Review of Mathematics Teaching in Early Years Settings and Primary Schools:

INTERIM REPORT

Consultation Response Form

The closing date for this consultation is: 30 April 2008
Your comments must reach us by that date.

department for
children, schools and families

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Please tick if you want us to keep your response confidential. ☐

Name	Professor Pat Broadhead (Chair)
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Please tick the box that best describes you as a respondent

☐ Teacher	☐ School Governor	☐ Local Authority Official
☐ Teacher Trainer	☐ Early Years Practitioner	☐ Headteacher
☐ Researcher	x **Other, please specify**	

Please Specify:

TACTYC (Training, Advancement and Co-operation in Teaching Young Children) was founded in 1978, initially to support tutors of advanced courses for teachers of young children. Members are drawn from academic, advisory and training organisations and include early years practitioners in all sectors. TACTYC represents 350+ very highly qualified and experienced educators, with particular expertise in the early years.

The organisation's aims are:

- To promote the highest quality professional development for all practitioners in early childhood education and care;
- To pursue matters of current educational concern and to act as a voice for all those who work with young children;
- To facilitate effective communication and support for early years tutors, trainers, advisers and practitioners in schools and settings;
- To further the educational well-being of all young children.

There is an increasing international dimension to TACTYC's reach, partly through *Early Years, An International Journal of Research and Development*, published three times a year by Taylor and Francis/Routledge.

Are you currently involved in mathematics education? If so, please specify how.

☐ Yes	☐ No

Please Specify:
TACTYC is concerned with all aspects of early years education, particularly the training of teachers and other practitioners. Therefore, we have a strong interest in the development not only of children's mathematical understanding but of the knowledge, understanding and skills of the teachers/practitioners who engage children aged birth-to-eight years with mathematics through play and the curriculum.

How did you hear about the consultation for the Williams Review?

☐ visited by the review team	☐ DCSF website	☐ word of mouth
☐ through a mathematics organisation (please say which one)	x **Other, please specify**	

Please Specify:
As a professional association, one of TACTYC's aims is to respond to all major initiatives which relate to early years education and training. Therefore, at our Executive Meetings we discuss recent and relevant consultations and press releases and this is how the Williams Review was brought to our attention.

The following 8 statements are the principal recommendations of the review. Please state how far you agree/disagree with these:

1 Recommendation 1: The potential for an ITT entry requirement of grade 'C' GCSEs in mathematics I and II, when they are firmly established, should be closely examined. For students who have taken or will take GCSEs before then, a grade 'C' in single award mathematics should remain the requirement. This should apply to the QTS in all phases.
(Chapter 6: The teacher – Initial Teacher Training and continuing professional development, paragraph 20)

☐ Strongly agree	☐ Agree	**Neither agree nor disagree**
☐ Disagree	☐ Strongly disagree	

Comments:

This is a difficult one. In principle, everyone at degree level who seeks QTS should have Grade C maths at least. But in the early years, this might not be achievable without some additional training or perhaps APEL. We understand that many *Early Years Professional Status* practitioners are being denied access to a teaching qualification because of lack of GCSE maths. This situation needs to be investigated to see whether other evidence of mathematical knowledge and understanding, of equal quality, might be acquired or access given to these practitioners to a GCSE level qualification.

2 Recommendation 2: A renewed emphasis on CPD is required by practitioners, head teachers, local authorities and Government, focused on both in-school activities and third party 'market' provision (including HEIs), with the clear delegation to school level of the responsibility for CPD undertaken.
(Chapter 6: The teacher – Initial Teacher Training and continuing professional development, paragraph 38)

☐ Strongly agree	**Agree**	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

We totally agree with this – CPD in mathematics teaching and learning is vital. But that training must not operate on a 'delivery' model, instructing teachers in how to deliver National Strategy requirements. It must emphasise children's developing understanding of meaning-making in mathematics, playful approaches to teaching and starting from where the child is in maths.

Teachers' mathematical knowledge has been shown only to make a significant contribution to their effectiveness when it is linked to knowledge of mathematics pedagogy (Rowland, Huckstep and Thwaites, 2005; Rowland and Turner, 2007).

Time would be most productively spent, therefore, on improving practitioners own understanding and confidence in mathematics as well as their understanding of children's development and effective pedagogical approaches.

3 Recommendation 3: Local authorities should strengthen the field force of mathematics consultants. The National Strategies, in partnership with the National Centre of Excellence in the Teaching of Mathematics, should develop 'refresher' CPD for all mathematics consultants.
(Chapter 6: The teacher – Initial Teacher Training and continuing professional development, paragraph 42)

☐ Strongly agree **Agree** ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

Comments:

Again, totally agree with this. But, again, the training must include elements of child development, especially how the youngest children learn through first-hand, playful, experimental approaches. We must not allow the government to see training as delivering the contents of the National Strategies. These mathematics consultants should understand mathematics learning for all children from birth to the end of primary schooling. In the context of teaching mathematics in this significant phase, we believe that this is of equal importance to the subject content of mathematics itself.

4 Recommendation 4: Within five years, there should be in post at least one Mathematics Specialist in each primary school, with deep mathematical subject and pedagogical knowledge, making appropriate arrangements for small and rural schools.
(Chapter 6: The teacher – Initial Teacher Training and continuing professional development, paragraph 55)

☐ Strongly agree **Agree** ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

Comments:

Yes. As well as deep mathematical knowledge, these maths specialists should also have knowledge of child development, playful approaches to teaching and learning, how children attempt to make meaning from abstract symbols and the challenges of many maths concepts for young children.

Teaching in all areas needs to build on what the youngest children know and can do, rather than a 'top down' model. This raises questions about the knowledge and experience of the proposed Mathematics Specialists, since few primary teachers have in-depth expertise in the early years, something that largely has not been the case for Numeracy Consultants.

5 Recommendation 5: The review endorses the Government's goal of increasing the proportion of graduate practitioners in early years settings.
(Chapter 7: The Early Years Foundation Stage, paragraph 77)

☐ Strongly agree ☐ **Agree** ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

Comments:

Yes - it is vital that all those who teach young children are at least as well qualified as other primary teachers (but see early response about Early Years Professional Status practitioners). They also need in-depth knowledge of how children learn and develop, including social and emotional development, and how and why playful approaches to learning are particularly powerful for young children.

6 Recommendation 6: Intervention in Every Child Counts should be led by a qualified teacher, normally with a single child, but in the research and

development phase, there should also be investigation of the potential benefits of working with small groups of up to three children.
(Chapter 8: Under-attainment and intervention – Every Child Counts, paragraph 131)

☐ Strongly agree	☐ Agree	**Neither agree nor disagree**
☐ Disagree	☐ Strongly disagree	

Comments:

Inevitably, teaching assistants and other adults will be involved in interventions. This means that the teachers and assistants who work together need time to build their own relationships of trust and respect. In the name of equal opportunities, it is also vital that children with special needs are taught mainly by qualified teachers and not left solely to be 'taught' by assistants. As it is teachers who will inevitably have the most mathematical knowledge, they will need to ensure that teaching assistants are clear about developmental pedagogy as well as 'getting the sums right' which research has shown is often a priority for classroom assistants (Moyles and Suschitzky 1997).

7 Recommendation 7: Before any intervention programme is implemented, it is vital that the child is fully committed and that the parents or carers are involved and understand the nature of the programme. These issues and the question around the integration of intervention teaching and classroom teaching for pupils should be considered carefully in the research and development phases of Every Child Counts.
(Chapter 8: Under-attainment and intervention – Every Child Counts, paragraph 142)

Strongly agree	☐ Agree	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

Intervention programmes will only work if EVERYONE is fully committed to making it work for the child concerned. The programme must also be phased in and phased out for the child, rather than having abrupt beginnings and endings. In theory, integration is preferred but this must not at the expense of all the other children in the class/setting.

8 Recommendation 8: The primary National Curriculum in mathematics should continue as currently prescribed, subject to any changes which may result from Sir Jim Rose's forthcoming review of the primary curriculum; the latter should examine the concept of 'use and application' more generally across subjects to assess whether the mathematical or other aspects of the curriculum need to be amended.
(Chapter 9: Curriculum and pedagogy, paragraph 163)

☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree

Disagree ☐ Strongly disagree

Comments:

We strongly believe that the Foundation Stage should be extended at least until the end of Year 1 or Yr 2, and the primary National Curriculum begun in Year 3. The emphasis throughout the entire Foundation Stage should be on an effective, play-based curriculum in which teachers and practitioners understand young children's mathematical development and effective pedagogy to support their mathematical meanings, understandings and thinking during this important phase.

The symbolic nature of mathematics makes formal mathematics difficult for young children who need first-hand, relevant, play experiences of handling numbers and mathematical concepts. Rather than teaching through restricting subjects, it would be more effective to train teachers to exercise professional judgement, enable them to see conceptual links across subjects, and then allow them to implement a curriculum that is broad in scope and relevant to their particular pupils. It is unhelpful to have mathematics as a separate strand within the Foundation Stage as it encourages separate, decontextualised

thinking and teaching. Teachers and other practitioners need to be trained to understand the cross-curricular nature of children's play and learning as it relates to numeracy and literacy. A carefully managed thematic approach, promoting cross-curricular skills and understandings, is to be preferred to an approach based on individual subjects because the latter are very time-consuming to implement and can so easily become out-of-date. However, it is important that where a thematically-based approach is used, it is built upon sound planning by teachers based on a clear and in depth knowledge of children's interests and mathematical understandings. Properly planned and taught, a thematic based approach can allow for more thorough conceptual development and the development of knowledge and skills in a context that makes sense to individual children.

Another highly successful approach is where teachers' observations (EYFS) or 'learning stories' (Carr 2001) of children learning through their play are used to inform teachers' plans: this allows for further experiences and opportunities that extend and support individual learners and builds on what they already know and can do, effectively 'personalising' learning.

The emphasis throughout should be on attitudes, understanding and dispositions in order to create motivated, purposeful, independent, lifelong learners. This would also allow more scope for schools to decide what is meaningful to the children and appropriate to their particular school community.

Question 9 is in three parts,

9 a) Proposal for consultation : Should the example be followed of other professions and a National Register of Professional Development for teachers be established?

☐ Yes **No** ☐ No view

Comments:

Not clear what this would achieve.

This proposal raises questions about eligibility for inclusion in such a register and how CPD providers would be selected (or agreed for inclusion).

Since the findings of research into children's learning of mathematics and effective pedagogy in mathematics often fails to reach early years settings and classrooms, some potentially valuable knowledge often remains within largely academic circles. One way of reducing this problem would be to develop stronger links to research; firstly through evidence-based CPD and secondly through promoting and involving teachers and practitioners in action research in their own settings and schools. We need to move towards a more generous view of CPD that includes teachers and practitioners rather than a reliance on CPD largely through input courses.

We believe strongly that the government needs to be clear about claims made for example, 'learning styles', 'Brain-gym', 'brain-based learning', 'accelerated learning' and 'hydration' that at best are misguided and at worst untrue. Such courses divert teachers' valuable time and attention from important issues relating to learning and teaching that are well supported by validated research. At worst, they confuse teachers and divert vast sums of money that would be better spent on developing their knowledge and pedagogy based on sound evidence and research. Many of these claims have been revealed to be highly questionable by studies including the *Learning and Skills Research Centre* and DfES (2004) and the recent *Primary Review Report* (December 2007), Research Survey 2/1a: *Children's Cognitive Development and Learning* (Usha Goswami and Peter Bryant) which emphasises that such claims 'are *not* supported by the latest brain science of learning' (p.24). We have been deeply concerned that some Higher Education institutions also focus on *Learning Styles*

9 b) if so, who should be responsible for keeping it?

Comments:
We already have the General Teaching Council.

9 c) and if so, what would be the relative benefits, disadvantages and costs? (Chapter 6: ITT and CPD for Teachers, Paragraph 33)

Comments:

Question 10 is in 3 parts.

10 a) Proposal for consultation : What form of incentive, if any, should there be for all practitioners to undertake CPD and what difference would it make to uptake?

Comments:

The one thing that all practitioners will respond to is TIME: time out and cover from regular teaching to attend CPD activities. This would make significant difference to uptake as headteachers will feel able to release teachers only if classes are supply-covered. The issue of valuing, respecting and trusting teachers is also an issue here: over recent years, teachers have been put in the position of being technicians, conforming, complying and 'delivering' a curriculum over which they have had little say and feeling inadequate if their professional knowledge tells them their teaching is actually inappropriate for the children.

However, CPD need not focus only on direct, expert-led and face-to-face sessions as various networked learning groups have shown. A great incentive would be to replace some of the direct 'input' courses with encouragement for teachers and practitioners to develop their own local networked learning groups in which they have ownership. In the face of a prolonged period of government-led initiatives and nationally, locally and school-based CPD, we believe that this would empower teachers and allow them to focus on mathematics appropriate to their particular settings and classes and the children they teach. Networked learning groups could choose to share their knowledge through networking with other groups in their geographical area and nationally, through sharing information on a national website and though occasional publication of the knowledge generated by their groups (as in the former '*National Writing Project'*) and through regional and national conferences.

10 b) are there any aspects of this question specific to mathematics?

Yes	☐ No	☐ Not Sure

Comments:

Particularly in relation to the early years, practitioners/teachers must understand how children develop mathematical skills and the complexities of the symbol system involved. All too often children are required to complete worksheets which, at best they can already do, and at worst leave them bored and unmotivated.

One key aspect that appears to be specific to mathematics for some early years teachers is their own confidence in mathematics and of a sometimes limited understanding of appropriate pedagogy for the youngest children (birth-to-7 years). They are often confused by the guidance (or lack of guidance particularly in respect of teaching early 'written' mathematics and calculations that results in a narrow perspective of what will best support young learners and

build confident young mathematicians (see for example Adams *et al.* 2004 - ATL Report on the teaching of mathematics and literacy in Reception classes). Of all the areas of the EYFS, it appears that children's experiences of mathematics are often fragmented and limiting, resulting in a lack of challenge and superficial understanding that lay poor foundations for mathematics in Key Stage 2 and beyond.

10 c) in the case of any long term CPD programmes leading to formal Masters-level qualifications, what additional incentives should there be? (Chapter 6: ITT and CPD for Teachers, Paragraph 61)

Comments:

Incentivising and making possible long-term CPD is vital to the development of a fully professional evidence-based teaching workforce. Salary increases and promotion should, therefore, be directly linked to CPD, so that further study and reflection upon practice is seen as an integral part of professional development, rather as an indulgent luxury, as now. At the same time, the detailed and over-prescriptive nature of the curriculum needs to be addressed in order to allow well qualified professionals to exercise their judgement and respond in an evidence-informed manner to the learning needs of the children with whom they are working.

For the following proposals, section please state how far you agree/disagree with the proposals and add any comments below

11 Proposal for consultation: The review acknowledges the change in the statutory QTS-to-pupil ratio from reception class onwards, but stresses the subject-specific need in mathematics for the presence of at least one additional suitably qualified adult, for example a teaching assistant with level 3 qualifications. Views are sought during consultation on how this might best be accomplished. (Chapter 7: Early Years Settings, Paragraph 96)

☐ Strongly agree	☐ Agree	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

12 Proposal for consultation: The review sees considerable potential for more effective use to be made by primary practitioners of the Foundation Stage Profile, analysed at the scale point level, not just on total scores. Views are sought on best practice and experience on this, especially from primary and EYFS practitioners. (Chapter 6: Early Years Settings, Paragraph 99)

☐ Strongly agree	☐ Agree	**Neither agree nor disagree**
☐ Disagree	☐ Strongly disagree	

Comments:

Many children do not meet all the early learning goals before entering KS1. We would emphasise that the ELGS should continue into KS1 so that numeracy/ mathematical skills and concepts can develop securely in a purposeful context that helps children make sense and meaning through play and first hand experiences, rather than undermining any disposition they have developed to mathematical learning.

Any narrow emphasis on continual 'ticking-off' targets throughout the term needs to be strenuously avoided since it reduces opportunities for children to have meaningful experiences at the expense of achieving narrow 'skills'. At the same time it develops a culture in which many of these very young children soon become viewed as early 'failures' in mathematics if they have reached fewer targets than some of their peers.

13 Proposal for consultation : Careful selection of the child who will benefit from intervention is of critical importance and should be based on robust research evidence and on a fine-grained assessment of the child's current level of competence. How can that best be achieved? (Chapter 8: Intervention and 'Every Child Counts', Paragraph 121)

☐ Strongly agree	☐ Agree	☐ Neither agree nor disagree
Disagree	☐ Strongly disagree	

Comments:

This is a dangerous area for very young children for whom the context of their learning is so important. Children can understand a concept in one situation but not in another.

In the early years, 'fine-grained assessment' based on in-depth teacher knowledge should be based on effective observations of children's mathematical understanding and concepts through play, rather than testing their skills in formalised ways before knowledge and skills have had time to develop or become securely established.

14 Proposal for consultation: The review seeks confirmation on whether the intervention programme in Every Child Counts should, wherever possible, be completed by the end of Key Stage 1, i.e. around seven years of age? (Chapter 8: Intervention and 'Every Child Counts' , Paragraph 124)

☐ Strongly agree	☐ Agree	☐ Neither agree nor disagree
☐ Disagree	**Strongly disagree**	

Comments:

This is far too early. Many children at 7-years are still grasping the fundamentals of numeracy, mathematical concepts and communication skills. The EYFS should be continued to the end of KS1 so that the learning experiences encountered by children are consistent. At present this is, sadly, not the case. There are considerable risks in judging very young children as failures in mathematics when their understanding is yet only partial and when in most other countries children have not yet started formal education.

15 Proposal for consultation : Where a child is in need of intervention support in both literacy and mathematics, is there a logical sequence in the literacy and mathematics intervention programmes? (Chapter 8: Intervention and 'Every Child Counts' , Paragraph 128)

☐ Literacy first, maths second	☐ Maths first, literacy second	☐ Both at the same time
☐ Leave it to the discretion of the school	☐ Other-please specify below	

Comments:

16 Proposal for consultation : Whatever intervention programme or programmes are advocated as part of Every Child Counts, what resources and equipment are required and how can schools be adequately funded to provide them? (Chapter 8: Intervention and 'Every Child Counts' , Paragraph 138)

Comments:

17 Proposal for consultation: Issues of transition between EYFS and Primary remain a concern to this review. It is therefore suggested that there should be greater coherence between 'Problem solving, reasoning and numeracy' in EYFS and 'mathematics' in Key Stage 1 to ensure continuity in learning. The review seeks views on how this might best be accomplished. (Chapter 9: Curriculum and Pedagogy, Paragraph 166)

☐ Strongly agree	**Agree**	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

Yes, we wholly agree with this suggestion and have already indicated a view above (see 14) in this regard.

18 Proposal for consultation: The review seeks inputs on how best to encourage children to improve their mental calculation strategies and develop high-quality

classroom discussion of the subject. (Chapter 9: Curriculum and Pedagogy, Paragraph 179)

☐ Strongly agree	**Agree**	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

Mental calculation strategies underpin written calculations. Therefore, rather than children recording something they have already either worked out mentally or with practical resources, the emphasis should be shifted to children being encouraged to use paper and pen if they choose to use it to support their mathematical thinking. This would help shift the emphasis from children filling in worksheets (a colouring-in activity rather than one requiring much mathematical engagement or content); or completing standard, horizontal calculations with superficial, if any, understanding. Children's mental methods for calculations need to be built on their earliest understandings of quantities and counting and teachers/practitioners should encourage them to develop their own written methods as they come to understand the written symbols and their functions. Formal teaching of written calculations should be left to at least the end of Year 1. For young children mental – and any early 'written' calculations (their own mathematical graphics) – need to be rooted in contexts that are personally meaningful – through play and through other relevant contexts (e.g. Nunes and Bryant 1996).

Dialogue needs to be collaborative if it is to lead to negotiation and co-construction of meanings and involve both the teacher and individual and, sometimes, small groups. This is especially important concerning meanings and understandings about the abstract written symbols of mathematics if children are to move towards standard written mathematics with deep understanding (Munn 1997).

19 Proposal for consultation: How can ITT and CPD give adequate priority to the development of pedagogies linked directly to the mathematics curriculum and appropriate to the unique needs of teaching mathematics, as well as to more general schemes of pedagogy which seek to address all subjects? (Chapter 9: Curriculum and Pedagogy, Paragraph 182)

Comments:

We have emphasised already the vital need for practitioners/teachers to be allowed to make principled, professional judgements in relation to individual children and the class as a whole. For too long teachers' confidence has been undermined by the 'delivery' ethos and the prescription applied to their teaching by the government and its advisers. Pedagogy is knowledge about teaching and learning – this is, and should be, part of every initial teacher education and CPD course, whatever its subject basis. Politicians seem to be content with a minimalist approach to teaching and learning, limited to basic measurable standards that cannot encapsulate vision and risk-taking – always the mark of a good teacher.

Teachers/practitioners should understand clearly that young children operate in a multi-sensory way and that physical, personal, emotional, social and creative development underpins children's intellectual growth and their disposition and motivation to learn. Physical development through play, in particular, is highlighted if boys are to be successful learners. A narrow emphasis on calculations, and particularly written calculations in the Reception class, should be avoided at all costs. ITE and CPD courses need to include young children's learning of the written language of mathematics and appropriate pedagogy to support this, and greater emphasis placed on children's developing mathematical thinking and communicative aspects of mathematics.

20 Proposal for consultation: It is important that practitioners are encouraged to work with parents to bring them up to date with the methods used to teach mathematics currently, in order that parents can support their children effectively. The review seeks views on how this might best be accomplished (Chapter 10, Parents and Families, Paragraph 195)

☐ Strongly agree	**Agree**	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

Yes, in principle, we agree with this but, in practice, parents are busy people and whilst many give inordinate amounts of time to supporting their children's mathematical and literacy learning, there is a limit to what should be expected of them.

In the case of young children, it is helpful if practitioners are encouraged to send home creative evidence such as pictorial representations and mathematical marks relating to children's mathematical learning so that parents can see that maths does not depend on worksheets and other formal written outcomes. Evidence, such as children uses liquid measures in the water try, using money to shop in the role play area, or using constructional materials in ways that show their developing understanding of shape and space, is easy to acquire in playful early years classrooms and settings and can be supported by photographs,

21 Proposal for consultation: The review would welcome inputs from practitioners regarding innovative ways of actively involving parents in their child's maths education, for example, through workshops, games and joint parent / child sessions within the setting or school. (Chapter 10, Parents and Families, Paragraph 199)

☐ Strongly agree	**Agree**	☐ Neither agree nor disagree
☐ Disagree	☐ Strongly disagree	

Comments:

Just as children take home reading books, they could take home number games and puzzles to play with parents and older siblings. Some parents will no doubt be Sudoko fans and be keen for their children to enjoy brain-teaser games such as these – but the play element (rather than the completion or competitiion) must be emphasised for young children particularly. It would also be valuable to help parents be aware of the mathematics children explore informally through their spontaneous play.

Two particular aspects that would be of benefit to young learners are to raise parents' awareness of the value of talking with their children about mathematics as they go about daily tasks (e.g. talking about the amount of petrol they are putting in the car or talking about how much money they need to pay the

milkman) and helping them be aware of real situations in which they write something mathematical (e.g. explaining what they are doing when writing a cheque or involving their child in writing a shopping list).

22 Do you have any further comments on any other aspects of the review NOT covered above?

Comments:

Assessment issues: Narrow forms of assessment are currently driving the pedagogy of mathematics. This is grossly inappropriate for young children who need time and scope to understand the complex concepts involved in mathematics and to play with ideas and meaning. We believe that all assessment should be from a positive perspective and based on information from teachers' observations of the mathematics children know, can do and use.

Relating to this we agree with the Interim Report that insufficient attention is given to the use of the Foundation Stage Profile (FSP) at scale point level, and further agree that Point 8 presents difficulty, either in the teachers' understanding the terms used e.g. 'developing mathematical ideas and methods to solve practical problems' or what this point means in reality. We recommend that this point be related to *using and applying mathematics* for children in Key Stage 1.

Regarding mathematical language, we hope that the Review team would consider recommending designated sections in *Problem solving, reasoning and numeracy*, on *language for thinking about mathematics* and *mathematical language for communication*. Children need to develop their understanding of ways in which mathematical language is used to support their thinking – and a significant and related aspect of this is also their own mathematical marks and representation which are exterior representations of their internal, abstract mathematical thought. The importance of *communicating* mathematical ideas through the use of spoken language is largely under-explored in mathematics in the Foundation Stage. Furthermore these two aspects relate to Point 8 of the FSP and to *Using and applying mathematics.*

Children's 'graphic explorations': we are encouraged that the Interim Report of the Williams Review highlighted the fact that guidance in the EYFS 'stresses the value of children's own graphic explorations' and highlighted that there is a 'valuable opportunity to encourage this early experimentation'. However, we stress that rather than the value resting *solely* with early experimentation in the Foundation Stage, that children's graphical explorations underpin their understanding about the full range of written mathematics including calculations

and data handling, leading to a deepening understanding of this central aspect of the mathematics curriculum and are equally important throughout Key Stage 1 (Carruthers and Worthington 2005; 2006) and provide an effective means to bridge transition between the Foundation stage and Key stage 1,

Thank you for taking the time to let us have your views. We do not intend to acknowledge individual responses unless you place an 'X' in the box below.

Please acknowledge this reply x

Here at the Department for Children, Schools and Families, we carry out our research on many different topics and consultations. As your views are valuable to us, would it be alright if we were to contact you again from time to time either for research or to send through consultation documents?

Yes ☐ No

Thank you for taking time to respond to this review.

Completed questionnaires and other responses should be sent to the address shown below by 30 April 2008

Send by post to: Consultation Unit, Department for Children, Schools and Families, Area 1A, Castle View House, East Lane, Runcorn, WA7 2GJ.

Send by e-mail to: wmr.consultation@dcsf.gsi.gov.uk