TeeJay

Maths For Play-Based Learning

Teaching Guide

CfE Early Level

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HODDER GIBSON
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Contents

Introduction

Teaching for play-based learning

What is play-based learning?

The benefits of play-based learning in the early years are much documented across broad fields of research. Learning through play has a positive impact on the development of cognitive and non-cognitive skills, as well as thinking skills and fostering intrinsic motivation.

By actively engaging with people, objects and representations through play, children can make their own sense of the world. By engaging in the play-based learning approaches in this guide, as well as the practice workbooks, we hope that children build a deeper conceptual understanding of mathematical and numeracy skills, ultimately ensuring their future success in the world of maths.

Using this teaching guide

This guide has been designed to support daily teaching of mathematics. It includes several elements that are fundamental to learners' understanding and progression in mathematics.

The teaching guidance anticipates the main teaching will be pitched slightly above the current level of understanding of the class, as per Vygotsky's 'zone of proximal development'. The workbooks are pitched slightly lower than this to allow for independent practice and overlearning in the classroom.

Topic overview

This section provides an overview of the entire chapter so that practitioners see the 'big picture' of the learning over a sequence of lessons. Within this overview, the big ideas – the key concepts to be taught and learned – are identified to support teacher subject knowledge.

Core vocabulary to support the understanding of key concepts is also identified. This builds progressively in this book, enabling learners to talk about their learning in the correct contexts.

Resources are listed to ensure that the play-based environment is fully resourced in advance of the learning week. Also included are suggestions for play-based learning – playful invitations – that support the development of the key concepts in each chapter. Reinforcement work has been built into the lesson plan where appropriate to embed learning.

We want our learners to develop a positive disposition toward mathematics and see mathematics as a powerful way of looking at situations. Disposition refers not only to attitudes but also to a way of thinking and acting in a positive manner. It shows itself in the way learners approach problems – ideally with confidence, willingness to explore alternatives, perseverance and interest – and in their tendency to reflect on their own thinking. Evaluating these indicators and learners' appreciation of the role and value of mathematics is central to the evaluation of mathematical knowledge as a whole.

The weekly lesson approach

Focus tasks for the week – these suggestions will support the teacher in planning for focused group work each week. The tasks provide extension and support suggestions to guide all learners.

All together – these are suggestions for engaging starter activities, usually rhymes or songs.

Let's learn! – these sections provide teacher guidance to support whole class learning.

Ch 5: Adding 0 to 10

Topic overview (Workbook 5)

Summary

This topic at a glance

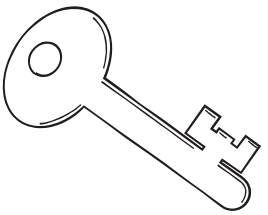
This chapter covers the teaching associated with *TeeJay Maths CfE Early Level Workbook 5*, where learners will explore addition within ten. They will use their secured counting skills to support this. Learners will begin to understand that addition is the combining of two groups or parts, to make the whole amount. They will be introduced to part and whole number bond diagrams, and will use concrete resources to build their understanding of the abstract symbolic system of recording.

Whole class learning opportunities are detailed in the 'All together' and 'Let's learn!' sections. There are also 'Focus tasks' that enable the teacher or support teacher to plan and work with one focus group per session. Differentiation suggestions are also included.

The TeeJay workbook could be used as an independent activity as part of a 'carousel' or as part of the focus task with the teacher or support teacher.

Big ideas

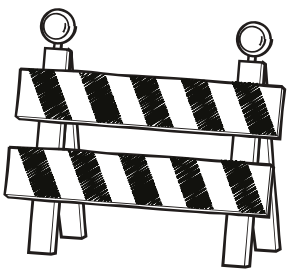
The key concepts for this chapter



- **Adding**: combining two groups to make a whole.
- **Counting**: to compare quantities.
- **Subtracting**: counting back and comparing quantities, using language of difference (more/less).
- **Mark-making**: to support calculation.

Common misconceptions

The barriers to learning

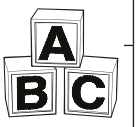


- Learners do not have secure counting skills (one-to-one correspondence, cardinality and conservation).
- Learners do not relate the mathematical symbol to the act of 'adding on'.

Resources

What you need from the maths cupboard

- objects for counting
- part-whole diagrams
- building blocks, such as Unifix® cubes
- digit cards

Core vocabulary					
add	part	whole	total	combine	amount 

Playful invitations

Ideas to make learning fun

Use these suggestions as 'pick and mix' alongside other continuous provision in the play environment.

Cooking

Make cookies.

Roll a dice and put one more chocolate drop or raisin on a cookie than the number on the dice. For example, if you roll a four, put five chocolate drops or raisins on the cookie.

Repeat for each cookie.

Mini-world

Change the prices in a play café. All the original prices should be in a whole number of pounds, up to £10. Tell children that all prices in the café are going up by £1 or £2.

Children write the new prices.

Puzzles

Children find all the dominoes that have one more spot on one side than the other.

Children play board games, saying what number they will land on when they move spaces according to the dice.

TeeJay

Children use *TeeJay Maths CfE Early Level Workbook 5* to practise before moving to a different activity.

Lesson approach: Week 1

Focus tasks for the week

Task 1: Activity with a teacher

Show the group three plates. Explain that you are going to put cupcakes on two plates and then find out the total number of cupcakes, by moving them onto the third plate.

Place three cupcakes on one plate and two on the other. Model counting the total by moving the two parts to the empty plate.

What other ways could we arrange the cakes on two plates but still total five?

Model recording in a part-whole diagram.

Support **struggling learners** by working within five. **Advanced learners** should work within ten.

Task 2: Activity with a teacher and an additional adult

The same task can be carried out with the additional adult this week as this is a key teaching point.

Lesson 1: On the carpet

All together

Sing a song such as 'Ten Green Bottles'. Ask the whole class to join in and count with you.

Let's learn!

Roll a 1–10 dice.

Model counting in ones or twos on a number track.

Model for children how to record the corresponding number sentence and invite them to write their own number sentences to match the count.

Repeat for different numbers.

Lesson 2: On the carpet

All together

Use a random number generator to ten, or a shuffled deck of 0–10 number cards.

Show children the generated number or pick a card.

Ask them to read the number out loud and continue counting until you say stop.

Repeat with other cards/numbers.

Let's learn!

Model sharing five objects between two plates.

Show how to combine the objects to create the total.

Roll a dice or use a random number generator to select a number between one and ten. Gather that number of objects and repeat the activity.

How else could the objects be separated to still make the same number as the total?

Lesson 3: On the carpet

All together

Write the numbers 1–6 on a beach ball. Throw the ball to the children.

Whoever catches the ball has to say the number that their thumb lands on.

Show me this number on your fingers. What is the next number? Show me on your fingers again.

Repeat this several times.

Let's learn!

Model planting seeds in a pot.

How many have I planted? How many more am I adding? How many do I have in total? How many plants should grow?

Repeat for other amounts and pots.

Lesson 4: On the carpet

All together

Count along the counting stick from ten to zero and back again.

Oh no, the stick has got the hiccups!

Start counting back, but 'hiccup' between numbers forwards and backwards.

Ask the children to tell you which number you missed when you hiccupped.

Let's learn!

Use the number splat square (available online) to find a starting number. Splat different numbers and children identify whether they are more or less than the starting number. ***How many more/less? How do you know?***

Lesson 5: On the carpet

All together

As per Lesson 4, count along the counting stick.

Tell the children that the stick no longer has the hiccups but has the 'shushes'.

When I touch the top of the stick, we say the number, but when I touch the bottom, we shush, and count in our heads without saying it out loud.

Repeat the activity a few times.

Let's learn!

Put a large 1–10 number track on the floor and ask a child to stand on number six.

Roll a large dice with one or two spots on each side.

Ask the rest of the group what number the child will land on if they jump the rolled number of spots on from six. Get them to show you their answers on their fingers.

Record the addition.

Repeat for different numbers, recording the addition each time.

Ch 6: Subtracting 0 to 10

Topic overview (Workbook 6)

Summary

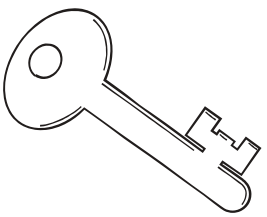
This topic at a glance

This chapter covers the teaching associated with *TeeJay Maths CfE Early Level Workbook 6*, where learners will explore subtraction within ten. They will relate addition and subtraction facts within ten. Learners will use the counting on and counting back methods for subtraction, as well as crossing items out.

Whole class learning opportunities are detailed in the 'All together' and 'Let's learn!' sections. There are also 'Focus tasks' that enable the teacher or support teacher to plan and work with one focus group per session. Differentiation suggestions are also included. Reinforcement work has been built into the lesson plan where appropriate to embed learning.

The TeeJay workbook could be used as an independent activity as part of a 'carousel' or as part of the focus task with the teacher or support teacher.

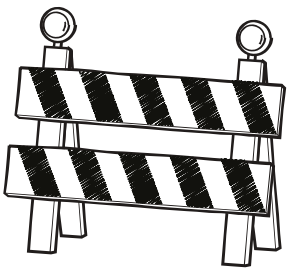
Big ideas



The key concepts for this chapter

- **Part-whole**: applying knowledge of part-whole relationships to both addition and subtraction.
- **Subtraction**: counting back and comparing quantities, using the language of difference (more/less).
- **Counting**: to compare quantities.
- **Mark-making**: used to support calculation.

Common misconceptions



The barriers to learning

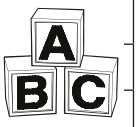
- Learners do not relate addition and subtraction.
- Learners do not relate counting back to subtracting.
- Learners do not understand that commutative law does not apply to subtraction.

Resources

What you need from the maths cupboard

- objects for counting
- tens frames
- part-whole diagrams
- building blocks, such as Unifix® cubes
- number tracks
- number fans

Core vocabulary					
add	subtract	cross out	count back	count on	left
more	less	fewer			



Playful invitations

Ideas to make learning fun

Use these suggestions as 'pick and mix' alongside other continuous provision in the play environment.

Outdoor teaching

One child throws a beanbag on the hopscotch grid. They then work out the number that is double the number their beanbag landed on. If everyone agrees with their answer, the child hopscotches and collects their beanbag.

Repeat so that other children have a turn.

Art

Give the children pictures of ladybirds or butterflies. Children draw, paint or stick the same number of spots on both halves of the ladybird or butterfly. They then add the spots to find the total.

Construction

Children find different ways of making trains with six carriages in two colours (for example, two red carriages and four blue carriages). Use the part-whole diagram to support this understanding. Repeat the activity for trains with seven carriages.

Cooking

Make cookies and put different numbers of chocolate drops or raisins on top.

Children count each chocolate drop or raisin as they place it on the cookie.

Mini-world

Children find different ways to partition a group of six or seven toys into parts (a minimum of two parts).

Puzzles

Children find all the dominoes that have a total of six or seven spots. They then find all the doubles. Ask the children to match the domino totals to number cards.

TeeJay

Children use *TeeJay Maths CfE Early Level Workbook 6* to practise before moving to a different activity.

Lesson approach: Week 2

Focus tasks for the week

Task 1: Activity with a teacher

On the board, draw five frogs in a pond. ***One frog jumps out. How many are left?***

Ask children how they could work it out. Discuss how they could use one finger to represent each frog. They hold up five fingers, put one finger down, and see how many are left.

Model this using blocks to represent the frogs, showing five blocks and taking one away. Ask children whether one was added or taken away.

Encourage children to think of the number sentence. Model writing 5 – 1 = 4. Repeat for other scenarios, using picture cues if necessary.

Task 2: Activity with a teacher and an additional adult

On the board or a flipchart, draw a simple picture of a number of people (for example, seven) on a bus. Explain that one person is getting off at the next stop. Ask children to tell their partner how many people will be left on the bus, and then show the answer with their fingers. Cross out one person on the bus. Discuss how many people are left. Record 7 – 1 = 6, saying: ***Seven take away one equals six***.

Lesson 1: On the carpet

All together

Children work in pairs to show number bonds to ten. One child shows four fingers and the other shows six to make the bond.

When one child is showing their number, the other should hold their fingers behind their head to avoid counting in ones on their fingers.

Let's learn!

Show children two plates and up to ten cupcakes. Explain that you are going to eat one cupcake from the first plate and one cupcake from the second plate. ***How many cupcakes will there be left in total?***

Ask pairs of children to come to the front and split the cupcakes between the plates in different ways. Record the matching subtractions on a card and stick them to a flipchart.

Lesson 2: On the carpet

All together

Show ten pegs on a coat hanger and ask children to close their eyes while you remove one or more of the pegs.

When children open their eyes, ask: ***How many pegs are left? How many have been removed?***

Repeat, removing a different number of pegs each time.

Let's learn!

Show children up to 20 pegs on a coat hanger. Partition the pegs into ___ and ___.

Turn the coat hanger around to show the number bonds, such as 17 + 3 and 3 + 17. Ask what the calculation would be if you took two pegs off the hanger.

Encourage children to help you write addition and subtraction number sentences. Repeat for other numbers.

Lesson 3: On the carpet

All together

Write different subtraction calculations to ten on the board. Then, cover parts of the equations with sticky notes.

Ask children how they could work out the missing numbers.

Let's learn!

Put children into pairs. Ask each pair to show you ten fingers between them, so one child might show six and the other might show four.

Challenge pairs to work out what number they would be left with if one of them took their fingers away. Encourage them to start by recalling what number they had at the beginning, and then think about how many are being taken away. Record this on a number bond diagram, and repeat for other numbers.

Lesson 4: On the carpet

All together

Cover 10 random numbers on a 1–100 grid (not multiples of 10).

Count to 100 as a class.

Ask children what numbers are missing on the grid, and how they know this.

Let's learn!

Show children up to 20 pegs on a coat hanger.

Partition the pegs into ___ and ___.

Turn the coat hanger around to show the number bonds, such as 17 + 3 and 3 + 17.

Ask what the calculation would be if you took two pegs off the hanger. Encourage children to help you write addition and subtraction number sentences. Repeat for other numbers.

Lesson 5: On the carpet

All together

Show children 3 numbers between 0 and 20.

Ask questions about the numbers, such as: ***What is the number before? What is the number after? What are the numbers between ____ and _____?***

Let's learn!

Draw 20 bees and stick them onto a drawing of a beehive. Model removing the bees from the hive by unsticking them one at a time. Encourage the children to describe what is happening.

Model how to record these changes as a subtraction. Repeat for other scenarios.

Invite children to create their own scenario for the class to solve.

Ch 8 Information handling and time

Topic overview (Workbook 8)

Summary

This topic at a glance

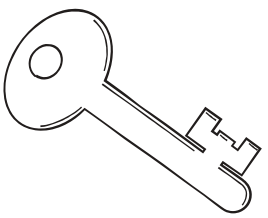
This chapter covers the teaching associated with *TeeJay Maths CfE Early Level Workbook 8*, where learners will begin to understand how information is gathered, presented and analysed. They will also be introduced to o'clock times using both digital and analogue clocks. They will learn the days of the week in and out of order. They will understand the relationship between quantities and numerals and will count on and back. They will also compare numbers.

Whole class learning opportunities are detailed in the 'All together' and 'Let's learn!' sections. There are also 'Focus tasks' that enable the teacher or support teacher to plan and work with one focus group per session. Reinforcement work has been built into the lesson plan where appropriate to embed learning.

The TeeJay workbook could be used as an independent activity as part of a 'carousel' or as part of the focus task with the teacher or support teacher.

Big ideas

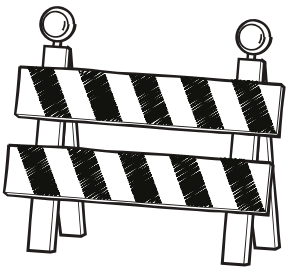
The key concepts for this chapter



- **Measuring time:** simple ways of measurement.
- **Language of time:** units (hours, days, minutes, seconds) and order (before, after).
- **Data:** collected with a specific purpose in mind, for example, to find which areas of the playground are most popular. Tally charts are used to collect data over time, for example, insects in a nature area. Graphs and charts are used to show information clearly.

Common misconceptions

The barriers to learning



- Learners do not understand the link between the clock and the measure of time; they confuse the hands on an analogue clock.
- Learners cannot count the number of 'votes' as represented by a graph.

Resources

What you need from the maths cupboard

- analogue and digital clocks
- building blocks, such as Unifix® cubes

Core vocabulary					
time	minutes	hours	days	months	order
digital	face	information	graph	pictograph	tally chart

Playful invitations

Ideas to make learning fun

Use these suggestions as 'pick and mix' alongside other continuous provision in the play environment.

Outdoor teaching

Put stopwatches outside and ask children to time each other having running races, bike races and so on.

Roleplay

Children time how long it takes to pretend to cook various foods. They should use a variety of timers, such as an egg timer, a stopwatch.

Art

Children design and make their own paper watches using collage materials.

Sand

Put out some sand timers, and challenge children to make as many sandcastles or moulds as they can before the sand runs out.

Cooking

Boil an egg, using an egg timer to time the cooking, and serve it with toast.

TeeJay

Children use *TeeJay Maths CfE Early Level Workbook 8* to practise before moving to a different activity.

Lesson approach: Week 3

Focus tasks for the week

Task 1: Activity with a teacher

Children make their own block graphs using linking cubes to answer questions.

What eye colours do we have in the class? What pets do we have? What are our favourite foods?

You can tailor your own questions to fit the children's interests.

Task 2: Activity with a teacher and an additional adult

Chldren use the block graphs created in Task 1 to write some of their own questions, for example ***What is the most common eye colour in the class?***

Help children structure their sentences and scribe if necessary.

Lesson 1: On the carpet

All together

Source an image of a bar graph to display to the class.

Count in ones to see how many of each item is shown.

Let's learn!

Children create an enlarged bar graph of a survey of their choice, such as favourite foods, eye colour, hair colour. Use large squares of coloured paper to represent each of the individual blocks.

What questions could we ask about the graph? Which __ is the most/least popular/common? How do you know? Repeat for other surveys and bar graphs.

Lesson 2: On the carpet

All together

Use the bar graph constructed in Let's learn! Lesson. Count each column and find the totals.

Let's learn!

Carry out another survey, using the enlarged paper and equipment from Let's learn! Lesson 1. Ask similar questions and then compare the two bar graphs. ***What is the same and what is different?***

Lesson 3: On the carpet

All together

Count to 20 and back using a pendulum to keep count.

Play a game where the children have to count in their heads and raise their hand when they think they have reached ten.

Let's learn!

Show a table of results from a survey (you can use an existing one from *TeeJay Workbook 8*). ***How could we make this into a graph?***

Explain that they will be looking at pictographs. Show pictures of objects to represent the numbers in the tables.

Work with the children to construct a pictograph of the results.

The table could show fruit or toys, for example.

Lesson 4: On the carpet

All together

Play a number bonds game. Choose a volunteer to come to the front of the class and hold up a number of fingers (for example, six). The rest of the class respond by holding up the missing number of fingers to make the number bond to ten (for example, four).

Let's learn!

Use the pictograph made in Let's learn! Lesson 3.

What questions could we ask about this? What does the graph show? How do you know?

Children work in pairs and come up with one question about the pictograph.

Lesson 5: On the carpet

All together

Count to 20 and back using a bead string.

Let's learn!

Show an image of the bar graph and the pictograph made in Lessons 1–4, earlier in the week.

Ask: ***What is the same and what is different about each of the graphs? What would you do if you wanted to find out what the class's favourite sport was?***

Take feedback and record their ideas as a list of success criteria.

Glossary

Term	Definition
2D	Abbreviation for two-dimensional. A figure is two-dimensional if it lies on a plane.
3D	Abbreviation for three-dimensional. A solid is three-dimensional and occupies space.
above	Used to describe a higher position than another object.
add	Carry out the process of addition.
addition	The operation to combine at least two numbers or quantities to form a further number or quantity, the sum or total. Addition is the inverse operation to subtraction.
altogether	In total.
balance	A measuring tool used to weigh objects. It has two pans attached to a bar. Both pans will be level when the contents weigh the same. Also, as a verb, to indicate equivalence and equality.
before	In front of or prior to.
below	Used to describe a position lower than another object.
between	Indicates a position in relation to two other places or objects that are on either side.
capacity	The amount of liquid a container can hold.
circle	The name of a 2D shape. A circle has one curved side.
clock	A tool used to measure time.
commutative law	The law that says that when you swap numbers around in an addition or multiplication, you still get the same answer. For example, $4 + 6 = 10$ and $6 + 4 = 10$; $5 \times 2 = 10$ and $2 \times 5 = 10$.
compare	Look for similarities and/or differences between at least two objects or sets.
corner	A point where two or more lines meet. The correct mathematical term is **vertex** (plural: **vertices**).
cost	A monetary value assigned to a good or service.
count	Assigning one number name to each of a set of objects to determine how many there are.
cube	A 3D shape with six identical square faces.
cuboid	A 3D shape with six faces (either all rectangular faces or there can be two square faces and the rest rectangular).
curved surface	A non-plane surface of a 3D shape. Both cones and cylinders have curved surfaces.
cylinder	A 3D shape with two circular faces joined by a curved surface.
describe	To express mathematical features, qualities and details in words.
difference	The numerical difference between two numbers or sets of objects. It is found by comparing the quantity of one set of objects with another.
direction	The orientation of a line in space.
distance	A measurement between two points or things.
double	To multiply by two or add a value to itself.