Annotated bibliography and further resources

Journals

Keyword internet search

Many journals are available through the internet. ‘Mathematics teaching and learning associations’ is useful as a keyword search to gain access to national and international associations of mathematics teaching.

Australian Association of Mathematics Teachers journals

The following three journals are available through Australian Association of Mathematics Teachers (AAMT):

- The Australian Mathematics Teacher
  
  This journal is a medium for the exchange of national and international teaching ideas. The AMT is published quarterly and is directed at teachers of mathematics in Years 7 to 10.

- Australian Senior Mathematics Journal
  
  This journal is published twice a year and is aimed at mathematics teachers of Years 11 and 12, and the first few years of education at university, college and TAFE.

- Teaching Mathematics
  
  This journal of the Queensland Association of Mathematics Teachers is published four times a year.

Journal articles


The authors examine the importance of providing meaningful opportunities for students to explore zero. By developing an understanding of zero, students establish a foundation for the introduction of algebra and the authors outline a possible sequence for exploring it.


A theory for designing teaching based on mathematical activity, situations, tasks and interventions, exposing and resolving cognitive conflicts, changes of structure and context, feedback, reflection and review is explained in this article. The ways that children make connections between concrete experiences and the formalisation of mathematical principles is also discussed.


A research-based paper that outlines stages of understanding needed to read analogue time. Students from Years 1 to 6 were tested for their ability to read analogue time, and asked to discuss the strategies they used. A sequence of learning to read time is proposed based on research and the findings of this study.


This paper considers ways to improve the performance of students’ mathematical performance in the middle years. The focus is on mental computation strategies and the need for students to practise their numeracy skills in a range of mathematical and social contexts.

Doug Clarke outlines a range of strategies, classroom activities and assessment tasks that aim to provide challenging learning experiences for middle years students. The focus is on discussion and involvement of students in their own learning and valuing, and building upon students’ methods of solving problems. The value of open-ended tasks and posing higher order questions are also discussed.


This article discusses a number of aspects related to how children learn about space and geometry. It provides information about the importance of developing children’s spatial sense, orientation, visualisation and imagery. It also describes materials that are useful for teaching and learning about space.


This paper outlines how to enhance young children’s exploration of geometry. It includes suggestions for providing a mathematics-rich environment, specifically outlining the type of manipulative materials that enhance learning about geometric shapes and developing spatial sense.


In this paper, Carmel Diezmann provides examples of ways to develop spatial ability in young children. Four recommended primary focuses for teaching geometry as stated in the National Council of Teachers of Mathematics Standards (1989) are discussed. These include exploring the properties of geometric figures, geometric relationships, spatial sense, and the use of geometric ideas throughout the curriculum.


This article is a review of international literature related to number knowledge, number strategies, and frameworks for classifying the learning of number for children aged 9 to 11. It is rich with information about researchers and their findings in the area of mathematics in which they specialise.


This paper reports a study of Year 3 children’s addition and subtraction mental computation abilities, and the complexity of affective factors that supported and diminished their ability to compute efficiently. The part memory plays in mental computation is also investigated. Finally, some implications for teaching are discussed.


This paper examines research into the performance on arithmetic word problems of deaf and hard of hearing students in the south-east Queensland region of Australia. It was found that performance on word problems was similar for deaf and hearing students, but that deaf students experienced delays in achieving successful performance on word problems relative to their hearing peers. The results confirm the findings of other studies showing that students who are deaf or hard of hearing experience delayed language acquisition which affects their capacity to solve arithmetic word problems.


This article outlines principles for teaching measurement to young children. It explores theory related to how young children learn to measure and explains the basic objectives of teaching measurement in the early years.


This article describes how to increase the focus on mental computation by adding simple number sense activities to your curriculum. It explores the prerequisite skills required for mental computation, describes the characteristics of number sense, and emphasises the importance of students understanding that there is often more than one method of determining an answer.

This article explores how number tracks and hundreds boards may be used for learning about number as position and the relationships between numbers. It links the exploration of number through hands-on materials to children’s development of mental computation strategies.

This article examines how the sophisticated development of understandings associated with geometric relationships develops. It explains the van Hiele levels — developed by mathematics educators Dina van Hiele and Pierre van Hiele — as a continuum of conceptual understandings along which students must progress in order to prepare for the deductive reasoning required in higher levels of geometry.

A resource that was produced as part of the collaborative Numeracy Research and Development Initiative Developing Computation (2001–2003). It provides definitions associated with mental computation and includes children’s work samples.

A compilation of articles that looks at ways to develop children’s computational fluency from differing perspectives. It analyses a variety of strategies relating to teaching and learning computation methods.

This article provides examples of activities designed to help young children make sense of time.

This paper presents a framework to identify children’s understandings of spatial concepts. Emphasis is placed upon students’ exploration of imagery and concepts related to the mathematics of position, movement, two-dimensional and three-dimensional shapes.

Siemon, D. 2002, ‘Partitioning — The missing link in building fraction knowledge and confidence’, pp. 1–8, RMIT University, Bundoora.  
This paper outlines a sequence for teaching fractions in the middle years and contains practical examples of the ideas discussed.

This article is a reflection on research into children’s learning of geometry. It analyses and describes the van Hiele levels, an understanding of which can inform teaching of geometry and learning.

This paper explores the role of open-ended realistic division problems in the development of algebraic reasoning. It discusses the advantages of providing students with contextualised, open-ended learning experiences and reports on students’ responses to an open-ended realistic division problem.

This paper presents an analysis of two questionnaire items that explore students’ understanding of the concept of luck in relation to the development of ideas of formal probability. The questionnaires were devised for students in grades 3, 6 and 9.
Websites


The AAMT website provides information about resources and projects along with membership options. The bulletin board on the website provides updates on the latest information and events.


An annotated, interactive dictionary for students that explains over 500 common mathematical terms in simple language.


This page contains links to publications and is designed to assist teachers to learn more about teaching, learning and thinking of students in the area of early algebra.


This interactive mathematics dictionary provides definitions and interactive examples/problems to assist understanding. It is a dictionary for middle school students, teachers, parents/carers, and anyone else interested in learning more about mathematical topics in the middle school curriculum. Terms are grouped in categories. The navigation items provide the following: description, related terms, everyday examples, interactive checkpoints, more information, challenge.


The QAMT provides information about opportunities for the professional development of teachers to support and promote the teaching and learning of mathematics and encourage and promote research into the teaching of mathematics. Its website links to useful resources, membership information and the latest student competitions and activities.

Books


This text is organised in three parts:

- Mathematics and mathematics education
- Content and processes in the primary mathematics curriculum
- Implementing effective mathematics learning


This text is a compilation of informative articles related to mathematics teaching and learning. The articles are grouped in the text under the following sections:

- Encouraging young mathematicians
- Nurturing middle year mathematicians
- Developing independent mathematicians
- Recognising diversity in young mathematicians
- Tools and techniques for making mathematicians.

Clements, D. & Bright, G. 2003, Learning and Teaching Measurement, National Council of Teachers of Mathematics, USA.
This text illustrates many important aspects of measurement, and discusses current thinking about learning and teaching measurement. It covers all levels from early childhood to adult education and focuses on research and practice, as well as the combination of the two.


A series of articles compiled in the following sections: Perspectives on probability and probability education; Teaching and learning probability in the elementary school; Teaching and learning probability in the middle school; Teaching and learning probability in the high school; and Teachers and probability. Issues discussed range from students’ conceptions and misconceptions to assessing probabilistic thinking and reasoning.


A text that examines probability, inference for distributions, proportions, two-way tables and regression, multiple regression, and analysis of variance.

National Council of Teachers of Mathematics, 2001, Navigating through Algebra, Navigations Series, Virginia, USA.

This series of texts provides practical teacher-tested activities for pre-kindergarten, grade 2, grades 3 to 5, grades 6 to 8, and grades 9 to 12. The texts are designed to help students develop a strong sense of algebraic concepts and relationships.

National Council of Teachers of Mathematics, 2001, Navigating through Geometry, Navigations Series, Virginia, USA.

This series of texts provides practical teacher-tested activities for pre-kindergarten, grade 2, grades 3 to 5, grades 6 to 8, and grades 9 to 12. The texts are designed to help students develop a strong sense of geometric concepts and relationships.

Perso, T. 2003, Everything You Want to Know about Algebra Outcomes for Your Class, K–9, Mathematical Association of Western Australia.

A text that discusses misconceptions about algebra and how students use algebra. It highlights the importance of learning the language and symbol system of algebra, and how the move into formal algebra must occur gradually. Activities for students are also included.


David Salsburg examines the development of ever-more powerful statistical methods for determining scientific truth.

Further resources

The following list of resources is a selection of the most recent works by some specialists in the area of mathematics learning.


