To equip additional adults to provide good support in Springboard programmes: | |
| <ul style="list-style-type: none">• What training could be provided?• What are the key messages you need to give? | |
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Notes: _____

The importance of questioning in mathematics

Information which can be drawn to the attention of additional adults includes: The *Framework for teaching mathematics: Reception to Year 6*, pp. 24–25; The National Numeracy Strategy *Mathematical Vocabulary* booklet Ref. DfES 0313/2000, pp. 4–6.

Notes: _____

Key questions for discussion on return to school

OHT 3b.4

- What do you want additional adults to do to support the teaching of mathematics in your school?
- What is it that your additional adults could do, or do better, to support the teaching of mathematics?
- What could you do to ensure that the support that additional adults provide in your school is effective and helps the teachers raise standards?

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The key role of additional adults is to help children learn mathematics and raise standards in the school.

A key need of additional adults is likely to involve subject knowledge and the approaches to teaching mathematics that are embedded in the Strategy, e.g. illustrating, exemplifying, demonstrating, modelling, etc.

A priority for your school might be to work through the key objectives from the *Framework*, covering both the subject knowledge and the pedagogy.

Key points for action:

Working with additional adults

Points to consider when discussing with colleagues working with additional adults

- How is planning, including the objectives, key vocabulary and the expected outcomes of lessons shared with additional adults?
- What kind of support and guidance is given to additional adults?
- What are additional adults asked to do to support the teaching in each part of the daily mathematics lesson?
- What should be discussed with additional adults before and after a daily mathematics lesson?
- How do you ensure additional adults have a good understanding of the mathematics involved in the lesson?
- How do you ensure that additional adults focus their observations and support on targeted children, and assist in monitoring their progress?
- How do you ensure that additional adults record their observations on the children they support and on the progress these children make?
- What advice do you give on how additional adults should question children in order to further thinking and help children to solve problems for themselves?
- How do you ensure a clear steer is given to additional adults on the importance of children developing their oral and written mathematical skills?

Teacher and additional adult planning sheet

| | |
|--|--------------------------|
| For completion by the teacher | |
| Teacher: | Additional adult: |
| Unit of work: | |
| Teaching points: (reference to objectives in the <i>Framework</i>) | |
| Targeted children: | |
| Key vocabulary: (to model and encourage children to use) | |
| Key learning points for the unit of work: | |
| 1 | |
| 2 | |
| 3 | |

| For completion by additional adult | | | | |
|------------------------------------|----------|-----------------------|-----------------------|--|
| Targeted children | Comments | | | |
| | Can do | Can do with some help | Limited understanding | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Asking open and closed questions

| Purpose | Closed question | Open question |
|---|------------------------|---|
| Monitoring children's recall of multiplication facts | What is 3×4 ? | I multiply a number by 3 and the answer is an even number. What could my number be? |

Key area
4 | Professional development
into practice

Module 4a

Planning for effective professional development

75 minutes

Module OHTs and briefing notes

Objective for the module

This module is about teachers' ongoing professional development. The focus is upon the fourth strand of the self-evaluation grid, 'Professional development into practice.'

Objective

To explore ways coordinators can plan, manage and deliver CPD to:

- create a climate
- identify needs
- support colleagues

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OHT 4a.1

Notes:

Self-evaluation grid

- Where did you locate yourself on the grid?
- What evidence do you have for this judgement?
- What are your emerging priorities for further development?

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OHT 4a.2

Notes:

National priorities for CPD

OHT 4a.3

- To develop a whole-school learning community to sustain improving standards
- To establish a planned, coherent CPD programme which is responsive to individual, school, LEA and national priorities
- To develop a programme that leads to improvements in standards
- To establish mechanisms for monitoring and evaluating the implementation of the CPD programme which inform future development

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Notes: _____

Introduction to activity

When planning effective CPD consider the following strategies.

Strategies for planning effective school INSET:

OHT 4a.4

- Responding
- Appraising
- Supporting
- Demonstrating
- Challenging
- Extending
- Resourcing
- Negotiating

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Notes: _____

Notes:

- **Responding** to teachers' own emerging priorities
- **Appraising** previous INSET and its effect on improving the quality of teaching and learning
- **Supporting** colleagues in aspects of the teaching of mathematics and literacy that staff have found particularly challenging
- **Demonstrating** pedagogy – particular aspects of the lesson

- **Challenging** assumptions in teaching, for example, informal methods of calculation or the place of phonics teaching
- **Extending** teachers' subject knowledge
- **Resourcing** the teaching of a particular area of mathematics or literacy, for example, providing guidance on how to make best use of a set of OHTs to teach children how to read different scales correctly in mathematics
- **Negotiating** a whole-school approach, for example, to the teaching of subtraction, or how teachers mark children's writing
- **Evaluating** the impact of professional development

Notes: _____

| | |
|--|-----------------|
| <p>Points for action</p> <ul style="list-style-type: none"> • Reflect on your pre-course judgements – amend as appropriate. • Confirm your priorities. • Identify two things that you would want to implement to develop CPD in your school. <p><i>The National Literacy and Numeracy Strategies</i></p> | OHT 4a.5 |
| Literacy and mathematics coordinators | |

Key points for action: _____

Literacy scenarios

Literacy scenario 1: Improving teachers' subject knowledge

Focus: Reading: analysis of text to support teaching and learning

In terms of learning outcomes across the school, the coordinator has analysed ongoing teachers' assessments of reading and results of optional and national tests. This analysis shows that generally children underachieve on questions which require responses at inferential and evaluative levels. At Key Stage 2, responses to questions which require an understanding of authorial intent are particularly weak.

Scrutiny of planning, observation of lessons, classroom displays and an overview of resources suggests that there is an issue with teachers' knowledge and selection of texts and their understanding of authors' techniques.

There are pockets of good practice across the school but practice overall is inconsistent.

The coordinator and SMT have decided to address this issue as a major focus of their CPD programme this year. As part of this programme, there will be a half day of professional development involving all staff.

Outcomes

All teachers have been supported in their selection and use of appropriate texts and have developed a greater understanding of how texts work and how the teacher's text choices influence learning.

Literacy scenario 2: Using assessment data to inform future planning

Focus: Using data to inform curricular targets for future learning

Currently teachers have a wealth of data available but there is little use of that data to inform planning and teaching. The head and coordinator are keen to introduce the idea of curricular targets to support whole-school planning and progression and to ensure that teaching is targeted to learning needs.

Outcomes

Teachers understand and are able to set appropriate curricular targets for their children. They are clear about how they can make the most effective use of the target setting process to set curricular targets, plan teaching, monitor children's progress and identify future learning needs.

Literacy scenario 3: Improving the quality of teaching

Focus: Teaching in the plenary

There has been a systematic programme of classroom observation and scrutiny of work across the school. Evidence suggests that the quality of teaching during the plenary is an aspect of the Literacy Hour that needs improving in most classrooms.

This finding mirrors national evaluations of the National Literacy Strategy by HMI and Ofsted.

In discussion with the coordinator, teachers express a lack of understanding of the purpose of and rationale for the plenary. They also express concerns about the management, organisation and outcomes of this part of the lesson.

Outcomes

Teachers understand the purpose of, and rationale for, the plenary. They understand the range of teaching strategies that can be employed and the learning skills being developed. They feel supported in addressing the management and organisational aspects of the plenary.

Mathematics scenarios

Mathematics scenario 1: Improving subject knowledge and the quality of teaching and learning

Focus: Shape and space

Following a series of lesson observations the coordinator has identified some teachers who are less confident in teaching shape and space. Properties of shapes and the correct use of mathematical vocabulary are particular aspects where teachers need support.

The coordinator and teacher have decided to address this issue as a major focus of their CPD programme this year. As part of this programme, there will be a half day of professional development involving all staff.

Outcomes

Share a clear understanding of the expectations and progression in shape and space linked to the *Framework*. Teachers have a better understanding of the properties of shape and associated vocabulary. Observations of mathematics lessons indicate a clearer purpose and variety when teachers are teaching shape and space.

Mathematics scenario 2: Using assessment data to inform future planning

Focus: Assess and review days

Teachers throughout the school are following the medium-term plans from the *Framework*. During the assess and review days the coordinator notes that they simply carry on with work from the previous week. At a recent staff meeting teachers said that they were unsure of how they should plan for the assess and review days and what assessment information they should use, collect and record.

Outcomes

Teachers are clear about how they can make most effective use of the assess and review days and how they can be used to assess children's learning and identify what needs to be taught next. Observations of mathematics lessons indicate a clearer purpose and variety in assess and review lessons.

Mathematics scenario 3: Improving the quality of teaching

Focus: Teaching in the plenary part of the lesson

There has been a systematic programme of classroom observation and scrutiny of work and evidence suggests that the quality of teaching during the plenary is an aspect of the mathematics lessons which need improving across the school.

This mirrors national evaluation of the Numeracy Strategy by HMI and Ofsted.

In discussion with the coordinator, teachers express a lack of understanding of the purpose and focus of the plenary. They also express concerns about planning, management, organisation and outcomes of this part of the lesson.

Outcomes

Teachers are clear about the purpose of the plenary and its value in providing an opportunity to assess pupils' progress and identify what needs to be taught next. They recognise the need to plan the plenary and ask children key questions that relate to the objectives for the lesson. Observations of mathematics lessons indicate a clearer purpose and variety in the plenary part of the lesson.

Mathematics scenario 4: Improving teachers' subject knowledge

Focus: Methods of calculations

The coordinator has focused this term on the teaching of the progression from mental to written calculations.

Handout 4a.2 *cont*

She has noted that in Years 3 and 4 teachers are moving children too quickly to more formal methods of calculation. Overall there is not a clear view of progression from mental to written methods of calculation, particularly in subtraction and division. At a recent staff meeting some teachers said that they thought children were being moved on too quickly to decomposition as a written method of subtraction and many children had little understanding of the formal methods they had been taught.

The headteacher, having attended a national headteachers' conference on mathematics, has asked the coordinator to check that there is clear progression throughout the school in the teaching of the progression from mental to written calculations and the ways in which children apply these strategies.

Outcomes

Teachers have a clear understanding of the progression from mental to written calculations and the implications for what needs to be taught at each stage. Children display a clear understanding of the written methods of calculation that they have been taught. Throughout the school children can select and use an efficient method they have been taught when carrying out a calculation. Observations of mathematics lessons indicate that there is a clear progression in the teaching from mental to written methods of calculation and children can apply what they have been taught.

Mathematics Scenario 5: Improving the quality of teaching

Focus: Developing AT1 in mathematics

The coordinator has seen little planning for AT1 in mathematics and when observing lessons has been concerned at the limited extent to which children's problem-solving skills are being developed. The staff are unsure about how they should incorporate the three strands of AT1 (communication, reasoning and problem solving) into their teaching. They have agreed that the next mathematics training sessions are to address AT1.

Outcomes

Teachers are better able to incorporate AT1 into the daily mathematics lessons. Their planning draws attention to how they intend to promote and develop children's communication, reasoning and problem-solving skills. Teachers are more confident at asking children questions that require reasons and justifications and that extend children's ability to sustain a mathematical argument. There are more lessons observed where children are set problems that require them to use and apply the mathematics they have been taught and the teachers recognise where to ask 'What if ...?' questions that challenge different groups of children. Standards in AT1 show a significant improvement over time.

Mathematics Scenario 6: Improving the quality of teaching

Focus: Raising expectations

The school is convinced that those children who should achieve level 4 or above at the end of Key Stage 2 are not all doing so. The school has not been involved in the piloting of the unit plans but has recently been told about them and wants to use them next year with a view to raising teachers' expectations. A key area for development is the use of questioning in the lesson to challenge children and help them to explain their ideas and strengthen their reasoning skills. Children are better at tackling the routine and familiar work than improving the new and unexpected.

Outcomes

The unit plans are guiding teaching and teachers' questions for children are a key feature of planning. Children are challenged and expectations are higher. Children are better at articulating their thoughts and can record their explanations more efficiently. More children appear to be en route to achieving at level 4 or higher.

Section 4 – Supporting information

The National Numeracy Strategy

Priorities for 2002-03

Numeracy training priorities

Listed below are the National Numeracy Strategy's training priorities for 2002 – 03. The priorities will form the focus for LEA support to schools. Most requests from teachers for support from mathematics coordinators are likely to match closely these national priorities.

- Improving the planning and teaching of the main part of the lesson and the plenary, and helping teachers to make use of opportunities for assessment and the diagnosis of children's learning needs in mathematics
- Supporting schools with implementation of the Springboard programmes
- Improving provision for more able children, working particularly with mathematics coordinators and Year 5 teachers
- Enhancing teachers' subject knowledge of mathematics, particularly training on:
 - the progression from mental methods to written methods
 - problem-solving techniques and reasoning skills
 - the appropriate use of calculators in Years 5 and 6
 - fractions, decimals, percentages, ratio and proportion
- Building local capacity, deploying leading mathematics teachers and others, to address the numeracy training priorities listed above, giving priority to those teachers who have received little or no training

Overview of roles and responsibilities

ROLE OF THE NUMERACY GOVERNOR

The full governing body retains responsibility for raising standards in mathematics; the role of the numeracy governor is to raise the profile of the subject. He or she should be a source of support and a 'critical friend' to the school. The governor's interest will give encouragement to teaching staff.

The numeracy governor might:

- attend some INSET courses;
- meet with the headteacher and mathematics coordinator to discuss the progress of the Strategy;
- talk with teachers and see some daily mathematics lessons;
- agree a section for the annual governors' report on mathematics with the headteacher and coordinator;
- work with the school to inform parents about and involve them in their children's mathematics.

ROLE OF THE HEADTEACHER

The role of the headteacher is crucial in ensuring that the school is successful in raising levels of attainment in mathematics.

The headteacher's role is to:

- lead, manage and monitor the implementation of the Strategy, including monitoring teaching plans and the quality of teaching in classrooms;
- with the numeracy governor, keep the governing body informed about the progress of the Strategy;
- carry out an annual audit/review of mathematics throughout the school, with the coordinator;
- agree an action plan for achieving the school's targets with the whole staff and governing body;
- plan and organise opportunities for keeping parents informed about the National Numeracy Strategy and ways in which they could support it;
- support the coordinator, special educational needs coordinator (SENCO) and staff in developing the Strategy in the school;
- deploy support staff, with the help of the SENCO, to maximise support for the Strategy;
- ensure that mathematics remains a high priority in the school's development work.

ROLE OF THE MATHEMATICS COORDINATOR

There is a change in the coordinators' role from writing schemes of work to supporting the development of effective teaching.

Coordinators are expected to:

- ensure teachers are familiar with the *Framework* and help them to plan lessons;
- lead by example in the way they teach in their own classrooms;
- prepare, organise and lead INSET, with the support of the headteacher;
- support the headteacher in carrying out an annual audit and action plan with staff and governors;
- work co-operatively with the SENCO in providing advice and support for staff;
- observe colleagues teaching from time to time, with a view to identifying the support they need;
- teach demonstration lessons occasionally;
- attend INSET provided by LEA numeracy consultants;
- help the headteacher in planning, organising and leading parent evenings or days about the Strategy and mathematics for parents;
- discuss regularly with the headteacher and numeracy governor the progress of implementing the Strategy in the school.

ROLE OF THE SENCO/OTHER KEY TEACHER

The role of the SENCO is also changing: sometimes in the past the brief of the SENCOs has not given mathematics a sufficiently high priority. The Strategy makes clear that the full involvement of the SENCO in mathematics is essential if standards are to be raised.

The role of the SENCO should include:

- supporting and working co-operatively with the coordinator to implement and develop the Strategy;
- leading INSET together with the coordinator for staff on special needs issues, based upon support materials provided by the Strategy;
- advising staff how best to support children with varying needs during mathematics lessons so that they meet the expectations of the yearly teaching programmes;
- helping to ensure that children who are capable of catching up with their peer group do so as quickly as possible;
- advising staff on the inclusion of mathematical objectives in individual education plans (IEPs) for children with special difficulties in mathematics;
- advising the headteacher and staff on the effective use of teaching assistants and helping support staff to become familiar with the *Framework*.

ROLE OF ADDITIONAL ADULTS AND TEACHING ASSISTANTS

The role of support staff is to help make sure that each child plays a full part in every lesson. They should have access to copies of *The Framework for teaching mathematics* and *Mathematical vocabulary*, and be aware of teachers' lesson plans. They will need to be briefed about their particular role in any lesson so that they know not only what children are to do, but what children are to learn.

During any **whole-class oral work**, support staff or additional adults should position themselves close to any children who need special help and provide this discreetly; for example, they can:

- be strategically positioned near particular individuals or groups to support and encourage responses, e.g. from shy and reticent children;
- support a child with visual impairment by using a hand-held white board to reproduce what is on the main board;
- sign or translate core vocabulary or phrases;
- keep children on task;
- help children to use specific individual resources, e.g. personal number cards, table-top number lines, or individualised information and communications technology (ICT) resources linked to a child's IEP.

They should also observe carefully the responses of the children they will be working with later in the lesson to inform the support they will give.

In **group work**, additional adults can:

- support individual children or groups;
- explain tasks;
- keep children focused;
- help maintain pace;
- provide pre-tutoring to small groups and individuals to prepare them for a forthcoming lesson and to ensure the lesson is a positive experience;
- remind children of teaching points and help them interpret instructions correctly;
- question children and encourage their participation (the class teacher will need to suggest the questions and prompts that would be appropriate, and any particular children whom they should focus on);
- emphasise correct use of mathematical vocabulary;
- look for and note any common difficulties that children have, or mistakes that they make, so that the class teacher can address these in the plenary and in future lessons;
- use a number line and/or 100-square, visual or practical aids, or a computer with suitable software, especially when helping children with difficulties or misunderstandings.

For the **plenary**, and during it, additional adults can:

- prepare children to give feedback on the work they have been doing;
- prompt children as they go along and help them explain their strategies;
- monitor the responses of particular children.

Guidance on being a coordinator

Questionnaire: finding out about your school

If you are a new coordinator just taking up your role you will need to find out all sorts of information to help you do the job. Here are some questions you might find useful to ask your headteacher or other colleagues. The list is by no means exhaustive and you probably know the answers to many of the questions already.

Details of:

- the name of adviser/inspector assigned to the school?
- the name of the line manager for the NNS?
- the name of the Numeracy consultant who may be providing in-school support?
- the mathematics section of the school development plan?
- guidance the school has provided on planning?
- in-school support that teachers have received over the past year?
- mathematics INSET that staff have attended in the past year?
- observations of mathematics lessons that have been carried out previously?
- teachers' plans?
- national test results, and any analysis carried out, for the past two years?
- other tests set, for example, the optional or NFER tests?
- documentation that shows the progress children make as they move through the school?
- any intervention programmes which are managed for both mathematics and English?
- the mathematics section of the most recent Ofsted report on the school?

The skills of the coordinator

BECOMING AWARE OF YOUR ROLE

Being aware of your role involves:

- clarifying your headteacher's and your own expectations;
- having a clear idea of what you want to achieve;
- having clearly delineated areas of responsibility;
- keeping your headteacher informed;
- co-operating with other members of your staff;
- knowing when to defer decisions to your headteacher;
- being approachable;
- building good relationships with teachers and colleagues.

MANAGING TIME

Managing time well means asking yourself five questions:

- What am I trying to do?
 - determining and balancing your priorities
- What am I actually doing?
 - analysing how your time is really spent
- Could I be using my time more effectively?
 - finding sensible ways to save time
- How shall I plan my time in the future?
 - planning ahead
- Do I have time to think about what I am doing?
 - planning time for reflection

Good time management involves:

- deciding what needs to be done;
- establishing what the real priorities are;
- keeping a sense of perspective;
- identifying any constraints;
- negotiating/agreeing a reasonable programme of support;
- equipping yourself with useful resources/information lists;
- responding wherever possible to requests for support.

LEADING A DISCUSSION

A powerful way of learning, for teachers as for everyone else, is through discussion with colleagues. Sometimes the discussion is a means of assimilating or digesting new ideas; sometimes it is a method of group problem solving. Discussion is also an important part of almost every meeting.

The unscheduled discussion over coffee can often be more profitable than a more formal meeting which takes place after school. Teachers often come back from courses saying, 'It wasn't the lectures that were helpful, but talking with other people.'

Leading discussion involves:

- providing an agenda;
- distributing any preliminary information;
- deciding on and making clear the purpose of the discussion;
- making clear what outcomes/decisions are required;
- acknowledging contributions and relating them to the main task;
- keeping notes of the main points to use as a summary;
- summarising:
 - the main points;
 - suggestions for action.

WORKING IN CLASSROOMS

Coordinators need to be clear with individual class teachers how they might work with them in a classroom. The main purpose is to support the professional development of the teacher. However, arrangements need to be made to ensure that there are opportunities to observe and participate in the teaching and also, once the lesson is over, discuss together the activities which have taken place.

Some effective ways of working are:

- you teach a teacher's class with the teacher watching, followed by discussion of the lesson, including which features the observing teacher will agree to incorporate into their own lessons;
- you watch the same teacher teach on a subsequent visit and discuss the lesson afterwards;
- you teach several lessons on a particular theme (e.g. fractions, decimals and percentages, informal written methods or mental calculations) to different age groups over the period of a term, and then lead a twilight meeting on that theme with the whole staff, referring to the lessons taught and involving the teachers who watched them;
- you co-plan a series of lessons with a year group, teach the first lesson, then watch a teacher teach one of the following lessons, evaluate the series of lessons and discuss what future lessons might include.
- Remember that your aim is to raise the quality of teaching in mathematics. The observing teacher should not be left thinking that this is an impossible task, but should be considering features she or he feels able to incorporate into her or his repertoire.

TEACHING DEMONSTRATION LESSONS

It might be possible for you to teach demonstration lessons for members of your staff. The purpose of a demonstration lesson is to show teachers some key features of a lesson or to provide guidance on an aspect of mathematics that teachers find more challenging to teach.

The National Numeracy Strategy training priorities for 2002–03 listed below indicate some key areas for development in order further to raise standards in mathematics.

- Improving the planning and teaching of the main part of the lesson and the plenary, helping teachers to make use of opportunities for assessment and the diagnosis of children's learning needs in mathematics
- Enhancing teachers' subject knowledge of mathematics, particularly training on:
 - the progression from mental methods to written methods
 - problem-solving techniques and reasoning skills
 - the appropriate use of calculators in Years 5 and 6
 - fractions, decimals, percentages, ratio and proportion

Teachers who watch another teacher teach may also be interested in one or more of these features of a mathematics lesson:

- how to maintain a suitable pace in each part of the lesson, and particularly in the main and plenary part of the lesson;
- questioning techniques and the way that the teacher and the children use the correct mathematical vocabulary;

- how children with particular needs are catered for during whole-class work. For example, how questions are tailor-made to suit different children, including those whose attainment is higher or lower.
- how mathematical imagery is developed; for example, by saying, *Close your eyes and imagine two frogs in a pond. Another jumps in. How many are there now?* For older children: *Imagine a white equilateral triangle. Place in your mind a black equilateral triangle in each of the corners. What shape is left in the middle?*
- how connections are made between different areas of mathematics;
- the direct teaching that takes place during group work, avoiding troubleshooting and flitting from group to group;
- how groups are organised; for example, putting children who may need extra help at the front or moving tables to create teaching groups;
- strategies for avoiding being interrupted by early finishers or children who are stuck; for example, getting them to generate their own questions, ask their partner first, collect a help card ...;
- the way that differentiation is made manageable.

There are certain mathematical topics which teachers often find helpful to see taught. These include:

- the progression from mental methods to increasingly more formal approaches to standard written methods;
- problem-solving techniques and skills;
- fractions, decimals, percentages, ratio and proportion;
- how and when to use calculators.

EVALUATING

When you are evaluating work that has taken place you will probably need to look at four aspects, and the match between them.

- What was planned
 - what you/the school/the course aimed to do
- What was offered
 - what actually happened in practice
- What the outcomes were
 - what has really been achieved
- What action should be taken in the future
 - what changes need to be made

When evaluating INSET you need to ask:

- Were teachers' training needs identified clearly?
- Did the INSET fulfil its purpose?
- Did teachers gain a clear idea of how to improve their teaching?
- Are teachers now more knowledgeable and confident?
- Will the INSET be likely to have an impact in classrooms?
- What might be changed if the INSET was repeated?
- Are there new training needs which the INSET has indicated?

Record of support forms

As part of their resource funding, schools will be able to provide a variable number of days of supply cover to release the mathematics coordinator or other teachers for training and support activities. A school could use the first of the two sheets which follow to list the activities supported by supply cover. This would form a record for the school.

You might use the second of the two sheets to record any support you receive from your LEA numeracy consultants. This could include training sessions with staff, planning with groups of staff and classroom support, including teaching demonstration lessons.

The National
Numeracy Strategy

Record of mathematics coordinator support time

School _____

| Time available to mathematics coordinator | | |
|---|---|------|
| Year group <input type="checkbox"/> | Number of release days <input type="checkbox"/> | |
| Activity | Date | Time |
| | | |
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Headteacher monitoring

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Teaching of Calculation in Primary Schools

**Extracts from HMI report – April 2002
(HMI 461 – www.ofsted.gov.uk)**

Background

- 1 Since the introduction of the National Numeracy Strategy (NNS) in 1999, Her Majesty's Inspectors (HMI) and Additional Inspectors (AIs) have carried out a series of annual visits to a nationally representative sample of primary schools to evaluate the impact of the Strategy on the quality of teaching in mathematics. There were 300 schools in the sample in the first year of the implementation of the Strategy, reduced to 200 in the second year.
- 2 In the Spring and Summer terms of 2001, inspectors gave particular attention in 68 schools to three important themes in primary mathematics: progression from mental to written calculation from Year 1 to Year 6; the solving of word problems; and the use of calculators in Years 5 and 6. These visits included the observation of the daily mathematics lesson; the scrutiny of pupils' work and, in 24 schools, discussions with groups of four pupils. The discussions focused on how pupils calculated using the four operations of number and on their approaches to problem solving. This paper draws upon those focused visits, as well as on evidence from the visits to the other schools in the national sample.

Introduction

- 3 Schools have made significant progress in the past two years in teaching mathematics and, in particular, in teaching pupils how to calculate mentally. There is still more to do, however, and this report highlights aspects of calculation and the methods of teaching it that need further improvement.

Main findings

- Teachers give appropriate emphasis to pupils' recall of number facts and mental methods of calculation during oral and mental sessions. However, at Key Stage 2 they often overlook the importance of linking pupils' mental strategies to the introduction of expanded and compact written methods.
- In the majority of schools, pupils are taught horizontal and expanded forms of calculation leading towards the use of a standard written form.
- Pupils make too little use of personal jottings to support and record mental strategies or explain their methods of calculation.
- Teachers rely too much on worksheets and commercial schemes, particularly in Key Stage 1, and this limits opportunities for pupils to develop and use their own methods of recording.

- Whilst teachers recognise the importance of estimating before calculating and teach this to pupils, pupils rarely use estimation in practice. As a result, they do not always have a clear idea of what constitutes a sensible answer.
- Pupils do not always make appropriate decisions about when to use written methods and when it is more sensible to work things out in their head.
- Insufficient attention is given to helping pupils to acquire a range of strategies to solve word problems, particularly more complex problems where two or more steps are needed to solve them.
- Errors or misconceptions evident in pupils' recording of calculations are not always tackled in the main body of the lesson or in the plenary.
- Schools are recognising, increasingly, the importance of adopting a common approach to the recording and layout of pupils' work, but much remains to be done to put policies into practice.
- There is not enough good use of calculators, either as a teaching tool or by the pupils themselves, in the daily mathematics lesson at Key Stage 2.

Progression from mental to written methods of calculation

- 4 The link between the teaching of mental skills and that of written calculations, as well as the development of pupils' ability to explain orally their methods of working, is crucial in ensuring that pupils move progressively from informal to more formal methods of recording in mathematics. In order to ensure that pupils make the move smoothly, teachers need:
 - a good understanding of mathematical progression and the ability to match this to the various stages and rates of pupils' understanding (the *NNS Framework* outlines the various stages clearly);
 - a clear understanding of how pupils can use jottings, expanded methods and standard written forms to support, explain and record their work in mathematics;
 - to be clear about the difference between mental recall and mental calculation and the implications of these differences for teaching and learning.
- 5 Teachers' knowledge and understanding of these factors have a strong influence on the quality of teaching. In the best teaching, expanded written methods and standard written forms are used as aids to pupils' understanding and not solely as a means of recording for someone else. Effective teaching ensures that pupils' written responses derive from their knowledge of mental strategies of calculation and from their skills in being able to explain orally how they have reached their answers.

Key Stage 1

In **Year 1**, teachers emphasise appropriately the vital oral and mental skills which underpin pupils' written recording. In particular, they focus on counting, ordering numbers and ensuring that pupils have instant recall of number bonds to 10. Pupils know that addition is adding, making bigger, and so on, and that subtraction is taking away, although they do not always understand the term 'difference'.

- 6 A positive feature at this stage is the wide and varied range of approaches to the teaching of counting. This includes counting forwards and backwards from different starting points, with individual pupils and with groups. One pupil, when asked to order the numbers 10, 5 and 9, used his knowledge of counting facts to explain, 'I can count it. Five comes before nine, then it's ten.' Another pupil made use of his counting knowledge to count on in order to answer $13 + 6 = 19$. Much of this understanding is enhanced by teachers' systematic teaching of number facts and strategies to support pupils' calculations. The good use of questioning encourages pupils to explain their thinking, whilst effective assessment enables teachers to help them to move forward in their learning.
- 7 Whilst pupils record accurately using conventional signs and symbols, the use of recording as an aid to calculation is a weakness, especially with larger numbers. Worksheets which provide no space for pupils' personal jottings or expanded methods of recording, or which simply require them to write answers in the boxes provided, are unhelpful. As a result, pupils have too few opportunities to jot down or illustrate their number work in a variety of ways. Teachers see commercial schemes as support for providing for progression but, in some instances, the worksheets limit pupils' opportunities to record their mathematical thinking in a manner which makes sense for them and which might support their oral explanations later.
- 8 In **Year 2**, teachers continue to emphasise pupils' oral and mental skills. As a result, most pupils are able to count to 100 and know addition and subtraction facts to 10 and beyond. They understand the commutative law for addition and this enables them, for example, to rearrange numbers to help them. For example, when adding $9 + 7 + 1$, they can rearrange the order of the numbers to $9 + 1 + 7$ to make $10 + 7$. By contrast, fewer pupils are clear about the inverse relationship between addition and subtraction and are not, for example, able to see that if $12 + 6 = 18$, then $18 - 6 = 12$. Most pupils are able to carry out multiplication as repeated addition in a formulaic way, but they do not readily see the link between, for example, $2 + 2 + 2 + 2 + 2 = 10$ and $2 \times 5 = 10$.
- 9 As in Year 1, pupils do not have enough opportunities to practise recording. Few see the use of jottings to record their thoughts as useful aids to calculation. Errors and misconceptions evident in pupils' recording are not always addressed, either in the main body of the lesson or the plenary. For example, in response to the question, 'What is double 3?' a pupil recorded $2 \times 2 \times 2 = 6$, but this misconception was not challenged by the teacher. In one or two lessons seen, pupils were encouraged to write their explanations as a way of supporting their mathematical thinking. For example, 'I made the plasticine weigh 10 cubes. When I changed the shape of the plasticine, the weight stayed the same'.

- 10** The rapid recall of number facts receives a high priority, not only for its own sake and to support quick mental calculations, but also to enable pupils to derive new facts from what they already know. For example, in order to answer the question $4 + 5$, one pupil used his knowledge of doubling and explained, 'I know five and five equals ten, so I take one away and that gives me nine'. The use of probing questions encourages pupils to reflect on their responses and the good use of individual white boards in some schools is effective in supporting pupils' recording of number facts. The use of jottings to help pupils with their mental calculations is not taught frequently enough.
- 11** The demonstration by teachers of ways of recording a calculation is a positive feature as well as, in some lessons, the linking of horizontal and vertical layout via partitioning. However, too few schools have an agreed approach to pupils' recording and layout of their work. When this is established successfully, it supports pupils in organising their work in mathematics and avoids careless errors, for instance in place value, which are caused by poor recording.
- 12** Teachers' over-reliance on worksheets or commercial schemes continues in Year 2. Many of these simply require an answer (often in a box) or some colouring in. No space is given for pupils' jottings or for them to show how they worked out the answer. Linked to this is an emphasis on recording at the expense of the explanation of methods. Pupils rarely use informal methods of recording or jottings to support and explain mental addition and subtraction of numbers to 100.

Key Stage 2

- 13** In **Year 3**, the mental and oral skills needed for all types of calculation are generally taught well. As a result, pupils are able to read, write and order numbers. They are confident in aspects such as partitioning, counting and recalling, and using number facts, but are unsure about the inverse relationship between multiplication and division. Pupils are less confident when applying their oral and mental skills to solve word problems and continue to be reluctant to use jottings to help with their calculations.
- 14** The use of individual white boards to record pupils' responses, and teachers' demonstration of recording and written methods, continue to be positive features in Year 3. Teachers use pupils' work effectively as a focus for learning through questioning with the whole class. Another positive feature is the extent to which many teachers make links across the different areas of number, such as between measurement and number. For instance, the numbers in a clock-face were used in one lesson in the calculation and recording of number bonds to 20. There were also examples of teachers demonstrating a bridge between recording in horizontal and vertical layouts. For example, pupils were presented with $68 + 79$ in a horizontal layout and shown how to use partitioning to do the calculation using the vertical layout below:

$$\begin{array}{r}
 68 + 79 \\
 60 + 70 = 130 \\
 8 + 9 = \underline{17} \\
 \underline{147} \\
 \underline{\underline{\quad}}
 \end{array}$$

- 21** Where pupils' mental methods are less secure, some are unable to use the expanded calculations properly. Similarly, the errors in the use of partitioning to support short ($TU \times U$) and long ($TU \times TU$) multiplications are due to an insecure knowledge of number facts.
- 22** In **Year 6**, pupils use horizontal methods with decimal calculations before extending the written format to column addition and subtraction of decimals. Most pupils use this standard written method reliably, although some make the common mistake of failing to keep decimal points and digits of similar place value in line. Pupils tackle short multiplication of numbers involving decimals with mixed success, the common error being the failure to 'carry' in a calculation, 3.5×5 for example. In one lesson, a Year 6 pupil made good use of prior knowledge and mental methods – knowledge of 3.5×10 then halving – to reach the correct answer. Such a choice of strategy, however, is rare.
- 23** Work on the short division of numbers involving decimals is limited, although, where it happens, pupils know how to calculate to one decimal place and recognise recurring decimals. The use of decimal notation becomes more firmly established in Year 6. The ordering of mixed sets of numbers and the consolidation of pupils' knowledge of place value are taught well. For instance, when questioned, pupils could record two- and three-place decimals confidently and place them in the correct order, working from the smallest or the largest.
- 24** By Year 6, pupils use standard vertical methods for all number operations. When these are developed from other informal written methods such as empty number lines or grid methods, they generally understand such methods well and are able to follow a process carefully when it is explained by the teacher. However, pupils still tend to rely too much on written methods even when they are able to reach a correct answer in their heads.

Problem-solving

- 25** Pupils in Years 1 to 3 usually solve one-step problems mentally. They identify correctly which operation to use, draw upon their knowledge of number bonds and multiplication facts and are able to explain their reasoning clearly. Pupils who record the processes they have gone through invariably use the horizontal format. For example, in Year 3, in response to the question: *A spider has 8 legs. How many legs do 5 spiders have?*, pupils who recorded their thinking wrote $8 \times 5 = 40$.
- 26** Pupils find word problems involving two or more steps more difficult. Most pupils are unable to identify the key information or questions involved. Few pupils approach such problems systematically or attempt to record their calculations through personal jottings. By contrast, Year 3 pupils used successfully a variety of methods to solve the problem: *A set of felt-tips costs £3. Marie saves 20p a week. How many weeks will she take to save up for the felt-tips?* One pupil calculated that it would take 5 weeks to save £1 ($5 \times 20p$), thus 15 weeks to save £3 ($5 \text{ weeks} \times 3$). Another wrote: 20, 40, 60, 80, 100 = £1, 300 = £3, $5 \times 3 = 15$ weeks. While they approach the problem logically and record the information systematically, pupils often omit to note the units of measurement involved. A good example of a useful personal jotting, but one which omitted the units, was when one boy wrote: '5 is one pound and $5 \times 3 = 15$ '.

- 27** By Year 6, many pupils know and use a systematic approach to solving word problems and teachers often provide pupils with good strategies for tackling them. For example, Year 6 pupils were asked: *Find the number of marbles in only three bags when 960 are divided equally into 16 bags.* They recognised the task as a two-step problem and were able to identify the steps to find an answer. One school used a problem frame with pupils to help them to analyse what type of word problem it might be and how to solve it. The teacher highlighted the key words and numbers with the pupils and then considered how the problem and the solution could be written mathematically.
- 28** Although systematic approaches to problem-solving are taught, too little attention is given to encouraging pupils to predict a sensible answer, using personal jottings and drawing upon mental strategies as good starting points. Estimation is not a sufficiently established feature of pupils' approaches to problem solving, nor is the use of checking to decide if the answer arrived at is a sensible one. As a result, pupils rely too much on the mechanical process of written calculation. In some cases, they are confident enough to work out word problems in their heads, but few use an appropriate combination of mental skills, personal jottings and standard written methods.
- 29** Pupils' anxiety to solve the problem and 'get it right' often leads them to use immediately what they feel is the security of a standard written method rather than a range of strategies related to the nature of the task. For example, in a group of four Year 5 pupils (two boys and two girls) only one was able to calculate accurately the length of a train journey from 11.50 to 15.45. Two of the pupils made inappropriate use of a vertical format:

$$\begin{array}{r} 15.45 \\ -11.50 \\ \hline \end{array}$$

The one pupil in the group who answered correctly used his knowledge of number lines and time to count on from 11.50 to 12.00; he then recognised that three hours and 45 minutes remained to which he could add the ten minutes from 11.50 to 12.00.

Points for action: from mental to written calculation and problem solving

- 30** To improve the quality of teaching of calculation and pupils' standards of attainment, schools need to:
- give more emphasis in the teaching of mathematics to the use of jottings as an aid to calculation, particularly when pupils are using commercial materials;
 - clarify the links between repeated addition and multiplication, especially for younger pupils, and between repeated subtraction and division;
 - give more attention, at Key Stage 1, to pupils' understanding of the inverse relationship between addition and subtraction; and at Key Stage 2, to pupils' understanding of multiplication and division and the inverse relationship between them;

- give more emphasis to practising the recall of division facts;
- ensure that, when pupils' errors and misconceptions are identified, time is taken to remedy them, particularly in the main teaching activity or during the plenary;
- give attention to pupils' accuracy in the vertical layout of calculations involving decimal numbers;
- give more attention towards the end of Key Stage 2 to the short division of numbers involving decimals;
- help pupils to develop strategies for solving word problems through the use of a combination of methods that include mental strategies, personal jottings, estimation and checking;
- strengthen the teaching of place value and the accuracy of setting out operations where calculations involving decimal fractions are concerned;
- ensure that mathematics policies include guidance, for both key stages, on when to move from mental calculation to using informal jottings and, finally, to using formal written methods.

Use of calculators by pupils in Years 5 and 6

31 A mental method of calculation should always be pupils' first strategy; they need to learn that a calculator does not replace this. They need to be able to weigh up the relative merits of mental, written and calculator methods and to apply them appropriately, depending on the task set. If they choose to use a calculator, they should be able to draw upon established skills, such as rounding numbers, to check the reasonableness of the answer.

32 The National Numeracy Strategy points out that calculators should not normally be used in Key Stage 1 at the point in pupils' learning of mathematics when recall and mental calculation need to receive strong emphasis:

. . . the calculator's main role in mathematics lessons is not as a calculating tool, since children are still developing the mental calculation skills and written methods that they will need throughout their lives.

However, at Key Stage 1, calculators can be used as an effective teaching tool rather than for calculation and, at Key Stage 2, as a way of teaching pupils about numbers and the number system.

33 Most of the work with calculators occurs in Years 5 and 6. By the end of Key Stage 2, pupils should have learned to enter numbers (money, measurements or fractions), carry out multiple-stage calculations (including the use of the memory function), interpret the display and appreciate what sort of work requires the use of a calculator.

34 Despite its potential value, the use of the calculator is not a regular feature in the teaching of the daily mathematics lesson. Although a significant number of teachers refer to its use, it is not given enough emphasis. Furthermore, when it is used, teachers give too little attention to encouraging a range of options, such as using mental methods and personal jottings alongside the use of calculators.

- 35** Teachers demonstrate and explain the different functions of the calculator keys well. This is reflected in most pupils' competent use of the keys for the four basic operations. Teachers extend pupils' knowledge and understanding, for instance, by teaching about recurring decimals in division in Year 6.

The teacher made good use of paired work by setting Year 6 pupils calculator tasks such as dividing 2,000 by 60. The concept of a recurring decimal was discussed and was followed up effectively in the plenary to reinforce the connection between recurring decimals and fractions.

- 36** Good attention is given to the role of the calculator when dealing with fractions, decimals and percentages. In one Year 6 class, the teacher gave a good demonstration of how to use the percentage key to calculate 20% of 137. Pupils were then encouraged to apply this simple skill in problem solving. Other instances included exploring the equivalences of fractions, decimals and percentages, for example $? = 0.75 = 75\%$, and the use of this knowledge in the context of problem solving to compare the relative values of given amounts expressed in different units.
- 37** Teachers often emphasise the importance of the correct interpretation of the numbers displayed.

In a Year 6 class, the teacher asked what 16.4 meant in the calculator's display in the context of a money problem. Having established that it meant £16.40, the teacher extended the pupils' knowledge through skilful questioning, for example by asking how 4p would be represented on the display. The pupils' knowledge of decimals and place value was reinforced.

Where such effective questioning does not take place, calculator work can become a mechanical exercise with insufficient emphasis on pupils' understanding of the underlying processes.

- 38** While teaching relating to decimals generally receives good attention, other important aspects of calculator use in Years 5 and 6 are not taught effectively. Little emphasis is given, for example, in Year 6, to using the memory function, although this was done effectively in one mixed Year 5/6 class:

The teacher gave clear, step-by-step explanations and instructions for the use and application of the memory function. The pupils were asked to carry out two- and three-stage calculations, firstly by using simple numbers, for example, $(3 \times 8) + (4 \times 7)$, then larger numbers in money problems. This involved selecting correct key sequences for more than one operation and using the memory function to store answers to calculations within brackets.

- 39** Increasingly, teachers are encouraging pupils to estimate the size of an answer and its reasonableness without relying solely upon the calculator. For example, one teacher required a Year 6 class to estimate and consider what would be a reasonable answer to the question: 'Are 1,000 minutes more or less than a day? How do you know?' There is also growing evidence of teachers encouraging pupils to check their answers when using a calculator. The most frequently used strategy is the application of the inverse operation. For example, $3,756 - 937 = 2,819$ is checked by the calculation $2,819 + 937$. The use of rounding, however, in order to estimate an answer to a calculator problem, is not well established.

- 40** Although many of the oral and mental sessions in Years 5 and 6 do not involve calculators, most of them form a useful link with the main teaching activity, through the reinforcement of important strategies which pupils might use later with calculators. Examples include doubling, rounding to the nearest ten, hundred or thousand and counting forwards and backwards to include negative numbers.
- 41** The use of the calculator occurs predominantly during the main part of the lesson, where the quality of teaching is mostly good. The use of an overhead projector (OHP) calculator is often a positive feature. It enables teachers to demonstrate the use of a calculator to the whole class, to generate discussion about strategies and to allow pupils to practise them. Effective use of the OHP calculator also enables teachers to emphasise the importance of the correct interpretation of the display. The follow-up usually involves pupils working individually or in pairs. In the best examples, teachers intervene by drawing the class back together to discuss the work before moving on to the next stage. These 'mini-reviews', which often focus on errors and misconceptions identified by the teacher, help to maintain a good pace.
- 42** In most lessons that use calculators in the main teaching activity, the learning objectives are revisited appropriately in the plenary. However, in better plenaries, teachers go much further than this by identifying pupils' errors and misconceptions and correcting them through discussion and explanation. Other features of good plenaries include the use of pupils' work to illustrate and explain teaching points, and the use of direct questions about how the calculator helped with the calculations needed to solve problems. Occasionally, the plenary is also used to reinforce or extend pupils' ability to use the calculator. For example, in a Year 6 class, following a revision of the main features of the lesson, the pupils were set an additional problem to enable them to practise the use of the percentage key on their calculators in a different context.

Points for action: the use of calculators

- 43** To improve the quality of teaching and pupils' standards of attainment, schools need to:
- teach pupils to judge when it is sensible to use mental, written and calculator methods, to choose the appropriate method or combination of methods, and to apply these accordingly;
 - encourage pupils' use of mental strategies, such as rounding, to check an answer when using a calculator;
 - continue to look for ways to make use of the calculator as an effective teaching and learning tool.

Planning plenaries

What is a plenary?

The plenary is a time for teachers and children to take stock, celebrate children's successes and establish future expectations. It is the time when children will be challenged and questioned in a way that invites them to demonstrate what they know, have learned or need to practise further.

Teaching assistants can make a significant contribution in supporting the participation of all children including those children with special educational needs, those who speak English as an additional language and children in Springboard groups. Their role involves prompting individuals, noting strengths and weaknesses for the teacher, and repeating instructions for those who need it.

During the plenary, teachers may look back at the whole lesson, one aspect of the lesson, or at several lessons to review the whole mathematical topic. Occasionally it is useful to inject a short plenary into the main teaching activity in order to review progress, correct mistakes and direct the activity.

To be effective, plenaries need to be planned and organised in a way that ensures the participation of all children. The plenary will be linked to the teaching objective(s) and the teacher will employ a variety of styles of teaching, including explaining, reporting, investigating, demonstrating, and playing a game. Each one of these should aim to challenge all the children in the class.

Why have a plenary?

It is important to have a plenary at the end of every lesson in order to:

- have a definite conclusion to the lesson, so that the children go away positive about what they have achieved;
- return to the lesson objective(s) and reinforce key words, facts, ideas and notation;
- re-emphasise teaching points and vocabulary;
- identify key points and methods for children to remember, and to resolve any mistakes and misunderstandings;
- give the children a clear idea of what they are moving onto next, and sometimes to set homework;
- relate the mathematics children have learned to other subjects in order to help them access the whole curriculum;
- continue to teach – not just have children reporting back.

When planning a plenary, teachers:

- assess children's developing knowledge and skills;
- prepare children for the next lesson;
- draw on any previous homework and link to the next homework;
- provide time for feedback, reflection and forward planning.

During the plenary, teachers:

- ensure that children can see and hear all contributions;
- discuss solutions and strategies, and correct mistakes and misunderstandings;
- check and extend children's use of vocabulary;
- review and refine methods of recording and presentation;
- assess learning against targets and adjust targets accordingly, whether for the class, particular children or groups of children.

Teachers will engage children through questions that:

- are targeted, open, prompting and probing;
- challenge assumptions and conclusions;
- prepare the way for the next stage in children's learning;
- prompt children to ask questions of their own.

National Numeracy Strategy Intervention programmes

Springboard 3 and 4

Aims

Springboard 3 and 4 are intended for those children in Year 3 and Year 4 who have achieved level 2C in the Key Stage 1 national tests in mathematics and who, with extra help, are likely to achieve level 3 by the end of Year 4. They aim to:

- support the identified children and to remedy particular weakness in number so that they are in a better position to access and benefit from the teaching programmes in Year 3 and 4 and beyond;
- set the expectation that these children will catch up with their peers;
- help teachers prepare a teaching programme enabling children to benefit fully from the main Year 3 or Year 4 teaching programme as soon as possible.

The Springboard 3 and 4 materials

The materials focus on key areas of number. They provide additional tuition for small groups of six to eight children outside the daily mathematics lesson during the weeks when these areas are being taught in the daily mathematics lesson.

The 10 units of work are designed to be used flexibly over the first term and a half of the school year. A diagram on page 14 of each file shows how schools following the planning grids for Year 3 and Year 4 in the *Framework for teaching mathematics from Reception to Year 6* can fit in the units over this period. Each unit consists of two sessions, of 30 minutes each, that are led by a teaching assistant and consolidates the work introduced by the teacher in the daily mathematics lesson. The teaching assistant should have worked with the group in the daily mathematics lesson before leading the two sessions. In each session, the teaching assistant introduces and explains an activity sheet to be completed before the next Springboard session. It is intended that teachers will mark these before the next session and deal with any misconceptions individuals may have. There is also a short weekly homework task, often a game to be played with a parent or carer.

Each unit covers carefully selected teaching objectives, mainly from the Year 2 and Year 3 teaching programmes, which children must meet if they are to tackle with confidence the key objectives of the Year 3 and Year 4 programmes. There is a detailed plan for each session, following the three-part lesson model developed by the National Numeracy Strategy and based on the teaching strategies outlined in the introduction to the *Framework for teaching mathematics from Reception to Year 6*. The programme includes detailed teaching points and key questions, and teaching objectives, vocabulary and resources are listed.

The materials are designed on the assumption that children will be working for several days in the daily mathematics lesson on the same topic as in a Springboard unit. The two additional sessions should take place during the same period of time.

Springboard 5

Aims

Springboard 5 is for use in Year 5. It is intended specifically for children who, without extra help, are likely to achieve level 3 in mathematics at the end of Key Stage 2. Its main aims are to:

- support the identified children and to tackle their weaknesses in mathematics so that they are in a better position to access the Year 5 and 6 teaching programmes;
- set the expectation that these children will catch up with their peers and achieve level 4 at the end of Key Stage 2;
- help teachers to prepare a teaching programme that enables the children to benefit fully from the main teaching programme for Year 5 as soon as possible.

The Springboard 5 materials

Springboard 5 includes sessions that can be taught as a stand-alone 10-week programme or more flexibly, working alongside the mathematics being taught in the daily mathematics lesson. Schools have to decide whether the additional sessions are taught during the school day or at lunchtime, before or after school.

Intervention programmes have helped a great many children who can now work more confidently in their daily mathematics lessons. There is no unique way of managing the programmes. You must decide on the way that suits your school best. This will depend on many factors, including the size of your school, staffing levels, the confidence of your teaching assistants and the space available to teach a targeted group of children. However, what is important is that the right children are targeted: those children who, with a little additional support, are likely to make progress and achieve a level 4 in the national tests. Groups can be taught in or out of the daily mathematics lesson. What is important is that their progress is monitored and the mathematics taught is targeted at those aspects of mathematics the children are struggling to cope with.

Schools that use QCA optional tests should find data from the tests helpful in identifying children who need additional support.

Springboard 6

Springboard 6 is a series of lessons designed to provide additional support in Booster classes for children in Year 6 who, with intensive targeted support, can achieve level 4 in the Key Stage 2 national tests.

Experience has shown that many Year 6 children working below the level 4 threshold can make the progress required to catch up by the time of the tests. Booster classes can help you to provide the help and support these children need. It is crucial for these children to reach the expected standards before entering Key Stage 3 if they are to fulfil their potential in mathematics and go on to achieve a good grade at GCSE.

The Springboard 6 materials

The 22 half-hour lessons are designed for use during the Spring term of Year 6. They can be used alongside, and in addition to, the work being planned in the daily mathematics lesson for that term. The lessons follow closely the sequence of topics identified by the units in the Year 6 yearly teaching programme set out in the National Numeracy Strategy's *Framework for teaching mathematics from Reception to Year 6*. They address a number of aspects of mathematics that the target group of children finds difficult. The lessons follow the three-part model developed by the National Numeracy Strategy. The lesson plans identify objectives, vocabulary, resources, teaching points and key questions. There is a substantial proportion of direct teaching in which children are expected to participate. Each lesson sets out what children should be able to do by the end of that lesson. In the plenary, the lesson ends with key statements for children to remember.

All general principles of effective mathematics teaching apply to these lessons. Some elements are especially important for Booster classes:

- a step-by-step approach;
- built-in consolidation and summaries;
- the use of direct questions and discussion about ideas and methods;
- the expression of the same mathematical ideas in a variety of ways;
- the use of demonstration by the teacher to model ideas and methods and to help children to visualise the process involved;
- the reinforcement of key mathematical vocabulary;
- the encouragement of children to articulate their mathematical thinking.

You will need to adjust the lessons to take account of your children's current attainment levels, their progress and the responses they make.

National Numeracy Strategy Intervention programmes

Other guidance

NLNS Revision Guidance for Year 6 pupils (literacy and numeracy) highlights the important objectives and teaching strategies to help children attain level 4 at the end of Key Stage 2.

Guidance on organising Literacy and Numeracy Booster classes booklet for all schools.

The following publications are available by quoting the full title or reference number to: **DfES publications, Tel: 0845 60 222 60, e-mail: dfes@prolog.uk.com.**

Year 6 Booster Units – ref. DfES 0017/2001
(also available at www.standards.dfes.gov.uk)

Springboard Files:

Springboard 3 – ref. DfES 0091/2001

Springboard 4 – ref. DfES 0092/2001

Springboard 5 – ref. DfES 0151/2000

Springboard 6 – ref. DfES 0778/2002

Sample Year 6 Booster Lessons – ref. DfES 0326/2000

NLNS Revision Guidance for Year 6 pupils – ref. DfES RGY6

Guidance on organising Literacy and Numeracy Booster classes – ref. DfES 0251/2000

More detailed information is available on the literacy and numeracy areas of the Standards website: www.standards.dfes.gov.uk

