

Holy Family Catholic Primary School



Calculation in the Early Years
Foundation Stage

Early Years Mathematics

Research on children's learning in the first six years of life demonstrates the importance of early experiences in Mathematics. An engaging and encouraging climate for children's early encounters with Mathematics develops their confidence in their ability to understand and use Mathematics. These positive experiences help children to develop dispositions such as curiosity, imagination, flexibility, inventiveness, and persistence, which contribute to their future success in and out of school (Clements & Conference Working Group, 2004).

Throughout Holy Family, Maths is taught daily. We have high expectations, making lessons fun, interactive and relevant for all of our children.

In Early Years, we use an approach to Mathematics based on a concrete – pictorial – abstract – cycle of learning. This approach develops children's understanding at a deeper level as it can be used at home or in the classroom. Young children are happy playing with blocks or drawing pictures. But, they can find number symbols like $5 + 2 = 7$ mystifying!

This method begins by allowing children to start learning about Maths by playing with real objects, blocks or manipulating objects. They build confidence with the basic ideas of adding and taking away. There is then a second stage of drawing pictures representing the objects. And only later do they gradually start to add numbers to their drawings.

Children must be exposed to different representations of Mathematical concepts in order to embed conceptual understanding. As your child progresses through the year groups, we will ensure that they are making progress towards mastery level by having opportunities to reason and develop their skills about number and recognising patterns and relationships.

Throughout Holy Family, we offer a wealth of opportunities for your child to progress, and hopefully give you a few extra ideas as to how you can help your child move forward in this area, too.

We count out loud every day in school, for real purposes, to help your child understand and hear numbers in the correct order and for a genuine, helpful reason. We may count the number of children in the register, and we always count on our fingers to give a visual element to the experience. We count things within our environment on a daily basis. This style of learning is often called 'learning by rote', and means that your child has mastered the skill (of counting aloud in the right order) but is yet to be able to use that knowledge in a practical way to begin to problem solve and fluency.

Throughout Holy Family, we are always providing children with opportunity to apply their problem solving skills, and involving different skill sets to be able to do this. Our activities may include finding out how many dolls are in the house (so we can source clothes) or in more complex situations such as how many of each type of animal lives in each area, all practically with props. To solve these puzzles, children need to be able to use one to one correspondence consistently, and also appreciate the cardinality of the numbers they are working with. This is not as complex as it sounds!

One to one correspondence simply means that children not yet able to use this will not coordinate saying the number names with taking/touching objects one by one. Some will say more than one number per object, others and will touch more than one object per number.

Cardinality (or the cardinal number) indicates the number of elements in the set being counted i.e. if I have four toy elephants and I count them correctly the last number I say will be four and that tells me how many I have. Four is the cardinal number in that example.

Counting whilst getting enough cups / plates / cutlery etc out at tea time is an excellent way of practising these skills at home as putting the shopping away, “How many tins of beans did we buy today?”

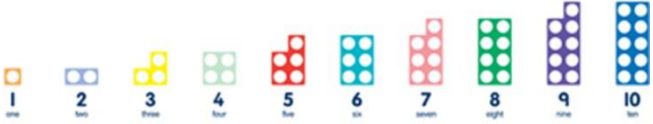

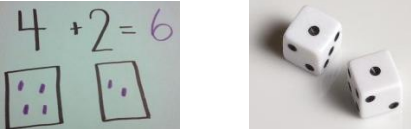


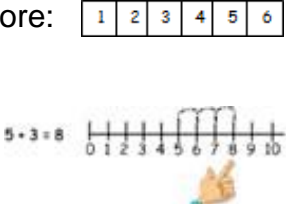

As children progress and understand more about values and the fixed nature of counting objects, no matter how many times I count the original set the answer will remain the same, they begin to ‘subitise’ objects when counting. This is often a breakthrough moment for us as Early Years Teachers, and one that we love sharing with the children! Subitising is when you look at an arrangement of objects and just ‘know’ how many things are there because it has become instinctive to recognise four objects as four.

Whilst there are many more areas of discovery within number such as reading and writing numerals, the relevance of environmental numbers. Can you see any numbers you know on the car registration plate? What do we need to press on the phone to speak to Grandma? Ordinal numbers (What comes after two? Before three? Who is first in the line? Etc), simple calculations (I’ve got two biscuits. How many more do I need for all of us to have one? I had 4 socks when I counted the washing but I’ve lost one! Can you help me find out how many I’ve got now?)

In the Numerical Pattern aspect of Maths, children’s’ natural curiosity helps greatly where discoveries, questions and problem solving are accessed through direct teaching and continuous provision opportunities such as shapes in block building, box building, painting, capacity through cooking and messy play. Number links closely to these varied activities showing children the meaningful relationship between both aspects of Mathematical learning.

Addition

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>Numicon shapes are introduced straight away and be used to:</p> <ul style="list-style-type: none"> • identify 1 more/less • combine pieces to add • find number bonds • add without counting  <p>Children can record this by printing or drawing around Numicon pieces.</p> <p>Children can begin to combine groups of objects using concrete apparatus:</p>  <p>Construct number sentences verbally or using cards to go with practical activities.</p>  <p>Children are encouraged to read number sentences aloud in different ways “Three add two equals 5” “5 is <u>equal</u> to three and two” “5 is the <u>same as</u> three and two”</p> <p>Children make a record in pictures, words or symbols of addition activities.</p>  <p>Solve simple problems using fingers</p>  <p>Number tracks can be introduced to count up on and to find one more: What is 1 more than 4? 1 more than 13?</p>  <p>Number lines can be used alongside number tracks and practical apparatus to solve addition calculations and word problems:</p>  <p>Children will need opportunities to look at and talk about different models and images as they move between representations.</p>	<p>Games and songs can be useful way to begin using vocabulary involved in addition i.e.</p> <p>One elephant went out to play</p> <p>plus</p> <p>add</p> <p>more</p> <p>and</p> <p>sum</p> <p>total</p> <p>make</p> <p>altogether</p> <p>double</p> <p>one more, two more, ten more...</p> <p>How many more make?</p> <p>How many more is ... than ...?</p> <p>same as</p> <p>Number bonds</p>

Subtraction

GUIDANCE / MODELS AND IMAGES

Children begin with mostly pictorial representations or real contexts.

Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.



Concrete apparatus models the subtraction of 2 objects from a set of 5.

Construct number sentences verbally or using cards to go with practical activities.



Children are encouraged to read sentences aloud in different ways “five subtract one leaves four” “four is equal to five subtract one” “four is the same as five subtract one”

Children make a record in pictures, words or symbols of subtraction activities.

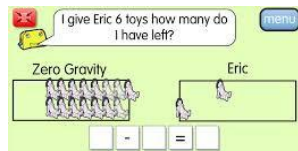


Solve simple problems using fingers



Number tracks can be introduced to count back and to find one less:
What is 1 less than 9? 1 less than 20?

Number lines can then be used alongside number tracks and practical apparatus to solve subtraction calculations and word problems. Children count back showing hops back on the number back.



$$1083=7$$



KEY VOCABULARY

Games and songs can be useful way to begin using vocabulary involved in addition i.e. Five little men in a flying saucer

take away

left

leave

How many are left / left over?

How many have gone?

one less, two less, ten less...?

How many fewer is ...?

than...?

difference between

hopping back

Children will need opportunities to look at and talk about different models and images as they move between representations.

Doubling

GUIDANCE / MODELS AND IMAGES

KEY VOCABULARY

Numicon is used to visualise the repeated adding of the same number. These can be drawn around or printed as a way of recording.

add again and again
doubling

Children being with mostly pictorial representations:



How many groups of 2 are there? $2 + 2 + 2 + 2 + 2$, so 5 groups of 2

Real life contexts and use of practical equipment to count in repeated groups of the same size:



How many wheels are there altogether?

How much money do I have?

Count in twos, fives, tens both aloud and with objects.



Children are given multiplication problems set in a real life context. Child are encouraged to visualise the problem.

How many fingers on two hands? How many sides on three triangles? How many legs on four ducks?

Children are encouraged to read number sentences aloud in different ways “five times two makes ten” “ten is equal to five multiplied by two” “ten is the same as five lots of two”



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Halving

GUIDANCE / MODELS AND IMAGES

KEY VOCABULARY

The ELG states that children solve problems including doubling, halving and sharing.

Children need to see and hear representations of division as both grouping and sharing.

Children begin with mostly pictorial representations linked to real life contexts.



Mum has 6 socks. She grouped them into pairs – how many pairs did she make?
How many socks did she have altogether?



Sharing model:
I have 10 sweets. I want to share them with my friend.
How many will we have each?



Although not explicit in the development matters document, the sharing model is a useful way of introducing young children to fractions and calculating with fractions.

Setting the problems in a real life context and solving them with concrete apparatus will support children's understanding.

"I have got a whole pizza to share between two people. Can you cut the pizza in half?"



Children make a record in pictures, words or symbols of division activities.

Children are encouraged to have a go at recording the calculation which has been carried out.

halving

sharing

number patterns

whole

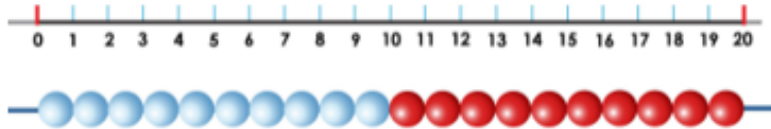
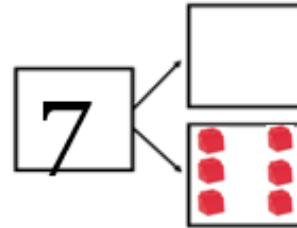
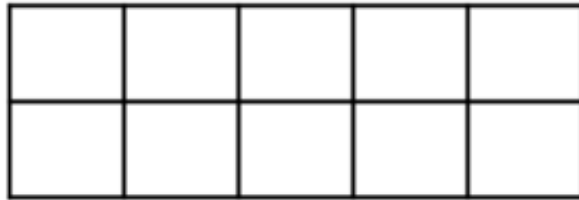
half

quarter

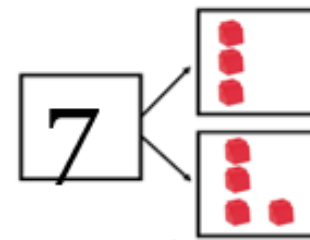
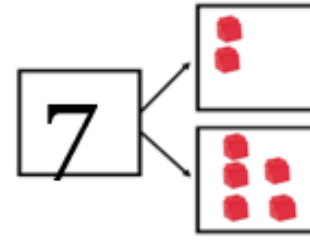
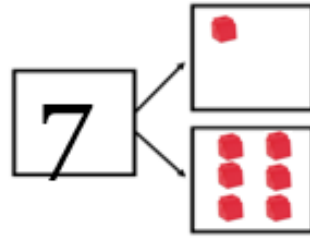
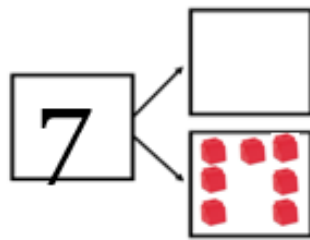
same

different

Purposeful representation



Conceptual
understanding



Conceptual
understanding

Exploring Number

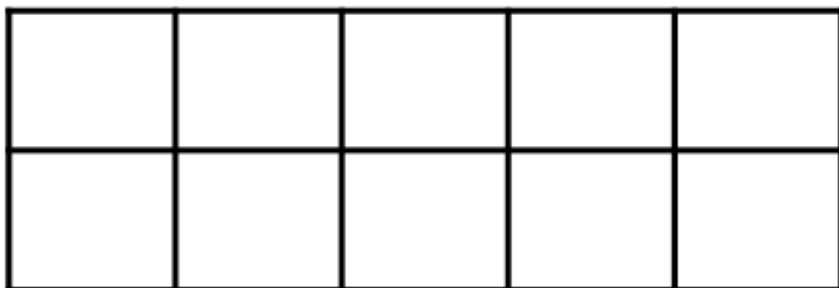


Conceptual
understanding

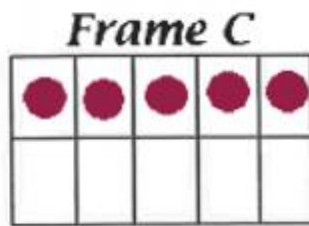
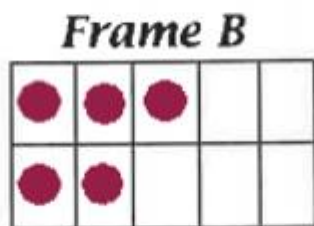
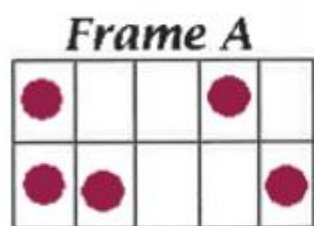
The five frame and cardinality of number



The ten frame



The ten frame



The bead string and the number line

