

# Mathematics Teaching in the Early Years

An Investigation  
of Teachers' Subject  
Knowledge

*Carol Aubrey*

# Mathematics Teaching In The Early Years An Investigation Of Teachers Subject Knowledge

**Elizabeth Carruthers, Maulfry  
Worthington**



## **Mathematics Teaching In The Early Years An Investigation Of Teachers Subject Knowledge:**

**Mathematics Teaching in the Early Years** Carol Aubrey, 2013-04-03 Young children start school already able to do a surprising amount of mathematics This book examines the nature and origin of subject knowledge and is based on information gathered from observing the interactions between teachers and their first year pupils It demonstrates the necessity of the classroom teacher to draw on many kinds of knowledge in order to deal with various issues surrounding classroom learning and teaching Two important core areas are knowledge of lesson structure and of subject matter this book address the area of subject matter and as such it should be of interest to classroom teachers and lecturers in education

**Developing Primary Mathematics Teaching** Tim Rowland, Fay Turner, Anne Thwaites, Peter Huckstep, 2009-03-09 How can KS1 2 teachers improve their mathematics teaching This book helps readers to become better more confident teachers of mathematics by enabling them to focus critically on what they know and what they do in the classroom Building on their close observation of primary mathematics classrooms the authors provide those starting out in the teaching profession with a four stage framework which acts as a tool of support for developing their teaching making sense of foundation knowledge focusing on what teachers know about mathematics transforming knowledge representing mathematics to learners through examples analogies illustrations and demonstrations connection helping learners to make sense of mathematics through understanding how ideas and concepts are linked to each other contingency what to do when the unexpected happens Each chapter includes practical activities lesson descriptions and extracts of classroom transcripts to help teachers reflect on effective practice

**The Role of Subject Knowledge in the Early Years of Schooling** Carol Aubrey, 2022-11-21 Originally published in 1994 the aim of the authors was to provide a comprehensive introduction to recent advances in research which had been made in learning and teaching in the early years of schooling at the time Emphasis is placed on how subject knowledge is constructed or acquired and the organization of teaching to promote the learner s active construction of meaning through the integration of new knowledge with existing understanding The National Curriculum is founded in subject knowledge though little examination appears to have been made of this in terms of how subject matter is transformed into the content of teaching that young children can understand It this remains for the teacher to develop instruction through the creation of a curriculum content and sequence which both reflects and advances the structure of existing forms of representation problem solving and knowledge which the child brings to the school The whole thrust of the book challenges the conventional early years ideology with its emphasis on child centred concrete and empirical approaches to learning with a view of teaching which is concerned with making sense of children s understanding and allowing their active construction of knowledge and information processing to develop expertise in context

Mathematics in Early Years Education Ann Montague-Smith, Tony Cotton, Alice Hansen, Alison J. Price, 2013-03-05 This third edition of the best selling Mathematics in Nursery Education provides an accessible introduction to the teaching of mathematics in the early years Covering all areas of

mathematics learning number and counting calculation pattern shape measures and data handling it summarises the research findings and underlying key concepts and explains how adults can help children to learn through practical experiences discussion and more direct intervention This new edition has been fully updated to incorporate the latest research and thinking in this area and includes why mathematics is important as a way of making sense of the world how attitudes to mathematics can influence teaching and learning how children learn mathematics new material on sorting matching and handling data ideas for observation and questioning to assess children s understanding examples of planned activities suggestions for language development assessment criteria This textbook is ideal for those training to be teachers through an undergraduate or PGCE route those training for Early Years Professional Status and those studying early childhood on foundation or honours degrees as well as parents looking to explore how their young children learn mathematics This will be an essential text for any Early Years practitioner looking to make mathematics interesting exciting and engaging in their classroom

*A Developmental Approach to Early Numeracy* Carol Aubrey,1999-12-01 Under achievement in maths is a growing concern for many teachers This book shows how a developmental approach to teaching maths can help to both identify difficulties and raise children s achievement Beginning with the Early Years age focused chapters outline some of the strategies that can be used to identify those in need of special teaching Practical examples show how these strategies can be applied in classroom situations Beginning with the early years age focused chapters look at the knowledge children develop outside school how teachers can assess and build on that knowledge children s misunderstandings in maths and how to remedy these This book also outlines some of the strategies that can be used to identify those in need of special teaching Practical examples show you how these strategies can be applied in classroom situations Each chapter is closely linked to the requirements of the National Numeracy Strategy and example lesson plans and activities are included detailing ways of using recommended strategies within the numeracy hour

**The Handbook of Mathematics Teacher Education: Volume 1** ,2008-01-01 The Handbook of Mathematics Teacher Education the first of its kind addresses the learning of mathematics teachers at all levels of schooling to teach mathematics and the provision of activity and programmes in which this learning can take place It consists of four volumes VOLUME 1 Knowledge and Beliefs in Mathematics Teaching and Teaching Development addresses the what of mathematics teacher education meaning knowledge for mathematics teaching and teaching development and consideration of associated beliefs As well as synthesizing research and practice over various dimensions of these issues it offers advice on best practice for teacher educators university decision makers and those involved in systemic policy development on teacher education

Mathematical Knowledge in Teaching Tim Rowland,Kenneth Ruthven,2011-01-06 The quality of primary and secondary school mathematics teaching is generally agreed to depend crucially on the subject related knowledge of the teacher However there is increasing recognition that effective teaching calls for distinctive forms of subject related knowledge and

thinking Thus established ways of conceptualizing developing and assessing mathematical knowledge for teaching may be less than adequate These are important issues for policy and practice because of longstanding difficulties in recruiting teachers who are confident and conventionally well qualified in mathematics and because of rising concern that teaching of the subject has not adapted sufficiently The issues to be examined in Mathematical Knowledge in Teaching are of considerable significance in addressing global aspirations to raise standards of teaching and learning in mathematics by developing more effective approaches to characterizing assessing and developing mathematical knowledge for teaching

*International Handbook of Mathematics Teacher Education: Volume 1*, 2019-12-02 This second edition of the International Handbook of Mathematics Teacher Education builds on and extends the topics ideas in the first edition while maintaining the themes for each of the volumes Collectively the authors looked back beyond and within the last 10 years to establish the state of the art and continuing and new trends in mathematics teacher and mathematics teacher educator education and looked forward regarding possible avenues for teachers teacher educators researchers and policy makers to consider to enhance and or further investigate mathematics teacher and teacher educator learning and practice in particular The volume editors provide introductions to each volume that highlight the subthemes used to group related chapters which offer meaningful lenses to see important connections within and across chapters Readers can also use these subthemes to make connections across the four volumes which although presented separately include topics that have relevance across them since they are all situated in the common focus regarding mathematics teachers Volume 1 Knowledge Beliefs and Identity in Mathematics Teaching and Teaching Development edited by Despina Potari and Olive Chapman examines teacher knowledge beliefs identity practice and relationships among them These important aspects of mathematics teacher education continue to be the focus of extensive research and policy debate globally Thus as the first volume in the series it appropriately addresses central topics issues that provide an excellent beginning to engage in the field of mathematics education through the handbook Contributors are Jill Adler Mike Askew Maria Bartolini Bussi Anne Bennison Kim Beswick Olive Chapman Charalambos Charalambus Helen Chick Marta Civil Sandra Crespo Sean Delaney Silvia Funghi Merrilyn Goos Roberta Hunter Barbara Jaworski Kim Koh Esther S Levenson Yeping Li Niamh O Meara JoengSuk Pang Randolph Phillipp Despina Potari Craig Pournara Stephen Quirke Alessandro Ramploud Tim Rowland John Zig Siegfried Naiqing Song Konstantinos Stouraitis Eva Thanheiser Collen Vale Hamsa Venkat and Huirong Zhang

**Supporting Early Mathematical Development** Caroline McGrath, 2010-07-12 This highly topical resource offers an excellent blend of theory and practice that will enable you to deliver successful mathematical education to birth to eight year olds **Children's**

**Mathematics** Elizabeth Carruthers, Maulfry Worthington, 2006-08-07 In Case Study 5 a grassroots Children's Mathematics Network group the initiative supported the participants in their professional change by giving them a space for the detailed and joint consideration of children's mathematical thinking Another significant feature of this initiative is its focus on careful

consideration and analysis of children's mathematics and the ways in which professionals can support and encourage the children's mathematical thinking and reasoning. The standard of the mathematical understanding thinking and reasoning that the displays revealed was far higher than the specified curriculum objectives for children of this age. Researching Effective CPD in Mathematics Education RECME project NCETM 2009. The review also plays great score by play based learning of a mathematical nature and makes specific recommendations regarding early mark making as a precursor to abstract mathematical symbolism. Section 115 features children's mathematical graphics and emphasises. The role of mark making in children's cognitive development is set out in the taxonomy Carruthers and Worthington 2006. The report recommends that local authorities leaders managers and head teachers should provide a culture with a significant focus on mathematical mark making and a learning environment that encourages children to choose to use their own mathematical graphics to support their mathematical thinking and processes. The Williams Maths Review DCSF 2008. At the very heart of the success of the book is the authors ability to see mathematics through young children's eyes by listening to and reflecting on the constant efforts made by children to make sense of their world. This is a liberating book which proposes that the teaching of mathematics could and should be a highly creative and enjoyable process. Branwen Llewelyn Jones Early Years Consultant at PACE Ltd TACTYC. Ground breaking. To single out any one chapter would be unfair because there is something thought provoking and inspirational throughout. If you want to expand your understanding upwards and outwards then get a copy soon. Times Educational Supplement. I first read Children's Mathematics Making Marks Making Meaning a couple of years ago and it had an immediate impact on my own thinking and teaching and the work I do with trainee teachers. I'm sure you will find it compelling reading too. I think it has the potential to change in a fundamental way how we think about early mathematical development. Lynne McClure Editor Math Coordinator's File Mathematics Association. In their exceptionally readable and informative book Children's Mathematics Making Marks Making Meaning Carruthers and Worthington 2006 draw attention to one of the main goals of early years teaching that is to help children make links between the mathematics they have already encountered and continue to engage with at home and the more abstract mathematics of the school. These authors suggest that by encouraging children to represent mathematical ideas in their own ways and crucially by talking to the pupils about the marks they have made we are given a window onto their thinking that may otherwise be inaccessible. Liz Pumphrey NRICH. This book draws on the authors many years of teaching children aged three to eight years and also on their extensive research with children in the home nursery and school. The authors explain the development and range of young children's mathematical marks and visual representations showing how children make mental connections between their own early marks and subsequent abstract mathematical symbolism and go on to develop their own written methods. Combining theory and practice this acclaimed book demonstrates how children's own mathematical graphics are highly creative and show deep levels of thinking. The authors show how this is the key to success in school mathematics and to higher levels of

achievement The authors are winners of TACTYC's 2003 Jenefer Joseph Award for the Creative Arts 3-8 awarded for their innovative work with children on mathematical graphics

**Early Childhood Educational Research** Carol Aubrey, Tricia David, Ray Godfrey, Linda Thompson, 2005-12 This work focuses on the field of early years research It argues that the educational research community has blossomed in the UK in recent years with the growth of higher degrees and practitioner research within this area

Mathematics Education in the Early Years Martin Carlsen, Ingvald Erfjord, Per Sigurd Hundeland, 2020-03-13 This book gives insights in the vivid research area of early mathematics learning The collection of selected chapters mirrors the research topics presented at the fourth POEM conference in May 2018 Thematically the volume reflects the importance of this evolving area of research which has begun to attract attention in the spheres of education and public policy due to increased interest in early years learning The research foci of the chapters comprise children's mathematical reasoning early years mathematics teaching and the role of parents for children's mathematical development The 2018 conference included a wider range of researchers than previous years

*Understanding Children's Mathematical Graphics: Beginnings in Play* Elizabeth Carruthers, Maulfry Worthington, 2011-04-16 This book challenges traditional beliefs and practices of teaching written mathematics in early childhood It gives theoretical underpinnings and offers exciting insights and context to children's early mathematical thinking and in particular into children's mathematical graphics showing how this supports their understanding of the abstract symbolic language of mathematics Drawing on a wide range of examples it illustrates and explains how children explore and communicate their mathematical thinking through their mathematical graphics and how this begins in play The book looks at the power of children's own marks symbols and other graphical representations to convey meanings exploring how they support complex thinking The authors explore the relationship between children's play and meaning making Rather than viewing mathematics as a separate subject or as a set of basic skills to be transmitted they demonstrate that in supportive learning cultures children develop their own mathematical thinking to solve problems Key features include Numerous new examples and case studies of children from birth to 8 years highlighting the complexity and richness of children's thinking Explanation of pedagogical issues showing how they can support rich play and mathematics Draws on the authors latest research This book is valuable reading for students teachers primary mathematics coordinators and all early years professionals working in the Early Years Foundation Stage and Key Stage One

Foundations of Mathematics Carole Skinner, Judith Dancer, 2013-06-20 Foundations of Mathematics outlines seven strands of practice which underpin successful mathematical development in children aged 3-7 Early years mathematics specialists Carole and Judith draw on their experience of working with early years practitioners including consultants and advisers across the UK and internationally The book is completely up to date and embeds the Revised Early Years Foundation Stage throughout the book The book brims with multi sensory ideas that will trigger children's curiosity measuring using sand mousse hunting for buried treasure and building secret dens outdoors There are activities

that involve playing and exploring games to make learning active and experiences to develop creative and critical thinking Alongside these practical experiences and activities are clear explanations of the reasoning behind the ideas with clear guidance on the role of the practitioner and Home Challenges to promote the engagement of families The authors provide straightforward advice to support the development of a mathematically enriched learning environment and ideas to help children transfer learning into their own child initiated play to build a genuine and solid foundation for mathematics

**Department for Children, Schools and Families** Great Britain. National Audit Office,2008 In 2007 the Department for Children Schools and Families commissioned Sir Peter Williams to undertake an independent review of the quality of primary mathematics teaching and his report was published in June 2008 This report evaluates in particular raising attainment and progress in mathematics and narrowing achievement gaps between certain pupils and their peers and the delivery and effectiveness of the Primary National Strategy s resources and interventions and their impact on pupil and school performance It was found that bringing greater structure and consistency to the way primary mathematics is taught the Strategy initially helped to improve test results at Key Stage 2 Since 2000 however attainment has levelled off It is too early to tell if the 2007 revisions to the Strategy will deliver the step change required The report makes recommendations on this basis Teaching And Learning Early Number Thompson, Ian,2008-10-01 For all trainee and practising early years teachers and classroom assistants this is an accessible guide to a wide range of research evidence about the teaching and learning of early number Planning an Appropriate Curriculum in the Early Years Rosemary Rodger,2013-04-03 The foundation stage has a fundamental role in the laying of foundations for children s learning In this new edition the author uses a wide range of material including research evidence to offer an additional dimension to work currently taking place in the Foundation Stage Each chapter includes the early learning goals for the majority of children and advice on providing for each area of learning personal social and emotional development language and literacy mathematics knowledge and understanding of the world and physical and creative development Students training to be specialist early years teachers and those already working in the sector will welcome this up to date guide to planning and providing for high quality learning experiences for children under five With case studies of good practice practical help in writing an early years policy and guidance on assessment and devising an effective post inspection plan this is a truly comprehensive guide to planning and implementing an appropriate curriculum for the under fives Proceedings Of The 14th International Congress On Mathematical Education (In 2 Volumes) Jianpan Wang,2024-06-07 The International Congress on Mathematical Education ICME is the largest international conference on mathematics education in the world This quadrennial event is organized under the auspices of the International Commission on Mathematical Instruction ICMI This book the Proceedings of ICME 14 presents the latest trends in mathematics education research and mathematics teaching practices at all levels Each chapter covers an extensive range of topics in mathematics education Volume I consists of 4 Plenary Lectures 3 Plenary Panels 5 Lectures of Awardees 4 Survey

Teams 62 Topic Study Groups 13 Discussion Groups 20 Workshops a Thematic Afternoon and an Early Career Researcher Day Plenary Lectures recognize substantial and continuing contributions to the growth of the field of Mathematics Education Plenary Panels address three major challenges currently facing mathematics educators across the globe The Survey Teams have a particular emphasis on identifying and characterizing important new knowledge recent developments new perspectives and emergent issues The Topic Study Groups provides a coverage of important topics in mathematics education Volume II consists of 50 invited lectures which present the work and reflections of both established and emerging researchers from around the world These lectures cover a wide spectrum of topics themes and issues that reflect the latest challenges and development in the field of mathematics education

### **Mathematics Explained for Primary Teachers**

Derek Haylock,Ralph Manning,2014-06-19 Get access to an interactive eBook when you buy the paperback Print paperback version only ISBN 9781446285879 A Unique Blend of Digital and Print Learning Resources 5 Star student reviews A must have for teachers to be especially those who are a bit shaky on their maths knowledge Not many maths books keep me fixated but this is one that is definitely worth the money It is a book I will be using even when in the classroom Mathematics Explained for Primary Teachers develops your understanding of mathematical concepts and processes and how children learn them so you can confidently teach mathematics to primary children Tried and tested the fifth edition of Derek Haylock s much loved textbook matches the 2014 curriculum requirements for England Every chapter integrates children s learning classroom practice and teacher s own requirements for subject knowledge making this the ideal text to guide you through your studies and beyond More than just a book The new edition is supported by FREE access to an interactive eBook and a companion website allowing you to use a wealth of teaching and learning resources You can use the eBook to study where and when you want and read annotate and search the book on a tablet laptop or PC You can also visit [study.sagepub.com/haylock5e](http://study.sagepub.com/haylock5e) to access Videos by the author introduce core themes of each section and explain key mathematical processes Links to the National Curriculum specify the statutory requirements for primary schools in England that relate to the mathematical content of each chapter Learning and Teaching points highlight important issues you may face in the classroom and provide practical guidance for teaching Self assessment questions help check your understanding and provide immediate feedback to see how well you have done Select SAGE journal articles to support literature reviews and wider reading Lesson Plan Activities by Ralph Manning support content focused chapters and contain creative mathematics tasks across the primary age range A Student Workbook is also available to accompany this book including over 700 practice problems to help you understand apply and teach primary mathematics Derek Haylock is an education consultant and writer with a background in mathematics teaching teacher education and classroom based research in mathematics education Ralph Manning is an independent consultant in primary education He has worked as a primary teacher and as a lecturer in primary teacher education for 18 years following a career in IT interactivity only available through Vitalsource eBook

Care and Education in Early Childhood Audrey Curtis, Maureen O'Hagan, 2003-12-16 This book provides a comprehensive text that brings together the core issues surrounding the training of early years students

## Unveiling the Power of Verbal Beauty: An Mental Sojourn through **Mathematics Teaching In The Early Years An Investigation Of Teachers Subject Knowledge**

In some sort of inundated with displays and the cacophony of fast transmission, the profound energy and psychological resonance of verbal beauty usually fade into obscurity, eclipsed by the regular barrage of sound and distractions. However, set within the musical pages of **Mathematics Teaching In The Early Years An Investigation Of Teachers Subject Knowledge**, a charming function of fictional beauty that pulses with raw thoughts, lies an remarkable journey waiting to be embarked upon. Penned with a virtuoso wordsmith, that enchanting opus manuals readers on a psychological odyssey, delicately revealing the latent possible and profound affect embedded within the delicate internet of language. Within the heart-wrenching expanse with this evocative analysis, we will embark upon an introspective exploration of the book is key subjects, dissect their fascinating writing model, and immerse ourselves in the indelible impression it leaves upon the depths of readers souls.

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