# The Little Big Maths Way

The Little Big Maths Way is a detailed description of how young children become numerate and what that means for adults working in early years settings, or for parents supporting their child at home. What should we be 'doing and saying' to ensure that all children become properly numerate as they journey through school? When should we say it? How should we say it? How often should we say it? This description of how to teach numeracy to young children comes in the form of 10 Key Messages. Here is a summary of each Key Message:

| The 10 LBM Way - Key Messages | | Description |
|---|---|---|
| 1 | It's simply about amounts...and amounts are simple! | The concept of 'amounts' is intrinsic to us, whereas the concept of number is 'abstract'. Amounts are obvious to young children and form the basis for becoming numerate. |
| 2 | Make number 'CLIC'! | The way we all become numerate follows a simple chronological process: we learn to count, we learn to recall counting facts, apply them into new contexts and then layer all of that together to get calculations. We call this 'CLIC'! |
| 3 | Use Progress Drives | Becoming numerate follows a natural order, a process that we can't bypass. Taking children through the obvious steps of progression makes learning easy and allows us to plan, teach and assess as one continuous process. |
| 4 | Sticky Play - Assess - Use Play | Numeracy is abstract. We learn and assess numeracy in the abstract. However, we need contexts to learn in (in order to make learning fun and meaningful) and we need new, different, contexts to apply our new learning to. |
| 5 | A daily CLIC session | The flexible daily numeracy session is called, 'CLIC'. Each of the sections are very focused and have different characteristics. The assessment and planning for the session is a single event, and happens in one place. |
| 6 | Get the children 'understanding' and 'doing' | For children to be properly numerate they have to understand what is happening with, and to, the numbers. However, we also have to teach children the 'doing' part of becoming numerate, and sometimes the 'doing' part comes first. |
| 7 | Keep it visual! | If we want children to understand numeracy then we have to communicate what's really happening with, and to, the numbers in a very clear visual way. If the child can't see it, they can't' understand it. |
| 8 | Keep it verbal! | If we want children to understand numeracy then we have to communicate what's really happening with, and to, the numbers using words that make sense to the children. The numeracy concepts must be accessible and memorable. |
| 9 | It's all about the brain | When all is said and done, learning happens in the brain. We must use what we do understand about the brain to inform our practice. Although the young brain is waiting to be assembled, it needs assembling! We are the assemblers! |
| 10 | Keep to the beautiful, numeracy learning journey | We must have high expectations for our children and that means painting out a beautiful, high-expectation, minimum, doable, numeracy learning journey that provides seamless continuation from LBM into Big Maths. |

## Using the Little Big Maths Way to develop practice

On the following page is a table showing again the 10 Key Messages for The Little Big Maths Way. Notice how each heading isn't just a message about what outstanding numeracy teaching looks like in the early years, it also becomes an important memo to us as practitioners. This part of the book does not need to be read regularly, and perhaps no more than once or twice. The key question is, 'Is this embedded?'

So, how does it become embedded?

Through habits! As each individual adult spends more time internalising the 10 key messages, putting them into practice, the more they become automated, second nature, and the more they become 'the way we do things round here.'

Learning leaders may wish to use the tick boxes to guide their understanding and implementation of the materials and messages. Notice how the tick boxes lead us from an initial reading of the materials to fully embedding the messages into our practice, in a Progress Drive style.

| The Little Big Maths Way<br>Key Message / Memo | Have read this section for the first time | Have revisited the key messages from this section | Have implemented in practice for the first time | Am implementing in practice regularly | Deeply embedded in my practice |
|---|---|---|---|---|---|
| 1. It's simply about amounts ... and amounts are simple! | | | | | |
| 2. Make numbers 'CLIC'! | | | | | |
| 3. Use Progress Drives | | | | | |
| 4. Sticky Play - Assess - Use Play | | | | | |
| 5. A daily CLIC session | | | | | |
| 6. Get the children 'understanding' and 'doing' | | | | | |
| 7. Keep it visual! | | | | | |
| 8. Keep it verbal! | | | | | |
| 9. It's all about the brain | | | | | |
| 10. Keep to the beautiful, numeracy learning journey | | | | | |


The Little Big Maths Way

# It's simply about amounts, & amounts are simple!

**Amounts are intrinsic, numbers are abstract.**

# 1. It's simply about amounts... and amounts are simple

Ok, to begin with let's just forget about the word 'Maths'. In fact you'll find the word 'Maths' hardly appears in this book, and that's because what we're really doing here is supporting children to appreciate, understand, compare and find the size of amounts!

It's useful from the outset to leave the word 'Maths' behind and reframe our interest and focus on amounts. Why?

Well, for some people, 'Maths' has negative connotations. It reminds them of struggles at school. This can also make us feel negative about teaching 'Maths'. We need to simplify 'Maths', stripping away the jargon that it has invented around itself.

Also, 'Maths' seems a bit too grown up and a bit too serious for 3 year olds – do they really need 'Maths'?

This also leads to a transition fault line. We can have a situation where children don't learn 'Maths' at home, but they do as soon as they start school. Yet there should, of course, be everyday conversations at home about amounts that continue and are extended in a more structured way when children start school.

This leads to the main reason why we must start to think about 'amounts' and not 'Maths'. Amounts are relevant to the children's lives, because they are relevant to human life! They are so important to finding out about ourselves, others, the world and how the world works. We must keep early years education simple. 'Maths' suggests we are doing 'work' to please someone else.

## Why are amounts so relevant to children?

If we agree that children are born ready, able and eager to learn then we soon see that many of their early realisations about themselves and the world are to do with amounts. There are concepts and conversations to do with amounts going on around young children all the time. They are simple, vital and unavoidable. As human beings we become naturally interested in amounts.

- How many hands do I have? (the amount of hands)
- How old am I? (the amount of time)
- How many parents do I live with? (the amount of parents)
- Where has my toy gone? (the amount of toys changes from 1 to none)
- How far is it to the shops? (the amount of distance)
- Have I got enough food? (the amount of food)
- Have I got my fair share of sweets? (the amounts needing to be the same)

These are all questions of amount. Even on the day a child is born, friends and family around them will be asking the two 'baby amounts' questions: How heavy were they? What time were they born? In other words, 'What amount of mass were they?' and, 'What amount of time passed from midnight that day?' Amounts will never stop being relevant to the child. As adults they won't even be able to book a holiday without considering the amount of time, the amount of money, the amount of heat, the amount of sun cream etc.

## We all get it!

As the human brain was evolving over millions of years, amounts were critical to survival. We needed enough food, warmth, speed, strength, rest, mates etc. if we were going to pass on our genes. Amounts are everything. Imagine the caveperson that gives birth to twins, or even triplets! Some amounts you just can't avoid noticing! It is widely accepted now that even very young babies start to notice changes in amounts of objects. This underlines the notion that the human brain is pre-wired to understand amounts. So, it is little wonder that we all find it easy to develop an understanding of amounts. This is why it really shouldn't be the case that so many people lack confidence and ability with their numeracy skills. Big Maths and Little Big Maths are dedicated to the belief that we can all become numerate with ease. However this is not an automatic process, it just requires teachers to have an understanding of how easy 'Maths' is and for that understanding to be passed on to the children.

## Little Big ~~Maths~~ ~~Amounts~~!

So when we talk about Mathematics in the early years, we are really talking about amounts. It would have been more appropriate for 'Little Big Maths' to have been titled, 'Little Big Amounts'! Notice how this would have highlighted another obvious concept i.e. that we have little amounts and big amounts. Again, whether it is a caveperson being chased by 30 woolly mammoths, or a 2 year old screaming because they don't have enough ice cream, amounts mean everything to us!

## Don't wait for osmosis!

Although children will naturally come across amounts (and their significance), our job as parents and educators is to support, aid and - at times - accelerate their development. Here are 3 critical areas and, although they are easy for the child to pick up on, they are all important concepts for us to put in place as foundations for numeracy success.

- We must help children to *notice* (or 'spot') amounts by pointing out;
  - When there are 'lots' of something, or only a few,
  - When something is very big, or very small,
  - When something has gone, or suddenly appeared.
- We must also help children *compare* amounts by;
  - Comparing an amount to need (too much, too many, or not enough),
  - And by comparing amounts to each other (bigger than, smaller than)
- We must also support children to watch and appreciate *changing* amounts;
  - Is it growing or shrinking?
  - Is it getting bigger or smaller?
  - Is anything happening to make it change? (Is something being added or taken away?)

Immediately we can see how effective story can be in providing a world where these observations can take place. Traditional stories like Jack and the Beanstalk and Goldilocks provide excellent focus on these concepts.

Of course there is a vocabulary associated with the child communicating these concepts, but our focus is on the conceptual progression of the child not the words. In this folder you will find Progress Drives to track conceptual progression of amounts, and in section 8 of The Little Big Maths Way you will find out how we can get children to use the correct vocabulary back to us.

## Amount...Count!

Sometimes we move beyond just noticing the amount, or comparing amounts or watching amounts change – sometimes we need to be more precise, and that's when we ask, **'How Much?':**

How much time?
How much heat?
How much distance?
How much ice cream?

Whenever we come to ask 'How much?' of something we need to agree on a unit or, more usefully, a 'thing'! A thing could be a day, a degree, a mile or a scoop! Once we have a 'thing' then we can change the 'How much?' question to, **'How many?';**

How many days?
How many degrees?
How many miles?
How many scoops?

And, once we are asking 'How many?' then there is only one answer...Count! So, we should hear less talk about 'Maths' and more talk about amounts, because the response to an unknown amount is to count! And numeracy is all about finding unknown amounts... by counting.

## Even the question;

**592 + 688 =**

is merely asking, 'When this amount and this amount come together, what is the new amount?' We find this unknown amount by counting... except... counting can take a long time! So we have to find ways of short cutting the counting... and that is where CLIC comes in!

**Amounts are intrinsic, numbers are abstract.**

## Takeaways

- We have lots of good reasons to be interested in amounts.
- The human brain naturally understands amounts.
- When we want to find unknown amounts of things we count them. Amounts underpin numeracy and measures.
- The human brain naturally understands counting.
- Finding amounts is simple, counting is simple, Maths is simple.
- We need to pass this understanding on to the children.

## With a high focus on... Amounts

### What does this look like in practice?

There is a constant conversation with the children about amounts, making them conscious that amounts are all around us and that we often count to find out how many, or measure to find out how much.

For Example

**One of the learning leaders tells children she is stopping to milk Daisy the cow everyday on her way to school**


**Count them!**

### Implementation Summary:

- Rather than merely finding 'contexts for counting', make explicit the need for children to spot amounts, the need to ask 'How Much?', the need then to decide on a 'thing' to count, and the need then to ask 'How Many?'...and then ...to count!
- Children's understanding of 'amounts' is tracked carefully using the Amounts Progress Drives and there is a daily focus on addressing next steps.
- Share with parents and carers the need to constantly talk to / with pre-school children about amounts.

## The Little Big Maths Way

# Make Numbers CLIC

**CLIC is the truth of how we become numerate**

## 2. Make Numbers CLIC!

Counting
Learn Its
It's Nothing New
Calculation

### The Chronology of CLIC

We have already seen that amounts were important for survival. Millions of years ago they were all around us as we were evolving. Eventually we began to want to answer the question, 'how many things?', whether the 'thing was' berries, tigers, stars or children. And so we began to attach certain 'grunts' to certain amounts. Eventually we have the grunt 'two' attached to the amount '2'. So it was that we began to count! (We now also have the squiggle '2' as the digit that represents the amount and the spelling 't-w-o' to represent the English word.)

Eventually we found counting shortcuts. Someone somewhere realised that if we count out 3 and then count on 4 more we always get to 7! It was the *always* part that was most important. From that point onwards we can just 'learn it'! If we just learn that 3 + 4 = 7 then we never ever need to count it out again!

Eventually someone somewhere discovered that if we change the 'thing' that we are counting then it doesn't change the amount. So 3 lions and 4 lions must be 7 lions, 3 children and 4 children must be 7 children, the amount is nothing new, even though we can change the 'thing' to any 'thing' we want it to be. This was a huge realisation since it opens a small door to a giant world of numeracy. Now, if we have a 'Learn It' fact such as 3 + 4 = 7, we don't need to count 'any-thing' and that means we can apply it to 'every-thing'!

Then farming developed, trading began and market places arose. This is when we began to calculate. Calculation is when we combine the first 3 realisations to save us from counting out much bigger numbers.

So as a species we became numerate through a chronology of **'Amounts CLIC':**

**Amounts:** We recognised that there were amounts of 'things' in the world around us.

**Counting:** We learnt to count those things.

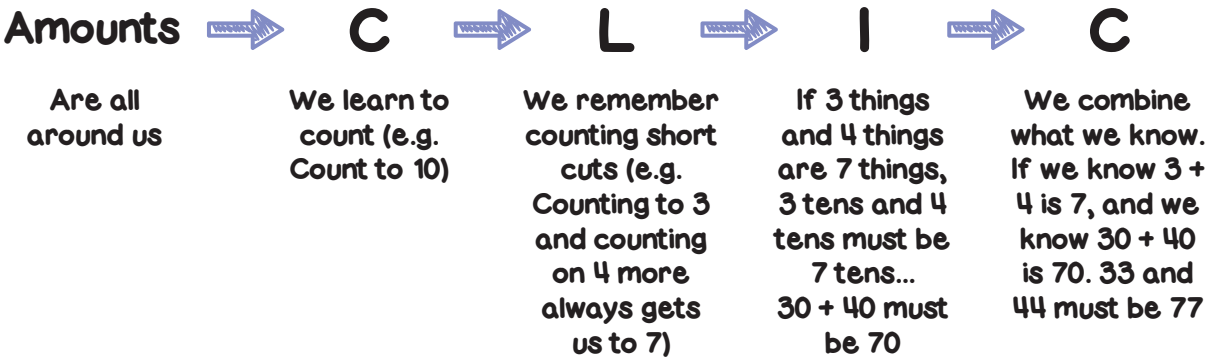
**Learn Its:** We learnt to recall counting facts that saved us the bother of counting.

**It's Nothing New:** We applied these 'Learn Its' to other 'things'... 'any-thing'.

**Calculation:** We combined what we knew to save us from counting much larger amounts.

So numeracy is all about learning to count... and then it is all about shortcutting the counting process. It is about counting and then not counting!

## The Chronology of CLIC




Not only did the human brain evolve its numeracy through the chronology of CLIC but each individual brain develops its numeracy through the chronology of CLIC. It's as if we all have our own mini fast-forward evolution! As individuals we learn to count, then we learn counting facts ('Learn Its'), and then we realise that we can swap the thing without changing the amount, and then we learn to calculate.

Since this is how each individual becomes numerate this is how we structure our teaching. In Big Maths the children have some time each and every day increasing their skills and understanding for Counting, Learn Its, It's Nothing New and Calculation. In other words, the children have a CLIC session!

### Amounts are intrinsic

In Little Big Maths we bring in the phase of 'Amounts' at the beginning since as individuals, and as a species, we must learn to appreciate 'amounts' before we can appreciate counting them. And so for Little Big Maths we have a chronological teaching and learning structure called, 'Amounts CLIC' (or A-CLIC for short).

This is a natural thing to do... we become aligned with nature! In section 5 of The Little Big Maths Way we will look in more detail about how to use the 'Amounts CLIC' structure and what each of the 5 phases looks like in practice.

### Takeaways

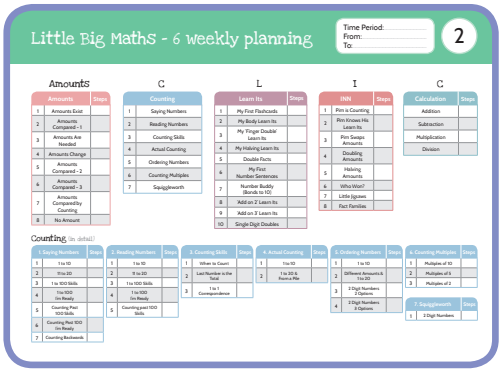
- The human brain evolved its numeracy through the chronology of 'Amounts CLIC'.
- We all develop our own numeracy through 'Amounts CLIC'.
- We therefore support this development by having 'Amounts CLIC' sessions at school.
- CLIC is simply about learning to count...
- ...and then finding shortcuts to save us from counting!

# With a high focus on... Amounts

## What does this look like in practice?

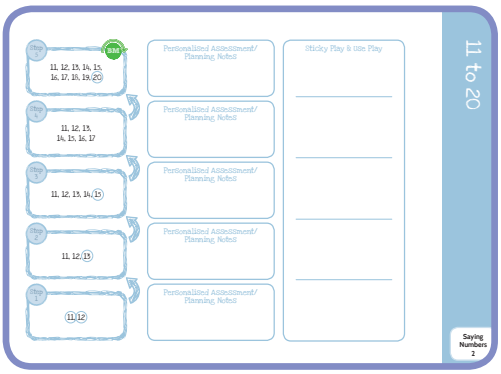

### Plan

- short term -
through 'Amounts CLIC'



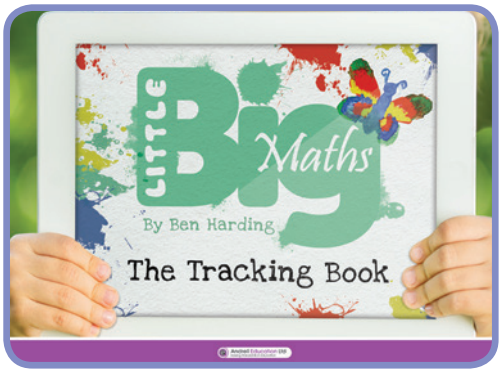

### Plan

- long term -
through 'Amounts CLIC'




### Assess

- short term -
through 'Amounts CLIC'




### Assess

- long term -
through 'Amounts CLIC'

## Implementation Summary:

- Deliver a 10-20 minutes basic skills session for numeracy every day.
- Follow the chronology of 'Amounts CLIC'. The breaks down the basic skills for maths into a natural structure.
- Use the Progress Drives for each phase of 'Amounts CLIC' to track progress.
- Structure planning, teaching and assessment around the 'Amounts CLIC' framework.

## The Little Big Maths Way

# Use Progress Drives

**Becoming numerate is systematic, one step follows another**

## 3. Use Progress Drives

We have already been introduced to Progress Drives earlier in the book, and the entire second part of this book is devoted to the actual Progress Drives for Little Big Maths. Here we look at what a Progress Drive is and how and why to use Progress Drives in a teaching and learning situation.

### What is a Progress Drive?

Progress Drives are nothing more than a simple sequence of progression. In all of life there are sequential stages of development. We learn to sit up before we can walk, and we walk before we can run. It is true for all areas of life that if you are at Step 1, on a 10 step scale, then you can not progress to Step 5 without heading first to Step 2, and then Step 3. Basic skills for numeracy follow very specific, natural and logical sequences of progression that are obvious and timeless. As mentioned in the introduction they have become the 'lost treasure' of teaching and learning. So we use Progress Drives because they describe the correct way that children learn numeracy.

Let us take a working example. If we look at the Progress Drive for doubling you will see the truth of the CLIC chronology. The bottom step is where the child learns the fact that double 2 is 4, double 3 is 6, and double 4 is 8. They don't need to think about it, they have just 'Learnt It' (this happens in the 'Learn Its' phase of CLIC, after the children have spent time Counting out 4 and 4 more are 8, this gives the children 'understanding' and 'doing').

It is only with this recall knowledge in place that we can approach the second step up. Now the child knows that double 2 is 4 we can show them that double 2 things are 4 things, and that we can change the 'thing' to any thing we choose. So, now the child can tell us how many we would have if we doubled 2 mice, 2 bananas, 2 sweets..it doesn't matter what 'the thing' is, we always get 4. **..It's Nothing New!**

Now, with this understanding in place, we can change 'the thing' to 'a ten'. Again, it's nothing new, if we double 2 tens we must have 4 tens.

This is the third step up. Now we can just reword slightly what we already know.

If we know double 2 tens are 4 tens, and we also know that we can call 2 tens '20' and 4 tens '40', then we can obviously reword this to now be 'double 20 is 40'! In this example this is Step 4. Even though acquiring Step 4 is an end in itself, we can use the skills and understanding as a foundation for further new learning in Calculation too.

Two key outcomes arise from following this natural sequence of progression:

1. The learner finds new learning easy since we are constantly building on their prior knowledge, and...
2. There is no trail of learning gaps that could halt new learning in the future.

A Progress Drive for Doubling:

# Why, and how, to use Progress Drives: 10 Brilliant Reasons!

## 1. To plan from... and to plan personalised learning from!

As soon as we see the Progress Drives they make planning for new learning easier. They let us all sit back and think, 'So that's what it all looks like, that's what we're trying to achieve!'. The simplicity gives us the clarity we need to boil it all down to simple next steps. When we come to plan we don't need to start off reinventing old wheels and sorting out the steps for ourselves. Instead, we can immediately focus on one Progress Drive at a time and plan personalised learning. If we know which step each child is on then we can turn up and teach their individual next step, rather than turn up and just 'cover a curriculum'. The Progress Drives take us immediately to the simplicity the far side of the complexity.

## 2. To assess from

Actually, we can't do the planning for personalised learning before we've done the personalised assessment. To plan for each child's next step on that particular Progress Drive means knowing which step they are on in the first place, and that has to come from an assessment. So, the Progress Drives become a framework for assessment. They force us to analyse where each child currently sits on a sequence of progression. In this way, assessment and planning become a single event...this is true and pure formative assessment. We always start from where the child is at.

## 3. To share with the children

If we can share the learning journey of the Progress Drives with a child in an appropriate way then we can develop assessment for learning. We can empower the child to become a conscious learner, knowing what they can do, what they will be learning next, and knowing how they can achieve their next step.

The how part is vital. When a child moves from one step to the next the learning leader needs to verbalise to the child what they need to 'remember to' do. These 'Remember to...' statements are the micro-steps within a new skill.


## 4. To celebrate achievement with

Our natural human instincts are to be concerned about attainment, and for children to compare what they can and can't do with others. This can be very damaging to all but those at the top of the attainment ladder, especially at a young age. Becoming focused on self-improvement for many is a learnt skill. One of the most fundamental principles of Big Maths is that it is about success for all. That's not just a buzz-phrase, it genuinely means that structures and practices are put in place to ensure that all children feel, deeply feel, good about their numeracy ability. One way that this is achieved is by using Progress Drives to celebrate every little step of achievement with every child. The lower the standard of attainment of the child, the more focus is put on breaking their learning down into small attainable steps that are celebrated as we climb the bespoke Progress Drive. Small steps, big celebrations!

## 5. To track rates of progress with

Tracking a child's progress using a Progress Drive is useful in itself for the reasons already discussed. However, it becomes even more powerful when time is factored in against it. This allows us to track the child's rate of progress. Are they hitting their next steps in sufficient time? In Little Big Maths we use the 'CLIC on your LBM Planning' document to compare a child's rate of progress against a minimum rate of progress. This minimum rate of progress is nevertheless a 'high expectation' rate of progress and has

nationally agreed milestones (for example in England, the Early Learning Goals) built into it. In LBM we call this minimum, high-expectation, learning journey the 'beautiful numeracy learning journey'.

### 6. To share with other teachers

As a child progresses from birth to 18 they will encounter a range of adults that will support them with their learning along the 'beautiful numeracy learning journey'. If all of those adults can see the Progress Drives and the steps of progression then it means everyone is facing in the same direction. The learner experiences the journey as if they were being tracked and assessed by one person. This leads to consistency, continuity and therefore efficiency.

### 7. To share with parents

Finding ways to help parents support their child's learning at school is vital. By sharing the Progress Drives with the parents then parents can easily see what Learning Leaders in Early Years settings are trying to achieve.

### 8. To constantly nudge with

Sometimes all the Progress Drive does is to support us to nudge the child's learning forwards in small baby steps. Once the child has secured the ability to say the numbers '1, 2, 3' out loud then we start focussing on supporting them to say the numbers, '1,2,3,4' out loud. 'Constant nudging' are the watchwords of any good numeracy teacher, and by using the Progress Drives there is a framework to back that approach up.

### 9. To manage the spread with

If you're a learning leader with responsibility for the numeracy learning journey of a large group of children, then the last thing you want to see is every individual child on a completely different step of a Progress Drive. This would render you ineffective (and stressed!) as you struggle to teach personal lessons to several individuals simultaneously. We know that there is no perfect answer, but we have to make ourselves as effective as possible by managing a spread. This means, at times, keeping groups of children together as they climb a Progress Drive. Placing the children's names on the Progress Drives hasn't created this situation, it has only made the reality of what we have been dealing with more transparent...and by doing so, made addressing the situation easier.

### 10. To teach with EASE

Teaching with EASE means 'Ensuring All Steps are Easy'. This is a critical Big Maths and Little Big Maths principle. It means breaking down new learning into the separate component parts and teaching them in isolation first. This means there is actually no new learning, even though the child is making progress! If a child is having difficulty the teacher would 'drill-down' and find out what their learning gap is, isolate this learning gap, teach it on its own and then come back to the original piece of learning. Quite often the Progress Drives will do all the hard work for us and make sure that the child has everything they need (i.e. the pre-requisite skills) for the new learning to be easy. However, at times we have to bring in other learning from other Progress Drives to make sure that the child can learn with EASE!

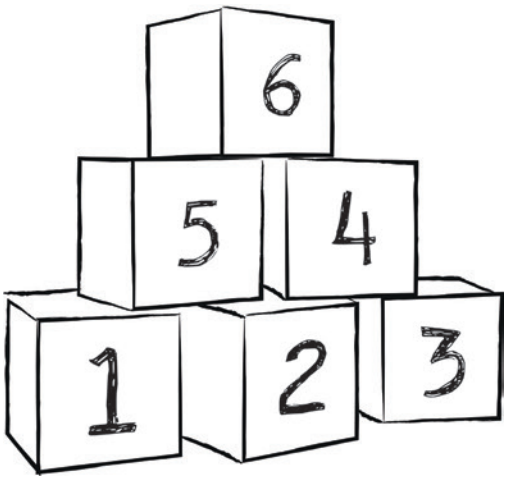
In section 2 of this book it will say in the planning notes for that step if the child should have prior learning from another Progress Drive in order for the new learning to be easy. Furthermore, the document 'CLIC on your LBM Planning' will build in automatically all of the skills the child needs to blend ahead of the time that they will need them. When we ask children to blend two or more aspects of prior learning, then it is a bit like we are asking them to juggle two or more balls that we already know they can throw and catch on their own (see example overleaf).

## The child is learning to do actual counting of 10 objects for the very first time


## Teaching with Ease

Q. How do you make new learning easy?

A. By making it impossible for it to be difficult!




### Takeaways

- Progress Drives are a simple and obvious sequence of progression for an aspect of numeracy.
- They show the real way that children learn Maths.
- They are used in 'Amounts CLIC' to track a child's progress.
- They are used in 'Amounts CLIC' to know what to teach the child next.
- Using Progress Drives is 'assessment for learning'.

## With a high focus on... Progress Drives

### What does this look like in practice?

Children are given a Progress Drive for reading numbers to 20 to take home and put stickers on as they attain each step.

Teachers meet to discuss rates of Progress up the Progress Drives.


A weekly achievement celebration rewards those children making excellent progress up the Progress Drives, regardless of attainment

Teachers share Progress Drive records with parents.

Adults watch children's lips as they chant to see if they have moved to the next step.

### Implementation Summary:

- Track all children up all Progress Drives.
- Use this tracking record to plan personalised 'next steps' for every child.
- Check each child's rate of Progress against the expected rate. Intervene with impact for those that are getting 'off track'.

4

The Little Big Maths Way

# Sticky Play - Assess - Use Play

**Get it, then use it!**

## 4. Sticky Play - Assess - Use Play

### Playtime?

In the past we gave young children a very formal education. Even 5 year olds would be sat at desks listening to direct input from the teacher. The human brain, so we thought, was an empty vessel waiting to be filled with knowledge. This view subsided as we began to embrace how productive the playful learning that children engage in naturally was. Learning through exploration, self-discovery and creativity seemed to be the way forward. It was certainly, as far as the child was concerned, more fun!

We have hit a point only recently where we understand that there needs to be balance. Children need to learn through play, but they also need 'direct input'. But rather than just providing children with 'a balance' the key point is to know precisely *when* to provide 'direct input' and precisely *when* to let children discover. Little Big Maths provides a very clear framework that empowers us to know when to be there and when to back off, when to lead and when to follow, and if we are giving direct input what exact form that should take.

### Play...Osmosis or Progress Driven?

Although there are times at school when we just let children 'get on and play', and those times are vitally important in themselves. When it comes to learning numeracy through play we can't afford to let children just pick up numeracy skills by osmosis. Merely placing numbers on the aprons and coat hooks and hoping it sinks in won't be enough to secure the rapid and sustained progress we desire. So when children do learn through play, that play should be driven by progress. In other words 'next steps', and again the Progress Drives provide a framework to lean on to ensure we get this right. We will still want children to explore, self-discover and be creative in their play but all of those features of play have to be built on top of a knowledge base. We can't even fantasise about being a mermaid unless we have a knowledge base about mermaids to then build on.

### Sometimes there is No-thing!

Number is abstract. Whether we like it or not, number is abstract. We all have to learn to 'count to 10', or know that 3 + 4 = 7, even when there is 'no-thing' to count or total. This abstract nature of Maths means that number can feel meaningless, which is the last thing we want with such young children. It can also make number dull. Not for everyone, some people can get really excited by abstract number and that's splendid.

Certainly, children with delayed language development or that are learning English as an additional language can really benefit from stripping all the words and contexts away from the number. Generally speaking though the dull potential increases when we go abstract! The dull factor increases even more when we consider how much repetition is needed to secure basic skills.

## So...We Need CONTEXT

So, we fight against the meaningless, potentially dull, abstract number by giving the number 'context'. Fun, real life contexts help to give the numbers a purpose and make the numeracy learning journey enjoyable. But...we must be very careful. There is a real danger to just placing the learning in a fun activity.

If we take any step on any LBM Progress Drive, we can think of that step as a new skill. Every step in LBM is a skill in itself that needs to be learnt, assessed, and then used. Imagine a situation where the children are still learning to count out 5 objects and are asked in their independent play to count out 5 objects. If the children haven't achieved this learning, i.e. they've never counted out 5 objects successfully before in their lives, then it is unlikely they will be able to go off on their own and succeed. In fact it could be damaging for a child to experience this if they feel they are struggling. Before the child can go off and use this skill the child needs is to first of all learn this skill! This learning of new skills requires direct input. Put more simply...teaching! It is not a time for the child to teach themselves!

Imagine on the other hand a situation where children can count out 5 objects. These children have just learnt this skill due to the direct input of the adult. These children can now go off successfully into new contexts and use their new skills with meaning and success. To begin with the child might need to be shown how they can use their new skill, and they might need to be shown how they can then use their new skill without an adult present to support them. Remember how the adult secured that learning in the first place. They provided a fun and interesting context for the child to learn the skill through, even though the adult was with them giving direct input. This initial activity will be very different to the one used to model and encourage children to apply their skills independently afterwards.

So for every step on every Progress Drive we see this simple three part learning journey:


## Sticky Play

We call this initial context (used to secure new learning) 'Sticky Play' because we get the child to take part in an activity which results in the acquisition of new skills or knowledge i.e. when we take the activity away the maths has stuck.

During Sticky Play the adult is present with the child since the teacher's focus is on the direct input that the child needs to acquire a new skill. The Sticky Play might be a carefully chosen game, song, rhyme, jingle, chant, dance, story, but we know the adult will be present and will be progress driven. Story is particularly powerful for securing the new learning in the Amounts and Calculation part of 'Amounts CLIC'.

Adult-led play activities are also very useful, but child-led play activities are unlikely to have the required impact. Sticky Play should never defeat its own purpose by being too jazzy, confusing, overloading or distracting. It may well have to happen every day for a period of time, or it may only need to happen once. Some children, remember, may be happy to go straight to the abstract. They might prefer to be drilled on saying, '1, 2, 3, 4, 5' rather than singing the song, ' 1,2, 3, 4, 5, once I caught a fish alive...'. However, children that do have this preference are probably exactly the children that would benefit from singing the song... for other reasons!

## Use Play

The activity that we provide children to now use their new found skills is called 'Use Play'. This is when we basically say to the child (paraphrasing), 'Ok, well done, now I know you

can do this skill, I want you to go off and do it in other contexts'. The child who has genuinely secured the skill will be successful. As with all of Little Big Maths we will be keeping children in their comfort zone as they constantly meet with high success and reward. In fact the child doesn't go off on their own at first. To begin with the adult shows the child how to use the skill in new contexts through adult-led play, and then withdraws support gradually by merely prompting the child to use their skills in new contexts, and eventually the adult just sets up creative contexts for the child to use their skills in through child-led play. This gradually withdrawn support the child is experiencing from the adult is proportionate to the child's success in their independence.

## Which Side of the Fence?

If you weren't sure whether a child needed a Sticky Play or Use Play then the key to finding out would be to assess in the abstract. For example, if the child can count backwards from 10 to zero then they need a Use Play activity to use and reinforce this skill in different situations. If they couldn't, then they would need some Sticky Play direct input to put that skill in place.

The names 'Sticky Play' and 'Use Play' aren't in themselves important, but what is crucial is that we have made a clear distinction about where the child is at in terms of their horizontal journey through each step (as well as their vertical journey up the Progress Drive), and have built an activity that is perfectly matched to their needs. Good Maths teaching at any age starts from where the learner is at.

## Exceptions

If we look at the 'Amounts CLIC' framework we can see that the 'Sticky Play – Assess – Use Play' chronology holds true for Counting, Learn Its, It's Nothing New and Calculation. The 'Amounts' phase still has Sticky Play and Use Play but we cannot assess in the abstract. This underlines the truth of 'Sticky Play – Assess – Use Play' principle since 'amounts' can only exist in the real world. Remember, they are the 'stuff' genuinely around us that are a pre-cursor to numeracy.

## Examples

On the next pages there are visual summaries and examples of these messages. For further examples of Sticky Play and Use Play activities see the separate Andrell Education publication, '100 LBM Activities'. Of course one of the many joys of working in Early Years settings is the potential to be creative ourselves and find just the right activity to inspire our very own little treasures!

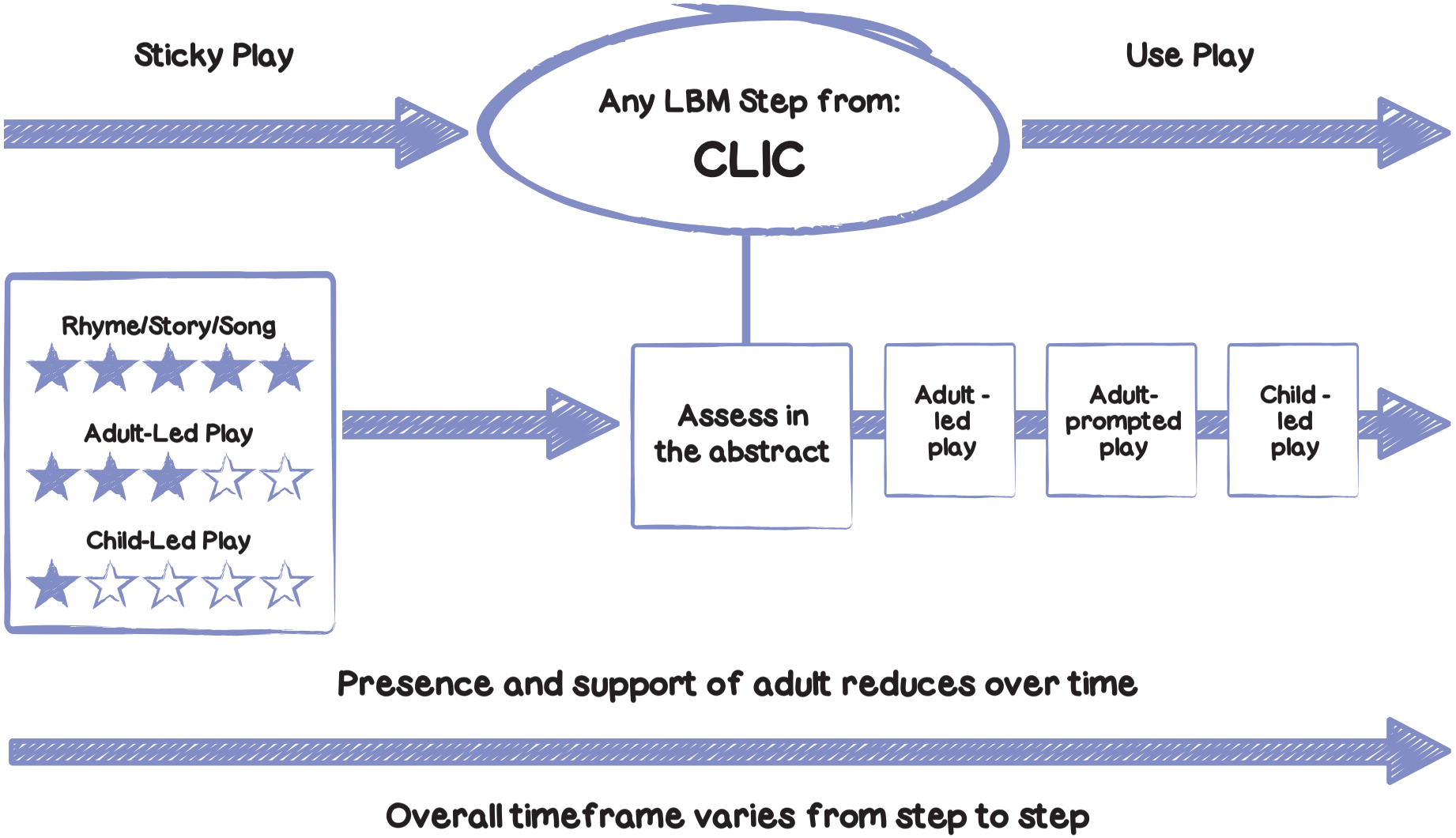
## Planning and Tracking

One of the main features of the Learning Leaders LBM Tracking Book is that it allows for simple tracking of children as they move up the steps of the Progress Drives. It also allows for easy consideration of the distinction between Sticky Play and Use Play at each step.

## Takeaways

- We use expert precision to know when children learn numeracy through play and when they need direct input.
- We even need to make a clear distinction between 'Sticky Play' and 'Use Play', being familiar with the contrasting features of each.
- For CLIC, children should be assessed in the abstract.

## Summary: Sticky Play - Assess - Use Play



## Example:

The children are learning their 'finger doubles': double 1, double 2, double 3, double 4 and double 5. This appears on the 'Learn Its 3 Progress Drive (Steps 1 to 5). Here is an example of how the 'Sticky Play' and 'Use Play' will differ.

**Sticky Play**

### The Doubles Chant

- At least once a day the Learning Leader leads the children in a doubles chant, building up the song, until over the three terms in Reception the child knows all of his/her 'Finger Doubles'.
- It is important that the Learning Leader holds up the corresponding number of fingers to help the children see and feel each double.

1 add 1 is 2,
Tap it on your shoe.
2 add 2 is 4,
Stamp it on the floor
3 add 3 is 6,
Watch how our Maths CLIC s
4 add 4 is 8.
Put your arms up straight
5 add 5 is 10,
Round we go again!!
Spin round and start again !)

**Learn Its 3**

5 → 10

**Steps 1 to 5**

**Assess in the Abstract**

**Double this number...3!**

**6!!**

**4!!**

**8!!**

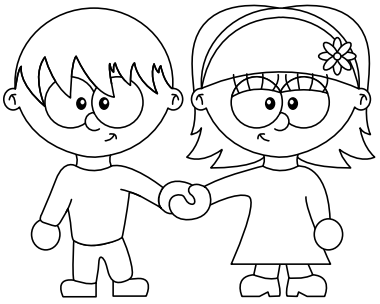
**Use Play**

### I Double Dare You!

- Children that have already shown they know their 'finger doubles' are in pairs.
- They all stand around the Learning Leader and they are given a number (1, 2, 3, 4 or 5).
- Their task is to run off back to their own bucket as a pair and pick out that number of objects each (e.g. 3)
- When they get back to the adult the first pair to shout the double total (e.g. 6) and show their objects wins!
- Here's the catch...the children don't running to their bucket when they hear the number, but when they hear the adult say, 'I double dare you!'
- The adult playfully teases the children by just saying, 'I dare you' at first. This makes the children really focus on the word 'double'.

# With a high focus on... Sticky Play & Use Play

## What does this look like in practice?



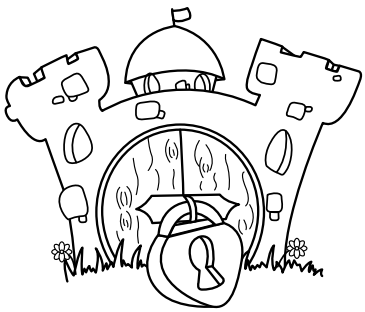
**Sticky Play** → **Counting Multiples 3**
**2, 4, 6, 8**
**Step 2**

### Partner Time

At least once a day the children have a situation when they have to find a partner. The learning leader is leading a chant ("2, 4, 6, 8... time to go and find a mate!") that the children are gradually joining in with.

Being careful to support every child emotionally and socially, the adult is observing the children's lips to see who is beginning to say "2, 4, 6, 8"

**Counting Multiples 3**
**2, 4, 6, 8**
**Step 2** → **Use Play**



### The Magic Gate

Children that can already say, "2, 4, 6, 8... time to go and find a mate!" are creating a story together with their leader called 'The Magic Gate.'

They are not writing the story anywhere, they are just sharing ideas and agreeing on what happens next in the story, and then acting it out.

In the story the children come across a magic gate and the only way to open it is to say, "2, 4, 6, 8... open, open magic gate!"

As part of the children's play choices they can choose to go off to the 'magic gate,' independently, and act out the story so far with a friend.

This has led to children using, "2, 4, 6, 8" in a different context.

Sticky Play → Ordering Numbers 1
1, 2, 3, 4, 5
Step 2

## Painting Hands

Children that can already count actual objects to 5 are being asked to pick a card from a pile. On the card is one of the numbers 1, 2, 3, 4, 5.

The child then picks up a strip of paper with large squares on. Their challenge is to put the correct amount of painted hand prints on the strip of paper to match their number.
Towards the end of the day the learning leader asks the children to gather round and start looking at the hand prints.

5 are chosen to pull out and look at, the adult asks the children to put them in order of size/amount.

This is turned into a display and the foundations are sewn for ordering numbers as well as block graphs. Hand prints can be exchanged for any object of interest.

Ordering Numbers 1
1, 2, 3, 4, 5
Step 2 → Use Play

## Mr Muddle's Football Shirts

Children that have already shown they can order numbers to 5 using flashcards are now being told about Mr Muddle.

Mr Muddle washes the village football teams shirts and today he is hanging them up to dry. He wants to place them in order but he has got into a muddle!

One of the play choices children can make on this day is to go and check the football shirts are hanging in order from 1 to 5, and if they are not then hang them up again... except this time in order.

## Implementation Summary:

- Learning Leaders have regular discussion about how to make the 'Sticky Play-Assess-Use Play' sequence work for their children.
- Adults plan activities based on a combined analysis of the numeracy at each step and their children's interests.
- CLIC is assessed in the abstract.

5

The Little Big Maths Way

# A Daily CLIC Session

**Do it fun, do it fast, do it frequent, do it focused!**

# 5. The CLIC Session

## The Correct Focus on Progression

Little Big Maths shows how children acquire the basic skills for numeracy at the age of 3, 4 and 5, and how we can teach young children in a progressive step-by-step order of skills so that their next step is always easy and accessible to them. This ensures that all children make progress, keeping in their comfort zones as we go.

For too long now we have hoped that young children pick up basic skills for numeracy through a process of 'osmosis' - surrounding them with numbers and mathematical activities and then hoping they will become numerate. Little Big Maths is about redressing the balance, ensuring that we have a dedicated time each day to 'insist on progress' for the basic skills for maths for every child - in much the same way that many schools successfully do for literacy through a structured phonics programme.

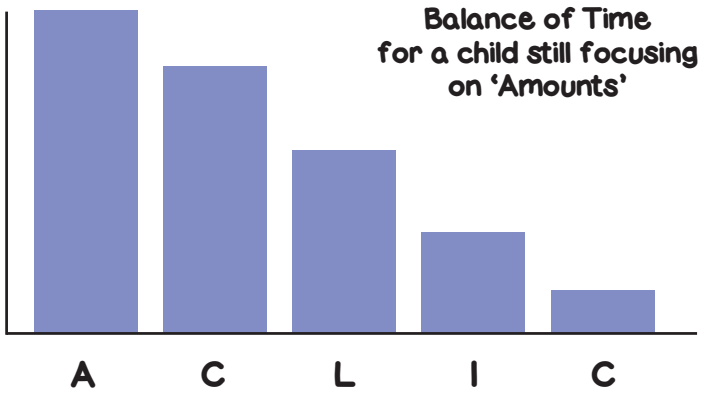
In Little Big Maths this daily dedicated time for children to acquire the basic skills for numeracy is called a 'CLIC session'. Just the act of giving the session a name raises the profile of maths with young children, and as they experience the fun of CLIC then they will correctly attach themselves to maths with a positive association. Sadly this positivity is missing in far too many children. Embedding high quality daily CLIC sessions in an early years setting means that you know children are being properly prepared for the continuation of their progressive basic skills journey when they become aged 6, 7 and beyond.

### Up-level the children every day, in all the right ways

A daily CLIC session will not set out to cover areas of the curriculum such as shape, space and measure. These may well be used as contexts for numeracy development within CLIC, but the focus of CLIC is to ensure that all children become properly numerate.

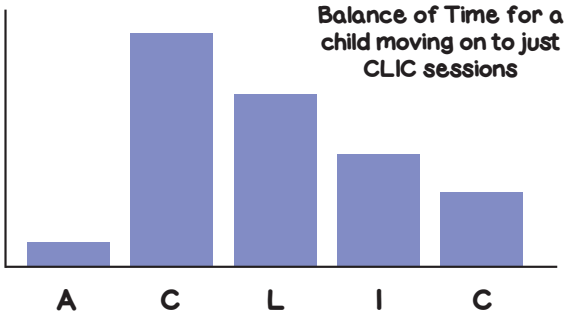
## The 'Amounts CLIC' Session

As we have seen CLIC is the correct framework for developing numeracy, and having an understanding of 'Amounts' are a precursor to CLIC. Some children at a very early stage of development may well still be needing significant time on the 'Amounts' Progress Drives. These children will still be having a daily CLIC session but there will be very little time spent on calculation (if any) since they are at such an early stage in their numeracy development. In this situation the balance of daily time allocated to each phase would look like this:

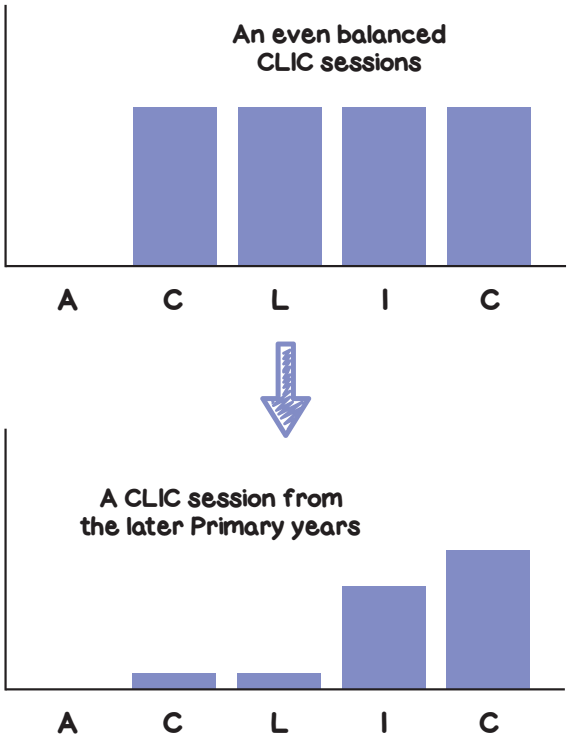


## Now watch it CLIC

As the 'Amounts' Progress Drive concepts become secure then the child can move into pure CLIC sessions (although there will be some of the later 'Amounts' steps still to secure like for example comparing amounts by counting). At this stage the balance of time devoted to each phase looks like this: a typical Little Big Maths CLIC session.




As a child's numeracy progresses and they leave Little Big Maths and move on to Big Maths the balance of time shifts again. Next to an even balanced CLIC session and then, ideally, as they become 9, 10 or 11 years of age the balance of time moves so that Counting and Learn Its are no longer necessary and the focus is more on Calculation.




## Let's get Physical...!

Notice how Counting, Learn Its and It's Nothing New feature strongly in the typical Little Big Maths CLIC session. It is these 3 phase that give CLIC its distinctive feel. Together they give us a daily dose of numeracy but in a very energetic way. We might take 10 to 15 minutes for these 3 phases and they will include the children singing, dancing with pom-poms, chanting, rapping, shouting, jumping and laughing! All with a very definite press on progression sitting underneath it all.

- It's Nothing New is included within this frenzy of activity since the Counting and Learn Its chants will merely be tweaked so we are now counting 'a thing'. For example if the children are chanting, '1, 2, 3, 4, 5...' we can change this easily to become, '1 poodle, 2 poodles, 3 poodles, 4 poodles, 5 poodles...' It doesn't matter what 'the thing' is so long as it entertains!

- There may well be further It's Nothing New activities going on at other times of the day as children move to more relaxed 'Use Play' adult-led play and child-led play.

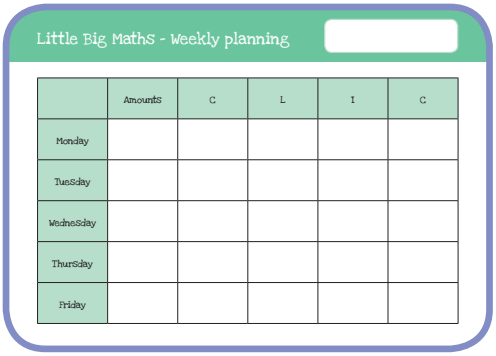
- Settling the children down for a quiet story (or a noisy story) may well appear at some point in the day. Story is an excellent 'Sticky Play' for Amounts and Calculation.

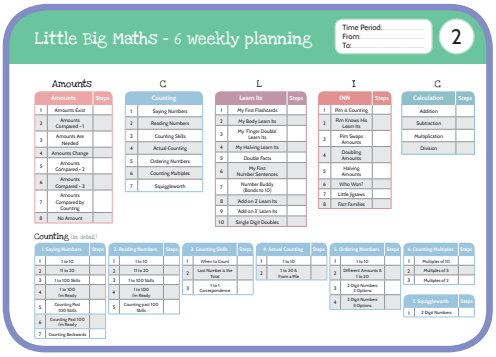
- In summary, CLIC is very flexible! How long and which order the phases are in each day is down to whatever the Learning Leader thinks will drive progress best. However, over time it is the consistency of approach and implementation of CLIC that is vital.

## Planning and Assessment

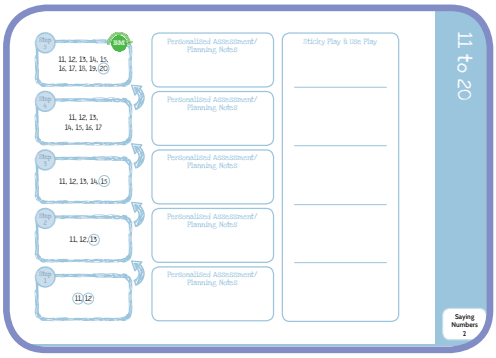
Little Big Maths is designed as a 'one stop shop'. You can plan and assess as a single event in a single place. This is how the system works:

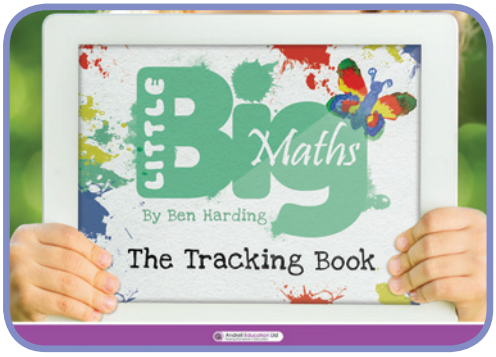
- Start by taking a Progress Drive that you know your children are currently spending time on. Make assessments as to where you think children are on the Progress Drive. This can be done in 'The Learning Leaders' Tracking Book' by writing the children's names against the steps.




- Now plan for 'next steps' by looking back at this main Little Big Maths book to see any planning notes that might be relevant.
- Plan a 'Sticky Play' activity for the next step, or perhaps a 'Use Play' activity for a skill they can already do but haven't used in a new situation yet. Again this can be written in the tracking book.
- When planning, start to try to pull your group together on to a common step, where possible, so that they can continue to make rapid sustained progress *as a group*.
- As time goes by begin to look at more Progress Drives and develop your CLIC session (or 'Amounts CLIC' session) gradually.
- As more time goes by and your CLIC delivery becomes fluent start to look at the 'CLIC on Your LBM Planning' document which informs you where (i.e. which steps) you would expect your children to be at any given time.
- Now use the longer term planning sheet shown here (also in the tracking book) to write in which steps you plan to cover over the next several weeks in order to keep children 'on track' or ahead of track.




### Takeaways

- CLIC sessions happen every day.
- For children in the very early stages of numeracy development there is a focus on 'Amounts'..
- The children are always active participants – they dance, sing, shout, play, exercise, think, 'understand' and 'do'.
- There is a constant focus on progress for every child.

## With a high focus on... CLIC

### What does this look like in practice?

**Children and adults learning and having fun together with**

**Little Big Maths!**

### Implementation Summary:

- Deliver a 10-20 minutes basic skills session for numeracy every day.
- Follow the chronology of 'Amounts CLIC'.
- CLI are active and energetic – almost like an aerobics session!
- The Calculation phase is often a calm story-time session, but with a definite focus on progression.

6

The Little Big Maths Way

# Get the children "understanding" & "doing"

**It's not 'either or', it's both!**

# 6. Get the children understanding & doing

## A Quick History Lesson

We had a time for many years whereby children learnt to do 'sums' without fully understanding what was going on. For example, children may have learnt to solve subtraction questions like this,

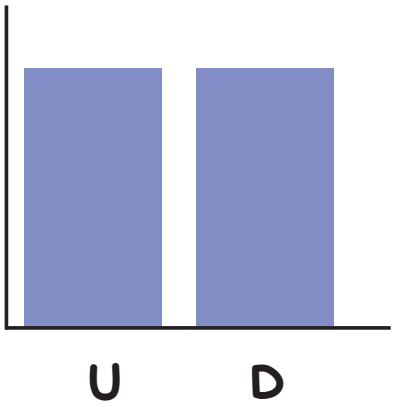
$$\begin{array}{r} {}^{3}4{}^{9}0{}^{9}0 \\ 1999 - \\ \hline 2001 \end{array}$$

but without being able to explain mathematically what they had just done. We could say that the child had the 'doing' but had very little understanding. There was a problem with this. People, adults included, that had just learnt maths as a set of 'doings' weren't properly numerate. There was little flexibility or creativity in their mathematical thinking. The 'doing' they had learnt might have got correct answers, but it had masked low levels of numeracy, or worse still, in some cases it had prevented people from becoming properly numerate!

Over the last 20 years or so there has been a big shift against this, and rightly so. We have seen a big drive for children to *understand* number. In fact we have had such a push on children understanding number that we have forgotten how useful the 'doing' part was. In Little Big Maths, as it does in Big Maths, the two dimensions of 'understanding' and 'doing' are seen as equally important. It isn't a case that we want one or the other, we actually want both!

## 'Understanding' and 'Doing'

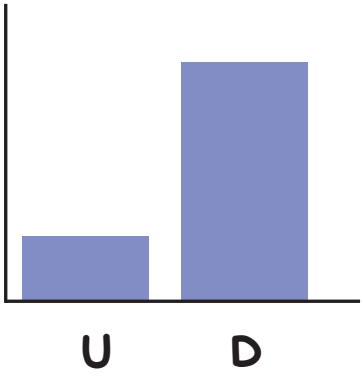
It couldn't be more explicit, we definitely always want the child to end up with both! It doesn't matter whether it is multiplying a whole number by 10, or just counting to 10, whichever step of numeracy we look at we can see that we want the children to have both.




One of the great benefits of thinking around this simple concept is that it allows us to analyse the children's learning, and our teaching, at a much more detailed level, but without really trying too hard. We can stop and 'check in' with any child at any step of any Progress Drive and see if they have 'understanding' as well as 'doing'. For example, knowing when we say the numbers that 11 comes after 10, isn't the same thing as understanding that 11 is a larger amount than 10. Furthermore, although we have said that we want both, that doesn't mean we just get on and teach both.

There are times when we will teach the 'doing' first and then put the 'understanding' in later, and there are times when we put the 'understanding' in first and put the 'doing' in later. We must be very precise about when we take which tact. Just thinking along these lines will allow us to get it right.

## Let the 'doing' come first



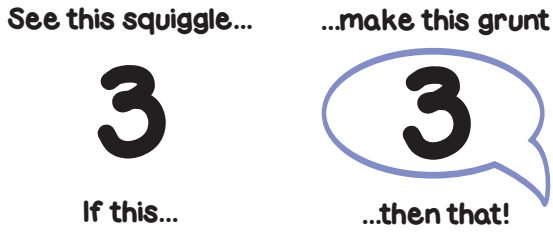

Such has been the drive for children to 'understand' that some teachers reel in horror at the thought of children 'doing' anything to do with number without 'understanding' it first... until they are reminded that when a child says the numbers, '1, 2, 3, 4, 5, 6, 7, 8, 9, 10' for the very first time in their lives they do not 'understand' the value of 6 compared to 7.

In fact when we stop and think about it there are lots of times when we get children to 'do' before they 'understand', and sometimes that is because there is no understanding. For example, when we learn to say the numbers 'one, two, three' they are just agreed 'grunts' to represent the amount. The grunt 'three' doesn't in itself mean 3. As a child learns to write all of the letters in the alphabet we can see again, doing without 'understanding'.

Allowing the 'doing' to come first works because the brain understands simple commands. It has been pre-wired through millions of years of evolution (allegedly!) to understand the basic command 'If this, then that!'

If I see food, eat it.
If I see floods, shelter.
If I see a tiger... escape!

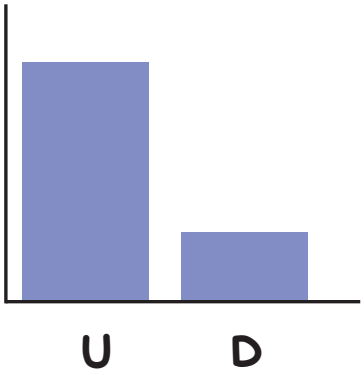
And so we can really cash in on this basic wiring, it's almost as if we are training the child's brain.




Quite often the earlier steps of progression on the beautiful numeracy learning journey involve 'doing' first, 'understanding' later. Although that is just the way it is, it is especially good news for those working in Early Years settings in areas of high social deprivation. If a child has not had an appreciation of amounts explicitly communicated to them, or experienced high quality modelling of counting in their first two years then all is not lost. It might mean they need more time spent inputting this content, and more focused 'brain training', but their capacity to understand 'if this, then that' will not have left them.

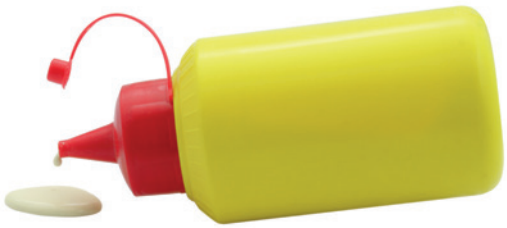
For those working in school settings this is a crucial issue. Class teachers that inherit a new class of children at the beginning of the school year do not want to inherit a wide range of numeracy ability if the children are the same age. This would render them ineffective as we saw in the commentary on Progress Drives earlier on. So, it is this focus on 'doing' that allows the Early Years teacher to 'level / flatten' the cohort and start the children away at the age of 5 already 'on track'.

## Let the 'Understanding' Come First




Sometimes the understanding comes first. If you look at the Little Big Maths Progress Drive for Addition (part of Calculation) you will see 20 progressive steps. These steps begin with the child learning the need to add, learning what effect adding has on the starting amount, and experiencing addition in lots of different contexts before we input the skills of addition.

Eventually, by Step 12 ('I can add numbers of objects to 10'), the process of addition has now been reduced to a simple set of 'doings'. These are the 'Remember To...' statements. In this situation we develop understanding first and then leave the child with the 'doing' part so that they can become more efficient. Again, the child ends up with both 'understanding' and 'doing' but this time the 'doing' is pinned to the understanding glue.



*Addition Step 12*


### Remember to

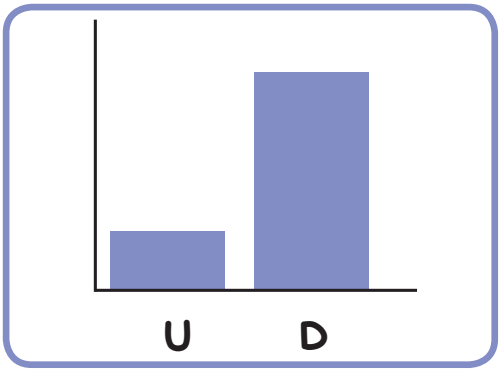
- Find out how many there are in the larger group
- Count on from the larger group
- Count on each one carefully

### Takeaways

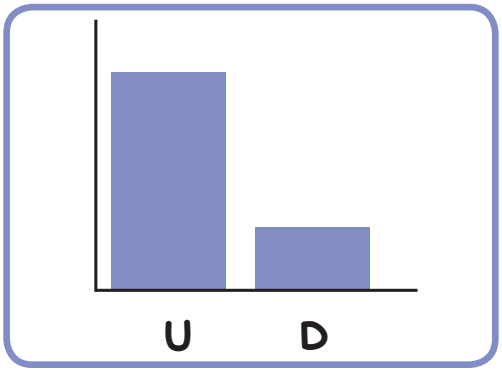
- For children to become properly numerate they need to understand number.
- However, we must not forget that we also need to provide children with the 'doing' part of becoming numerate.
- Sometimes children learn the 'doing' part before the 'understanding' part.
- In the early years where this 'doing' races ahead of 'understanding' is one of the key strategies we can use to get all children 'on track'.

## With a high focus on... 'Understanding' and 'Doing'

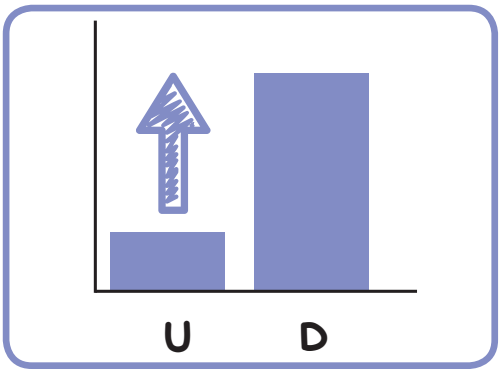
### What does this look like in practice?




Learning Leaders are comfortable with children saying their first 10 multiples of 100, prior to fully understanding them.




As part of the CLIC chronology children learn in Counting, that counting to 3 and then counting on 2 more lands them at 5 (understanding). In the Learn Its part of CLIC they are shown again that 3+2=5, and asked to just 'Learn It' (doing)!




An adult spots that one child can 'do' Subtraction Step 13, but effective questioning revealed gaps in 'understanding' - a specific intervention was implemented.

### Implementation Summary:

- All adults are aware of the 2 dimensions; 'Understanding' and 'doing'.
- Detailed observations are focused on assessing all children against both dimensions.
- Teachers are not afraid to let the children's 'doing' race ahead of their 'understanding'.

## The Little Big Maths Way

# Keep it Visual

**If a child can't see it, a child can't understand it!**

## 7. Keep it Visual

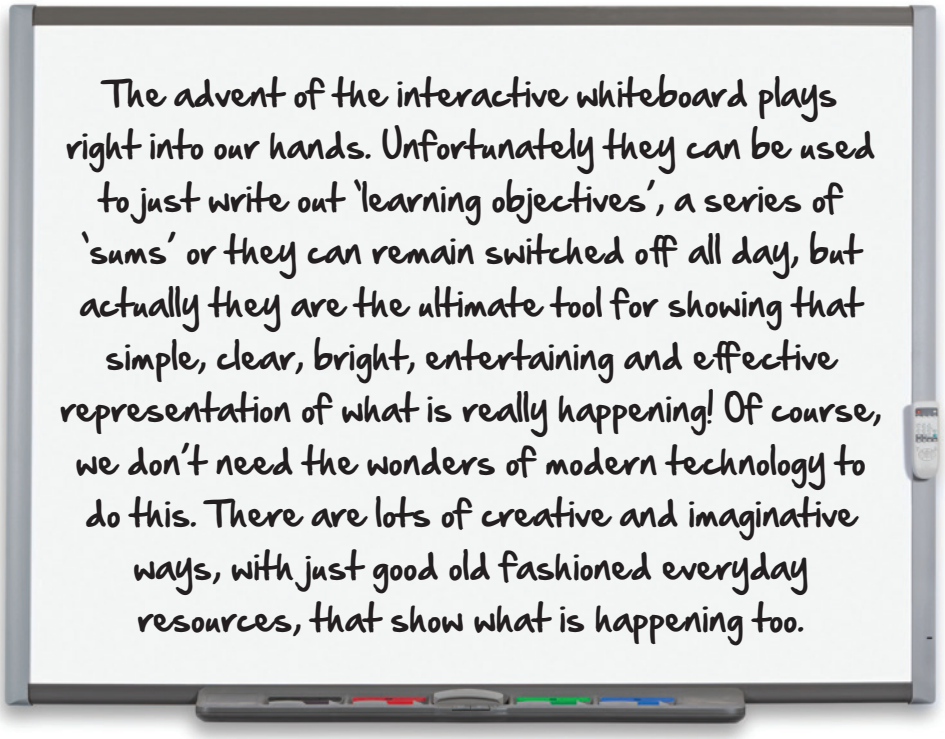
### See to 'Understand'

In the previous part of The Little Big Maths Way one of the concepts we looked at was the importance of developing proper 'understanding' of numeracy in young children. Once we have decided that we want children to 'understand' numeracy then we have to start looking for the most effective ways of communicating that 'understanding' to children. We must never underestimate the huge positive impact on understanding that 'visualisation' has. If we want children to really 'understand' what's going on, then we must show them what is really happening with, and to, the number. There should never be a missed opportunity to illustrate simply, clearly, brightly, entertainingly and effectively what is really happening. There are also some benefits to children *feeling* the number, however quite often it is actually the seeing of what they are kinaesthetically experiencing that is having the impact on understanding. Imagine a 3 year old holding 2 conkers in one hand and 1 in the other, it is still the visualisation rather than the holding that is most striking to the learner.

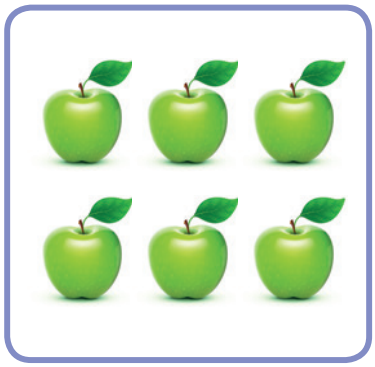
### Now you See it, now you don't!

Remembering that each step on a Progress Drive is assessed in the abstract, it is important to eventually take that visualisation away and check the child can still 'do' it without the visual support. For example children that are seeing a visual representation of the numbers as they learn to say the numbers to 10, will need to be assessed eventually to check they can say the numbers to 10 without any visual aid, even if at first they pass through a mini-step whereby they can only do it with a visualisation in front of them.

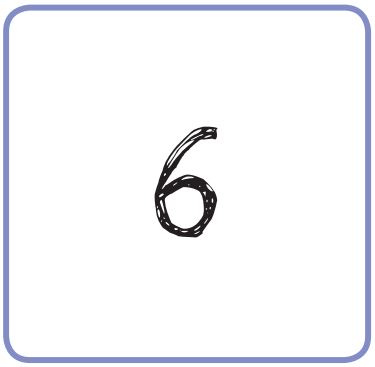
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|



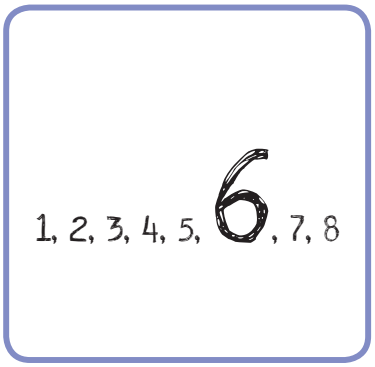
## Different ways of visualising as we learn to say the numbers to 10



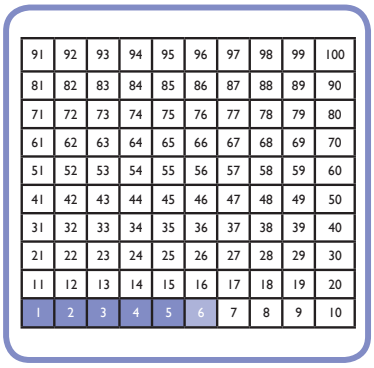
**Objects increasing in amount**




**The number appears as it's being counted**

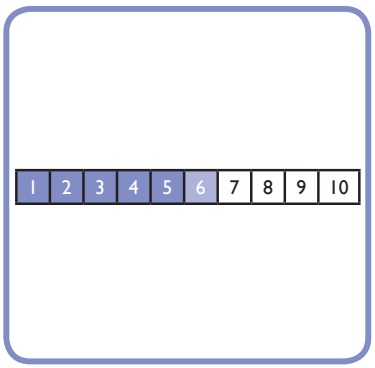



**The number grows as it is said**



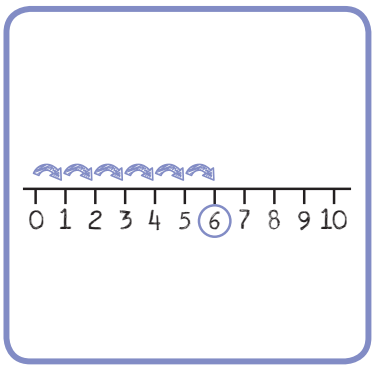
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**On a 100 square**



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**On just the bottom row of a 100 square**

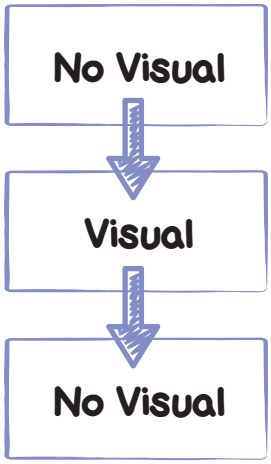



**On a number line**

**No Visualisation**

## No Visual - Visual - No Visual

In fact in many situations, especially when children are learning counting chants (like for example, saying the numbers to 10, or saying the first 10 multiples of 10), we start off without a visual representation. This is because when children are first getting their mouths, and brains, around saying the numbers any further cognitive expectation would (or could) overload them. If you felt confident that it wouldn't overload the children then there is nothing wrong with going for the visualisation straight away, but, as a general rule of thumb we get the counting chant going without the visualisation, then do it on a daily basis with (and still occasionally without) different visualisations, and then assess at the end that each child can do it without any visualisation.




## The 4 Levels of Visual Input

It is helpful to think of our visual input at one of 4 levels of support.

**i. Osmosis:** This is when we put a visual display up on the wall that has some value from a numeracy development point of view. It is occasionally referred to by adults, but generally we just hope that children pick up some of the content since it's part of their immediate environment. Although, low impact, this visual support still has an important role.

**ii. 'No Presh' Connections:** Here we have a situation where the child is exposed to a high quality visual representation of what they are doing and the conversation is directed towards the display but there is no pressure on the learner to answer questions about it or to feel like they should understand it. The example given earlier of children learning to say the numbers to 10 fits here. At first there is no visual, then there is, and it is here that the children might come across lots of different representations (as seen on the interactive whiteboards from the previous page) but there is no pressure on them to do anything with them..they just connect together in their subconscious!

**iii. The Process:** Here the representation is integral to the teaching points. For example if we are teaching children, in Calculation, to jump along a number line to solve a simple subtraction sentence (Step 13 of the Subtraction Progress Drive). The display is at the heart of the teaching and is used to structure the 'Remember To...' statements.

**iv. Self-Check:** Now the visualisation is back to being a display on the wall but the child refers to it as a prop for their 'Remember To...' statements when they choose to and as they develop their independence as learners.

### Takeaways

- If we want children to understand numeracy then we need to communicate 'what's really happening' with high visualisation.
- The visualisation has a tremendous effect on increasing understanding.
- Even if children are doing something kinaesthetically it is often the visualisation that is adding to their understanding.
- Eventually we take the visual representation/support away.

## With a high focus on... Keep it Visual

### What does this look like in practice?

All children are saying numbers out loud to 100. One adult leads the chant/dance, one adult uses a clicker to give a changing visual display, one adult watches the children's lips.

Children on Step 3 of the 'My Body Learn Its' Progress Drive are learning they have 5 fingers on one hand. Adults do 'High5's with children and follow it with, 'how many fingers?' The child says '5'!

Children learning the Pim Principle are hearing a story about a 3 legged pirate. The teacher has a visual display behind to show 'the thing' changing, but the amount staying the same.

### Implementation Summary:

- Learning Leaders constantly think about how to visualise the amounts and numbers.
- The visualisations always add to the understanding, never overload or confuse.
- Visualisations are always clear, bright and fun!

8

The Little Big Maths Way

# Keep it Verbal

**For high quality, purposeful numeracy talk...talk...talk!**

# 8. Keep it Verbal

## Keep them talking!

Linking back to the notion that we want children to 'understand' and 'do' numeracy, both dimensions require talk. The more a child can talk it the more they will 'understand' it, and they won't be 'doing' anything if they're not talking it! So our daily 'Amounts CLIC' session will be full of talk, but what kind of talk?

- Well, in the **Amounts** phase the children will generally be exploring amounts and playing with each other and with an adult. The adult will guide the vocabulary to fit the concept behind the next step up the Progress Drive.
- In the **Counting** and **Learn Its** phases they will be chanting, counting, shouting, singing, rapping!
- In **It's Nothing New** they will be using those same words in a calmer manner in a whole host of different contexts.
- Some **Calculation** steps require some direct teaching input and in these situations it is good to focus the child's talk on the 'Remember To...' statements. Explaining the process to a talk partner adds a considerable layer to understanding and internalising that process.
- There are times when we won't expect any talk. For example if the child is listening to a story as part of a 'Sticky Play', or is thinking about amounts as they play on their own.

## Strip all the Unwanted Words Away

There are some important new words that we want children to start using freely as they embark on their beautiful numeracy learning journey. We certainly don't want to add any unnecessary, unimportant words. Remember, all assessment of CLIC happens in the abstract – essentially all progress happens in the abstract too. This is a natural feature of numeracy but it is also a useful feature since it means the learning is de-contextualised, i.e. we can take all of the social situations, and also therefore the unnecessary words, out of the way and just focus on the pure, simple and straight forward number!

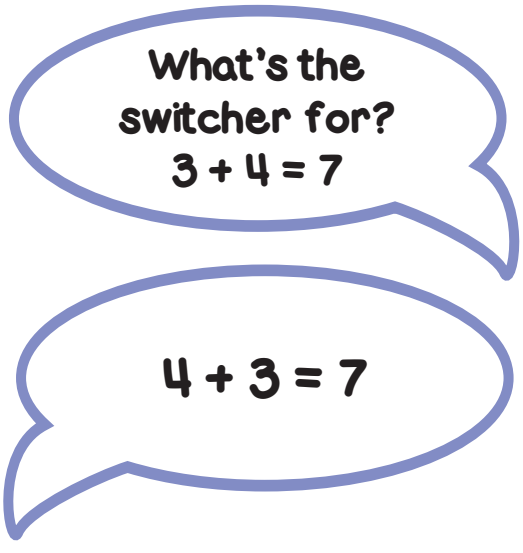
## Give Concepts Names

As we start stripping away the unwanted words we realise that some concepts have been given unbelievably inappropriate names for young children.

Switcher: For example the simple concept that...

**2 + 3 = 5 .... so 3 + 2 = 5**

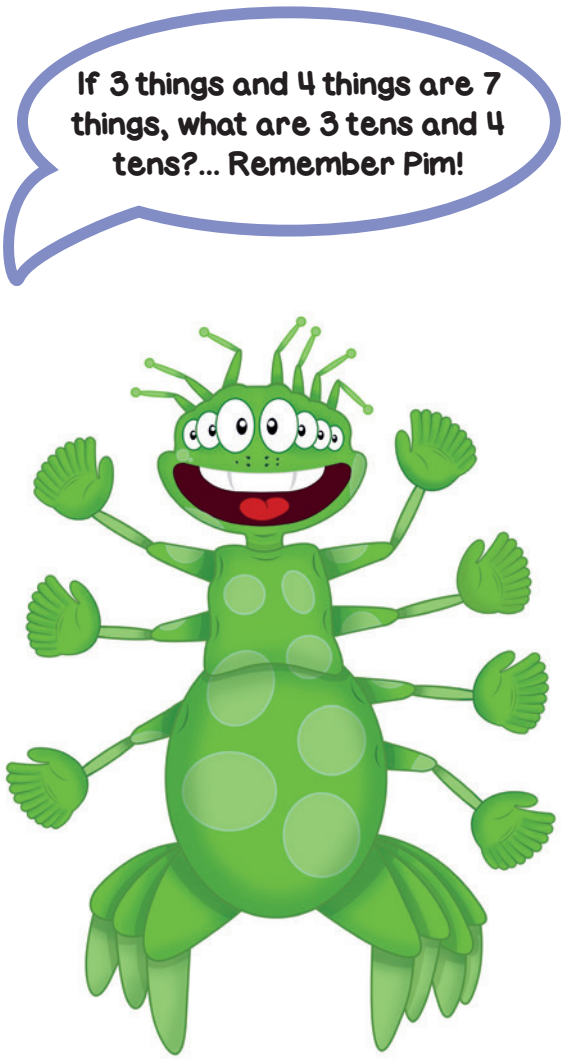
...is called the 'commutative law'. We couldn't possibly start to explain to our young children that this is called the 'commutative law'! Yet, we don't want a concept to remain nameless either (because it makes it less memorable), so in Little Big Maths we call this concept 'a switcher'. This makes the concept accessible and memorable to children. It does what it says 'on the tin'!



## The Pim Principle:

You will find out more about 'Pim the Alien' in the 'It's Nothing New' part of Little Big Maths. He shows the children that 3 things and 4 things are always 7 things. This is another concept that it is useful to give a name to. The simple idea that we can change 'the thing' but the amount doesn't change is such an important one for children to learn (see 'Cashing in on The Pim Principle' in the 'It's Nothing New' introduction for a breakdown of why it is so important).

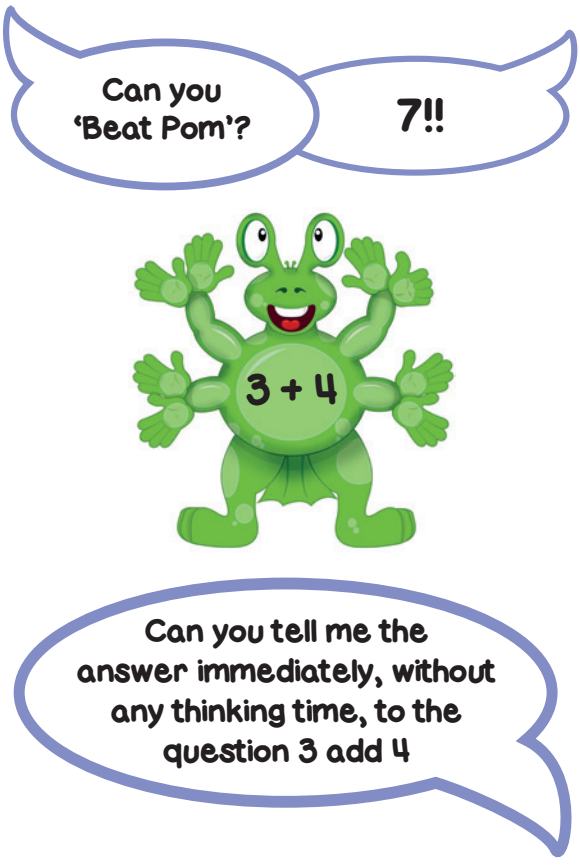
By introducing 'Pim the Alien' it gives us a child friendly context to explore this concept and later on we can fall back on this by merely asking the children to 'Remember Pim'.




## Beat Pom:

You will also meet Pom the alien, Pom is Pim's friend. He is used in Little big Maths to play 'Beat Pom'. This is communicating to the children the very simple concept that sometimes we have to 'just know' stuff!

Notice how Pom has no brain, his head goes straight from his face to his antennae. This is a subtle communication that there is zero thinking time in these situations, we just know the answer. In these situations we don't expect any thinking time, we just respond automatically, 'see this, say that!' The 'see this' part happens on Pom's body. Children see what number or question Pom gives them and they have to meet the challenge of 'pinging' back the correct response. It can be set up as a game, 'Can you beat Pom by knowing the answer straight away?'. We are left with a neat succinct way of communicating a vital concept of immediate recall.



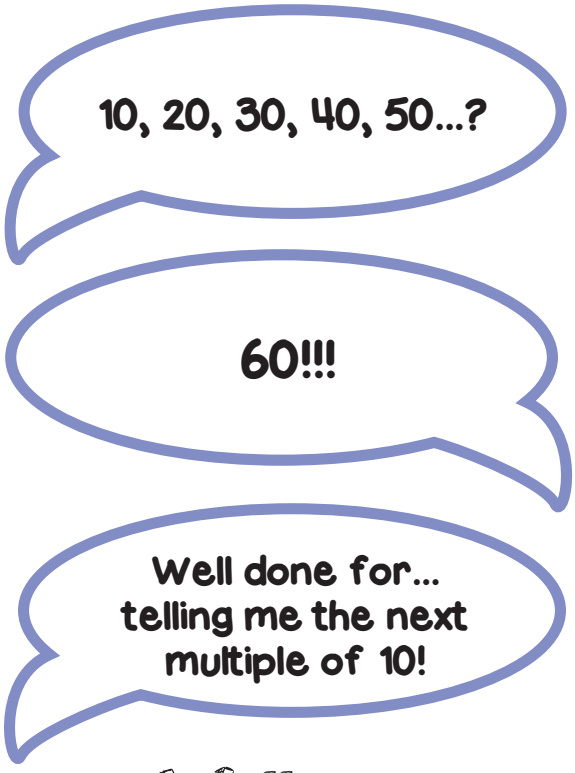
## Well done for...

There was a time when teachers would turn up to cover a curriculum, and the curriculum would say, 'to recognise odd and even numbers' and so the teacher would teach that concept that day and expect the children to be introduced to 'odd and even' numbers and start using those words feely and with purpose 45 minutes later! Luckily those days have gone and we now know that if we want children to use language meaningfully and genuinely they need to be exposed to it first. Our language becomes their language.

In fact, if we want this to happen we have to be precise about when we want children to use which words with meaning, and then plan backwards by using those words ahead of time. So, for example, we might use the word 'multiple' in a context that we know is 'safe'. Children that we know have secured the first 10 multiples of 10 can be asked, '10, 20, 30, 40, 50...?' When they say '60', as we know they will, we can congratulate them by saying, 'Well done for telling me the next multiple of 10'.

There is no pressure (again) on the child to use the word, but we know that the context we are using it in will make sense to them and by doing this over a long period of time (perhaps in this case 2 years) they will soon come to understand and use the word 'multiple' for themselves. When we let our language race ahead of the children's like this, and make it explicit, by congratulating them on something we knew they would be able to do, we call this a 'Well done for...'. The symbol shown here is used in the second section of this book to show steps within the Progress Drives where this technique takes on greater significance.

Well Done 4...



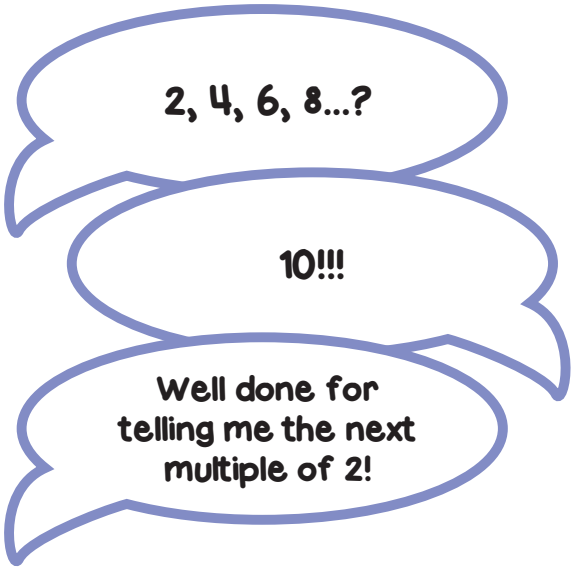

Well Done 4...

### Takeaways

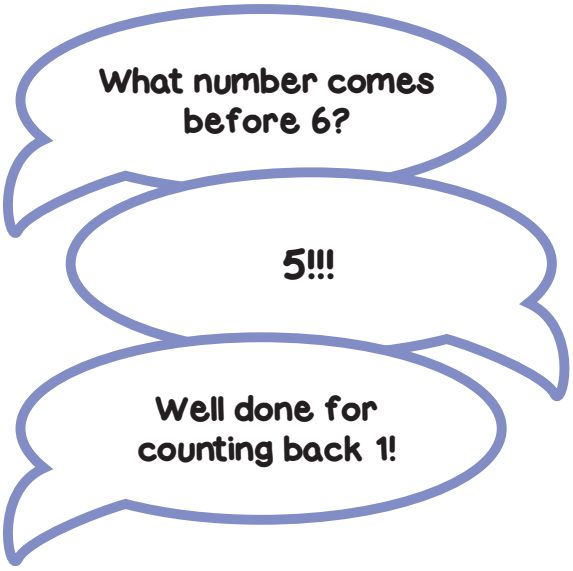
- If we want children to understand numeracy then we need to communicate 'what's happening' with high verbalisation.
- The verbalisation has a tremendous effect on increasing understanding.
- Children should talk, talk, talk.
- Our words should 'race ahead' of their words.
- Maths concepts should be communicated with names that make the concepts accessible and memorable to children.

## With a high focus on... Effective Talk

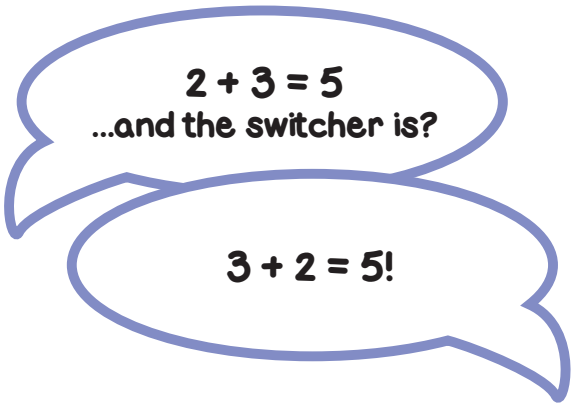
### What does this look like in practice?



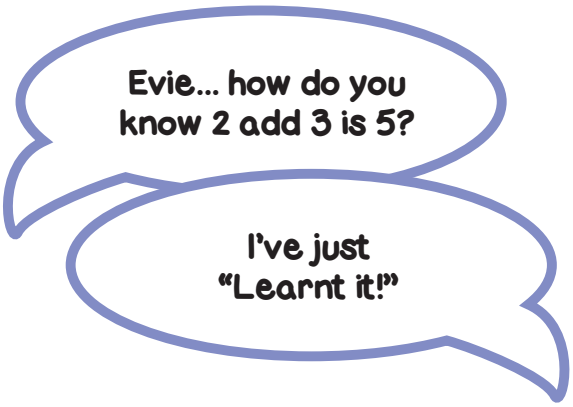

Modelling language we expect the child to start using in 2 years.




Modelling language we expect the child to start using in 2 weeks.




Using child friendly words to make maths concepts accessible and memorable.




Using a simple 'how do you know' question to make the child conscious of their factual knowledge.

### Implementation Summary:

- Learning Leaders skilfully choose when to model the use of specific words.
- The words always add to the understanding, never overload or confuse.
- Teachers guide and structure the children's use of words so that children are always in their comfort zone.

9

The Little Big Maths Way

# It's all about the brain

**Learning doesn't happen in the classroom, it happens in the brain.**

# 9. It's all about the brain!

There are 5 key points to be made about the brain.

## 1. You are a Brain ASSembler!

We often forget that inside every young child's head is an actual brain, a young brain. Everyday when we go to work to teach, what we are really doing is to try and get the neurons (nerve cells) in the brain to fire together, and then wire together. This is what learning really looks like. Brain scientists used to think children's brains were empty vessels waiting to be filled with knowledge. Not one brain scientist believes that any more. Today the brain is seen as having lots of 'pre-wiring', in other words it is expecting to learn. It won't just develop on its own though, it needs the right input...and that's our job.

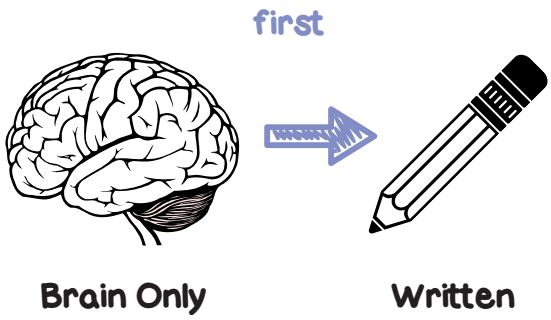
We are brain assemblers! Earlier on when we looked at Progress Drives we looked at the notion of 'Teaching with EASE'. This is when we make new learning easy for the child by making sure they have all of the pre-requisite skills (the 'juggling balls') ahead of needing them for the new learning. What is actually happening here is that we are creating a neural pathway in the brain for new learning to attach to. This is one way we act as brain assemblers. Another way is when we get children to do things with a lot of support, and then take the support away gradually.

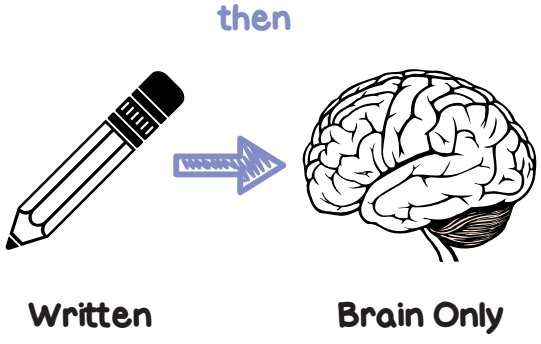
So, if we get the child to count to 3 with a rhyme in Sticky Play, then we find we can take the rhyme away and the child can still say, '1, 2, 3'. As we watch the child do things with greater independence what is really happening is that we get the child's brain wired up so well with the support, that if we take the support away the wiring is still there.

The maths has stuck!

## 2. Brain only?

If you are familiar with Big Maths then you will know about The FAB Continuum. This is where we get children to do a calculation and then take the writing away gradually until they can do it using their brain only, no writing necessary. This doesn't make sense for our young children aged 3, 4 or 5 because they may not even have learnt to write numbers yet. However, sometimes we do the writing and show the children what it looks like before taking the writing away. Usually though, for our young children, we first of all get them to do 'stuff' in their brains and only later do we ask them to write it down. The 'writing it down' helps to clarify the child's thinking, it helps them to see it! Little do they know that later on in the journey we'll be taking the writing away again! Nearly all of Little Big Maths happens without any writing. Writing the numeracy and being numerate are two separate entities. Children that can't yet write their 10 digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) and 5 Symbols (+, -, X, ÷, =) mustn't feel excluded, so long as there is a daily press on achieving that writing goal and small amounts of progression are observable then that's fine.



## 3. Assess the Brain

Once we start to think of learning really happening in the brain then it focuses assessment on the brain too. Until we have some kind of brain scanning equipment in school we will have to continue to find other ways to see if the brain has 'got it'.

On the few occasions when children write in Little Big Maths (e.g. In Squiggleworth and some of the later Calculation steps) we consistently use individual whiteboards so we can check if each child's brain has 'got it'. However, since so much of Little Big Maths is oral there is a huge focus on watching children's lips, not to check if they are joining in, but to check if their brain has 'got it'!

## 4. Repeat and Revisit

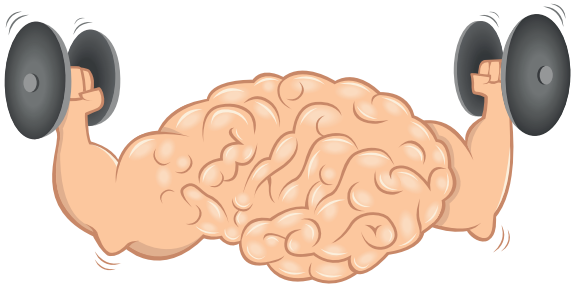
Whenever a child has initially 'got it', when they master a new step for the very first time, then that doesn't mean their brain will hold on to that learning. In fact, unless the information is essential for survival the brain wants to forget it! The good news though is that the brain is also pre-wired to develop habits and routines, and so with a very definite focus on adults ensuring children repeat new learning again and again then we can 'hardwire' new learning into the brain.

Part of this process is about adults structuring their planning so that recently learnt skills are revisited too. This effort, to let a little time pass then come back to the skill, then let a little more time pass and come back to the skill, and so on, is vital if the wiring is going to stand the test of time. Eventually the new skill is automated, second nature, and we can therefore build other new learning on top of that!

**Repeat to remember, and remember to repeat!**

## 5. Train the Brain

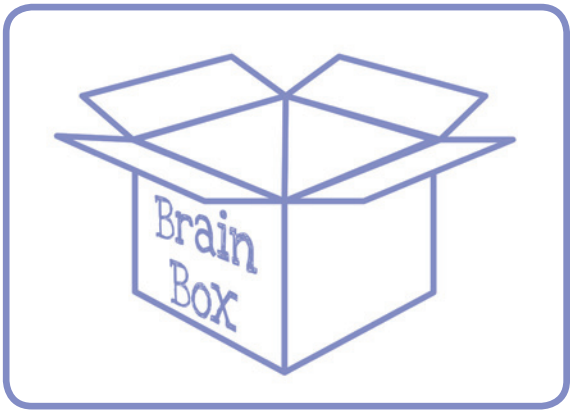
As children progress from Little Big Maths to Big Maths we expect them to hold more numbers in their brain, this is partly what it means to be properly numerate. For children to meet this expectation with EASE they need to have great capacity to hold information in their brain, and this capacity comes from having their brain trained up! For example, if we get children joining in a Counting chant they may master that step of progression for Counting but without ever having counted it in their heads. But by asking and expecting children to also count in their minds we can develop their mental capacity and also get them to think about their thinking (a process called metacognition) at a very basic level.



### Takeaways

- The human brain wants to forget stuff, yet remembering makes us clever!
- Repetition provides the glue for new learning to stay locked in.
- In Little Big Maths repetition is one way that we shift recently learnt basic skills into the long term memory.
- We also need to allow some time to pass and revisit new learning to help the child retrieve new learning.

## With a high focus on... The Brain
### What does this look like in practice?




One teacher creates a 'Brain Box' game and asks a different child each day to hold in 'their brain' the 2 things placed in the box at the start of the day and recall them at the end of the day. The teacher starts with two play objects but as time goes by gradually introduces numbers.

Children use little whiteboards whenever possible so learning leaders can 'brain scan' the child to check the new learning is secure.

Adults watch children's lips, and therefore their brains, very carefully as they chant out their counting.

Children who have secured saying the first multiples of 5 up to 50, sit in a circle. The teacher asks. 'Who will say 35?' so children can practise counting the multiples in their brain.

### Implementation Summary:

- All adults think about developing the child's brain, and see themselves as observing their thinking (i.e. brain scanning).
- Specific strategies (such as those shown here) are used to teach and assess the numeracy development of the brain. Particular focus is given to repetition, revisiting and holding numbers in the brain.

10

The Little Big Maths Way

# Keep to the "beautiful numeracy" learning journey

**It's a minimum, yet high expectation journey!**

# 10. Keep to the "beautiful numeracy learning journey"

## The Journey

All children are on a numeracy learning journey. The numeracy learning journey is itself made up of smaller threads, these are the Progress Drives, and if we zoom in further we see small sequential steps of progression. The numeracy learning journey is really a 0-18 year old learning journey, but the Little Big Maths chunk at the beginning is by far the most important part. If we get it right it is a beautiful journey filled with fun, exploration, discovery, success and mastery. It feels great! Children initially learning with EASE, then finding for themselves lots of new places and contexts to use their numeracy.

## Keep to 'The Journey'

Getting it right means keeping to the journey. This means marrying together two systems. One, is what the journey actually looks like. In other words, which steps we can expect children to be on at any given time. This must be a journey characterised by high expectations. This detail can be found in the free online document, 'CLIC on your Little Big Maths Planning', which is also cross referenced to your country's national assessment criteria so that you can effortlessly blend in reporting standards and levels to external agencies that require them.

The other system that needs to be married to this is your own internal system for tracking each child up each Progress Drive. We recommend using the learning leaders 'Little Big Maths Tracking Book' which links planning and assessment together for a group of children (with personalised tracking within that where needed). In summary then, know where the child should be, and know where they actually are.

## Whole Class Teaching?

The thought of having whole class teaching for a class of 4 year old children might appear to be quite shocking. However, there are times when it might be appropriate because it is the most effective thing to do! If the children in the class are all 'on track', i.e. they are keeping to the 'beautiful numeracy learning journey' then the next step could be addressed as a large group. This would mainly be true in the Counting part of 'Amounts CLIC'. One very distinct feature of Little Big Maths is that the Counting session is characterised by an active dance and chant This can be led by one adult in the setting while other adults actively assess 'brains' by looking at children's lips and support individual children where necessary. So, think not of it as 'whole class teaching', more as a large group daily workout! Physical and mental!


## Ahead is Good!

It's important to be clear that of course children may travel ahead of the agreed schedule for the journey. More able children certainly will. The entire ethos of Little Big Maths is personalised learning: teaching the individual children's next step up the Progress Drive. Ideally there would be a group of children that are travelling ahead of schedule.

If there are individuals that appear ready to progress to new steps on their own then we must remember that we can make ourselves less effective by encouraging this spread. It is a difficult balancing act and one that relies on professional judgement in that context at that time. Children can always be extended outwards (as opposed to going up the Progress Drive) by giving them more challenging contexts to use their core numeracy in.

## Learning Gaps

By simply marrying the expected journey with the tracking of a child up the Progress Drives any 'learning gap' will automatically reveal itself. We won't even need to hunt for it, it will just jump out. This is good because it triggers a response. The last thing we want is children that are travelling 'off track' or behind schedule. The 'beautiful numeracy learning journey' that we have painted out is a minimum journey, a high-expectation minimum journey. So, we have ourselves a little action plan!:

I. Firstly, get all children 'on track'. Remember the initial focus on 'doing' rather than 'understanding' is a great leveller.

II. Prevent children that are 'on track' from becoming 'off track' by delivering 'quality first' teaching.

III. If a child develops a 'learning gap' intervene immediately. Plug the gap!

IV. If a child develops learning gaps repeatedly, consider them for further specialist assessments to check if they have a genuine learning difficulty.

## Organisation and Alignment

Embedding The Little Big Maths Way is important for the child's continuity of experience, not just within the setting but also as they move through primary school so that they have a smooth and beautiful numeracy learning journey. Implementing Big Maths across the whole of the primary years means that schools have whole-school alignment and organisation. Everyone is facing in one direction. This efficiency has a marked impact on the rates of progress which children make. The child experiences their entire beautiful numeracy learning journey as if they were being taught, and tracked, by one teacher. Even before the child starts school it is useful to talk to parents about the conceptual progression in the 'Amounts' Progress Drives. Once the child comes into school start immediately to deliver appropriate 'A-CLIC' sessions. Every minute of every session 'counts'! The key then is for the approach to be sustained and delivered with great consistency. The person with leadership responsibility for Little Big Maths in the school then answers the 2 killer school self-evaluation questions:

1. Is what we agreed to happen actually happening?
2. If so, with what impact?

### Takeaways

- Little Big Maths paints out a detailed minimum numeracy learning journey for children in the early years.
- This journey links with Big Maths so that the child experiences perfect continuity as they move through school.
- This journey tells us what steps of the Progress Drives we expect children to be on at a given time if they are 'on track'.
- This journey has high expectations and allows us to spot where children have 'learning gaps'.
- Some more able children may be in advance of this journey.

## With a high focus on... Keeping to the Journey

### What does this look like in practice?

Detailed tracking of children against the expected journey reveals one child is now 'off track'. Individual intervention is immediately planned. Further specialist assessments are being carried out to check his cognitive ability.

Prevention: One child has been absent and so is now receiving additional support to prevent them becoming 'off track'

Detailed tracking of children against the expected journey reveals several children are now 'off track'. Group intervention is immediately planned.

Leadership and Management: Rigorous monitoring of the implementation of The Little Big Maths Way is taking place.

### Implementation Summary:

- There is a constant check that all children are keeping to the planned journey.
- Children that become 'off track' trigger a specific intervening focus until they are back on track
- Monitoring and evaluating the quality of The Little Big Maths Way in practice is seen as crucial.