



A GUIDE FOR PARENTS OF PRIMARY AGED CHILDREN HELPING YOUR CHILDREN WITH MATHEMATICS

The suggestions below have been prepared by staff at the Mathematics Teaching and Learning Centre at the Australian Catholic University as a guide for parents.

SOME GENERAL PRINCIPLES

There are a number of general principles which you might keep in mind when you are helping your children.

- **Building on success** is important. Create the impression that learning mathematics well is desirable. Reward effort and see errors as part of the learning process.
- People learn, not so much by being told things, as by **working things out for themselves** and linking new ideas to ideas that they already have. You can help by asking your children questions, letting them work out answers for themselves, and then discussing their answers and strategies with them.
- Children need **time to think** and **time to answer**. When asking your children questions or talking to them about mathematics, give them time. Be patient. Wait for them to answer. Also, explain to older children that they need to give younger children time to answer questions, rather than always answering for them.
- Encourage children to **talk**. Talking about mathematics is an effective way of learning, especially when a mathematical situation arises naturally.
- **Use mathematical words** when you describe things. For example, instead of saying "the big red bucket" you might say, "the 10 Litre bucket". Instead of saying "the large packet of rice", you might say, "the 2kg packet of rice". In this way, children get to hear the quantities being stated as an everyday way of describing things.
- **There is no hurry**. Children develop their mathematics skills gradually and there is no urgency about developing any particular skill. It is necessary to work progressively on helping them to learn mathematics. Start now, but there is no particular need to accelerate your child's development.

- **Buy children's books** with mathematical themes. Some examples are:

Allen, P. (1988). *A Lion in the Night*. Melbourne: Puffin Books.
Allen, P. (1994). *Mr Archimedes' Bath*. London: Puffin Books.
Anno, M. (1985). *Anno's Counting Book*. London: Macmillan.
Carle, E. (1982). *The Very Hungry Caterpillar*. London: Puffin Books.
Clement, R. (1999). *Counting on Frank*. Pymble, NSW: Angus & Robertson.
Dale, P. (2010). *Ten Out of Bed*. London: Walker Books.
Donaldson, J. (2007). *The Snail and the Whale*. London: Macmillan.
Fox, M. (2008). *Ten Little Fingers, Ten Little Toes*. Sydney: Scholastic.
French, J. (2009). *Baby Wombat's Week*. Pymble, NSW: Harper Collins.
Hutchins, P. (1987). *Clocks and More Clocks*. Middlesex: Puffin Books.
Hutchins, P. (1988). *The Doorbell Rang*. London: Puffin Books.
Wells, R. E. (2005). *Is a Blue Whale the Biggest Thing There is?* London: Franklin Watts.

Read these with your children and ask them questions about the stories.

- **Help your child's teacher**. Your child's teacher is vitally interested in your child's mathematical development. Talk to the teacher about how your child is going in mathematics and find out whether there are any ways that can help your child. Supporting teachers if they recommend any homework or home-based activities is highly desirable. Speaking positively about the school and teachers builds a positive feeling in the child about school and learning.

SOME SUGGESTED ACTIVITIES

The following are some activities that you can do with your children. Some are general and some relate to specific aspects of the mathematics curriculum.

ESTIMATING

Estimating is an important activity and applies to all aspects of mathematics. Whenever possible, ask your children to estimate quantities. For example, you might ask children to:

- Estimate the number of jelly beans in a jar
- Estimate how many people are in the room
- Estimate how many pieces of bread are in a loaf
- Estimate the biggest house number in the street that you have just turned into
- Estimate how far it is to a particular point in the distance whilst driving
- Estimate how long it will be until you walk to a particular point
- Estimate the crowd at large sporting events, such as football matches
- Estimate how many steps there are from the bottom to the top when you are walking up some stairs.

On some occasions, work together to find the actual amount, distance etc.

REMEMBERING

It is helpful for children to get practice at remembering numbers and other information. Examples of the type of information which we commonly try to remember are:

- Telephone numbers: when children are young, you might ask them to repeat back to you 2 or 3 number in a row; as they get older they should be able to repeat back longer strings, and even to remember some numbers such as their own phone number and those of their grandparent
- Addresses: help the children to learn their own address and others such as their grandparents
- Car registration numbers
- Birthdays: children can learn the birth dates in your family, and also those of other relatives and friends
- Times of special events.

LENGTH

We often compare objects and distances by length and height. Children can first do this without using units, then using informal units (like paces). Then they learn about metres, centimetres and kilometres. Also:

- When you are measuring with sewing or building materials, ask the children to estimate where a particular mark would be
- Put up a height measurer marked in centimetres on which the children can record their height at progressive intervals, such as once every two months. The children take an interest in the way that they grow, and it also provides a language for describing how their height is changing.

- Discuss lengths, heights, distances, angles which arise in sporting events (e.g., the Olympics)

WEIGHING

Children learn first to compare things by hand, and by using balances. Later they learn about kilograms, and grams. You can:

- Talk to children about different ways of weighing things
- Talk about containers in terms of how much they weigh
- Compare the size and weight of items in the supermarket
- Using language of heavier or lighter when comparing the weight of items
- Ask them to find something that might weigh the same as a packet of rice, for example
- Weigh ingredients when you are cooking (learning to cook is helpful in many ways).

CAPACITY

Children learn to compare containers by their capacities. Sometimes children think that a tall skinny glass holds more than a short fat one. Playing with containers and water helps. Children can use water or rice to compare the capacity of containers. They also learn about litres, then about millilitres. You can:

- Talk about the size of containers of items such as washing detergent bottles and medicine glasses
- Ask them to find something that they think has the same capacity as their drink bottle
- Describe objects in terms of their capacity such as the 375 mL bottle of Coke, or the 5 mL spoon.

TIME

It is important that children can read both analogue (clockface) and digital time. It is useful to get them to learn to do particular tasks, such as:

- Setting alarms and TV programs to record
- Asking the children "What is today's date?"
- Keeping track of family birthdays and knowing which ones are coming
- Estimating then checking how long it would take to find a particular name in the phone book
- Examining use-by-dates on items and comparing the dates with today's date
- Reading timetables: for example, ask "What time train would we need to catch to get to the football by one o'clock?"
- Asking time calculations like "How long is it from now until....bedtime?" "How long till your next birthday?"
- Finding birthdays or special events on the calendar

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MONEY

For obvious reasons, children can learn about money at home. This can include:

- Calculating money amounts and different ways to use coins and notes to present particular amounts – e.g. “Show me \$2.50”, “How much do I have in my hand?”
- Calculating which of two different size items is the better buy and discussing strategies
- Giving change, particularly change from \$1 or \$10
- Asking how much change they would expect to get.

DIRECTIONS

Parents have a variety of opportunities to help children learn about directions. You might like to:

- Describe how to do various household tasks – e.g. setting the table, give instructions like “Put the fork on the left hand side, the knife and soup spoon on the right hand side and the soup spoon on the right hand side of the knife.”
- Use north, south, east and west to give directions rather than simply pointing
- When travelling in the car if you need to use the street directory, let the children direct you. Let them find out how to locate your destination and then direct you using the street directory.
- When there are maps, such as maps of the school, maps of the suburb, maps of the city, or zoo that the children need to use for navigating or locating, let them take some responsibility for interpreting such maps.

SHAPES

Children can learn about shape names by hearing them used in everyday speech. You can also:

- Use shape names to describe objects, such as the square table, or the rectangular vegetable garden
- Get them to sort the cutlery drawer
- Play ‘I Spy’ games when travelling or walking. I spy with my little eye something that is shaped like a hexagon
- Do jigsaw puzzles together and ask the child to imagine the piece they need for a particular spot
- Have them help tidy items in the toolshed
- Make buildings using different shaped blocks.

LEARNING TO COUNT

Learning to count is important. Counting 1,2,3,4..... is the main way, but also counting using patterns:

| | |
|---------------------------------|----------------------|
| 2, 4, 6, 8..... | 5, 10, 15, 20..... |
| 100, 99, 98, 97..... | 100, 90, 80, 70..... |
| 0.5, 1, 1.5, 2..... | a, b, c, d..... |
| Monday, Tuesday, Wednesday..... | |
| January, February, March..... | |

Nursery rhymes help with forwards and backwards counting. “Five little ducks”, “1,2,3,4,5, once I caught a fish alive”, “10 green bottles”, are just a few examples of the nursery rhymes you can say together.

When walking around the block, predict the next house number and then check.

NUMBER FACTS

Knowing number facts is very useful for the future mathematical studies of your children. You can help by taking an interest and by giving them practice. There are a number of important elements about learning tables and number facts.

First is that all the number facts come in families. If the children know, for example, that $5 + 2 = 7$ is the same as $2 + 5 = 7$, and relates to $7 - 2 = 5$ and $7 - 5 = 2$, then they know a lot of facts. The same is true for multiplication. If they know that $5 \times 4 = 20$, they also know $4 \times 5 = 20$, $20 \div 5 = 4$ and $20 \div 4 = 5$.

Next they need to learn general principles such as adding 1, adding 2, doubles, near doubles ($5+6$ is the same as $5+5+1$), adding 10, adding 9 (by adding 10 and taking away 1). For multiplication they can learn about doubling (\times by 2), multiplication by 10, 5, 4, 3, first, then the rest.

Using Mobile Devices to Encourage Mathematical Thinking in Children

There are many applications (apps) available for mobile devices (eg. Phone, tablet, iPad). Many generic apps come with these devices, while others may be downloaded from app stores. We recommend FREE apps, best downloaded while connected to WiFi. Look for the *Lite* version of apps. This is a good way to try an app for free and then upgrade for a small cost if you find the app is exactly what you are looking for.

The suggestions below are for apps that come with most devices:

- Go to the app store and search the category Sports for those of interest to your child. Exploring and comparing team and individual results can be quite mathematical.
- Using the Camera App, your child could photograph everyday objects and sort them into similar shapes; take a photo of one object from different views (e.g., above, front, side); or take a sequence of photos as an event is occurring (e.g., building a tower with blocks) and then challenge the family to place them in the order they might have been taken
- *Maps Apps* – Your children can use these apps to plan the route to their next party or outing with the family.
- *Calendar Apps* – We live our lives around our calendar, so it is important that children understand its structure. Have your child add family events to the calendar.
- *Weather Apps* – Children can check the weather app a week/day before some event to assist in planning.

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NUMBER GAMES, BOARD GAMES & OTHER GAMES

There are a range of games which are published in books and which are suitable as family games and which practice mathematics skills. One card game commonly available now is called *Número* which can be purchased in games' shops and newsagents. These provide practice with mental arithmetic. There are also more traditional games such as *GIN Rummy*, *Snakes and Ladders*, and *Ludo* which provide some experience at addition and useful practice for children.

When playing games for which there is a degree of logical thinking implied, talk with the children about better moves, or plays which lead to winning. Think together about ways which help not to lose rather than to win. Verbalising strategies are important for logical thinking.

Some other games that can be played easily include:

Car number plates

When your car pulls up behind the car in front, you might have a competition to see how many different answers children can make using the numbers from the car number plate. For example if the number plate is 152 the children might say:

$1 \times 5 + 2$ is 7, or $1 + 5 + 2$ is 8, or $(1 + 5) \times 2$ is 12 and so on. Another idea is to add the digits like this: 157 becomes $1 + 5 + 7$ which is 13, then $1 + 3 = 4$ and to see which number plate will give a special target number.

Guess the pattern

One player thinks of a rule (such as double and add 1). Other players can suggest a number (such as 5) and the first player tells them the number which results from the pattern (11). The players can keep testing numbers until they can tell what the rule is.

Guess my number

One player thinks of a number, say between 1 and 100, the other player can ask questions only using the words "more or less". For example, a player might ask "Is the number more than 52?" The first player must answer either yes or no.

Race to 10

This game has two players. Starting at 0 they take turns and can add either 1 or 2 to the last number said. The player who says 10 is the winner.

For example, suppose:

| A says | B says |
|--------|-----------|
| 1 | 3 |
| 4 | 6 |
| 7 | 8 |
| 10 | So A wins |

Note that the game has a winning strategy. Can you work it out? This game is flexible. You can play 'Race to 21' counting by numbers from 1 to 3, or 'Race to 50' using 1 to 6, for example.

Fruit salad

This is based on a party game, where each child is given a fruit. The chairs are arranged in a circle, with one less chair than people. The child in the centre calls one fruit, then all children with a particular fruit must move to a different chair, and the child in the centre must also try to find a seat. The child who is left calls the next fruit. On the call of "fruit salad", all children must move seats. A variation is to have number cards say 1 up to 20, and call out "even numbers", "between 7 and 12", "is a factor of 36", "is prime", "is divisible by 5" etc. Note: This can be done for shapes, time words, numbers, in fact anything based on classifications.

Helpful gifts to promote mathematical thinking:

These items as gifts help encourage your children to think mathematically. Many of these things can be purchased cheaply from a \$2 shop: Playing cards, Dice, Calculators, Tape measures, Kitchen scales/balance scales, Building blocks, Jigsaw puzzles, Calendars and Clocks.

The Mathematics Teaching and Learning Centre at Australian Catholic University

The MTLC promotes quality research and a national perspective on mathematics teaching and learning. It has a commitment to access to quality learning for all.

Australian Catholic University has campuses in Ballarat, Brisbane, Canberra, Melbourne and Sydney. ACU Education offers Higher Degree Research supervision for individuals wishing to extend their study in the field of mathematics education at Masters' level, or beyond through Doctor of Education and Doctor of Philosophy degrees.

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