

Counting to Ten & Twenty

2nd ed.

Tier One

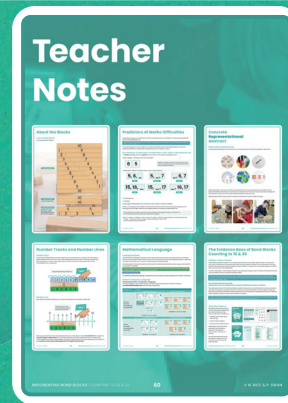
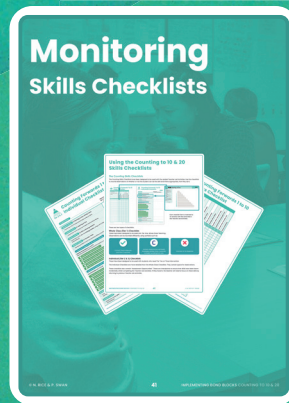
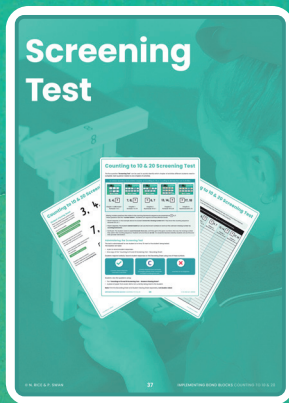
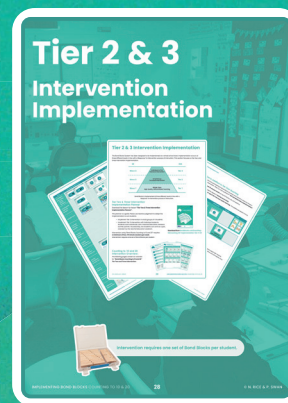
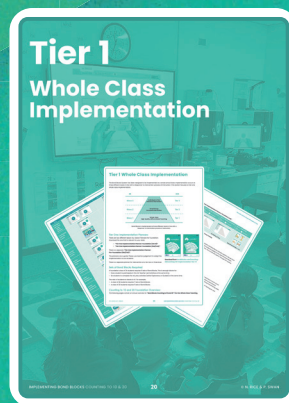
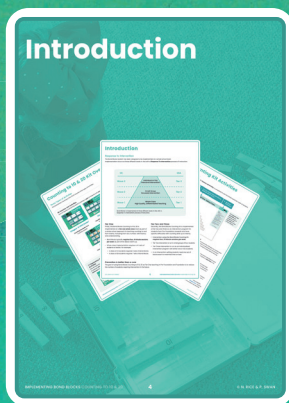
Firstly, the Bond Blocks Counting to 10 & 20 is implemented at a **tier one whole class** level as part of a whole school approach to teaching counting to and from twenty, including from any number, with fluency and understanding.

Tier Two and Three

Secondly, the Bond Blocks Counting Kit is implemented at **tier two and three** as an **intervention** program for students from Pre-Foundation onwards who who have specific difficulties with counting skills up to twenty.

Prevention is better than a cure

The goal of using Bond Blocks Counting to 10 & 20 as Tier One teaching in Pre-Foundation and Foundation is to reduce the number of students requiring intervention in the future.



Narelle Rice & Dr Paul Swan



bondblocks.com



drpaulswan.com.au

Copyright

Implementing Bond Blocks Counting to Ten & Twenty (2nd ed.)

First published 2024, revised 2025

Authors: Narelle Rice and Dr Paul Swan

Copyright © A-Z Type

ISBN 978-0-6454486-0-3

Printed in Australia for A-Z Type

The author may be contacted at: info@bondblocks.com.au

Thank you to Leighland and Daniel Swan for design.

Thank you to the students and teachers involved in Counting with Bond Blocks.

Reproduction and Communication for educational purposes

A purchasing educational institution and its staff are permitted to make copies or prints of the pages provided that the number of copies or prints does not exceed the number reasonably required by the educational institution to satisfy its teaching purposes, and that;

- Copies are not sold or lent;
- Every copy made clearly shows the footer
(© N. Rice & P. Swan).

Rights and Limitations	Physical and eBook
Printing or photocopying of pages for personal or class use.	Unlimited copies of these pages is permitted.
Printing or photocopying of pages for wider school use.	Unlimited copies of these pages is permitted as long as they retain the footer.
Scanning of / storage of this book on school intranet.	Permitted.
Public sharing or sale of this publication (in part or in full).	Not permitted.

For details of the CAL licence for educational institutions contact:

Copyright Agency Limited

E-mail: info@copyright.com.au



Thank you for purchasing Bond Blocks.
We hope they help build

Curiosity,
Connections and
Confidence with maths.

- Narelle and Paul.

Contents

Introduction	4	Monitoring Skills Checklists	41
Introduction	5	Using the Counting to 10 & 20 Skills Checklists.....	42
Counting to 10 & 20 Kit Overview.....	8	Counting Forwards 1 to 5 Individual Checklist.....	44
The Counting Kit Activities.....	10	Counting Forwards 1 to 10 Class Checklist.....	45
General Implementation Instructions.....	15	Counting Forwards 1 to 10 Individual Checklist.....	46
Curriculum Links.....	19	Counting Backwards 10 to 1 Class Checklist.....	48
		Counting Backwards 10 to 1 Individual Checklist.....	49
		Counting Forwards 10 to 20 Class Checklist.....	51
		Counting Forwards 10 to 20 Individual Checklist.....	52
		Counting Backwards 20 to 10 Class Checklist.....	55
		Counting Backwards 20 to 10 Individual Checklist.....	56
		Counting Skills Number Cards.....	58
Tier 1 Whole Class Implementation	20		
Tier 1 Whole Class Implementation.....	21		
Tier 2 & 3 Intervention Implementation	28	Teacher Notes	60
Tier 2 & 3 Intervention Implementation.....	29	About the Blocks.....	61
		Predictors of Maths Difficulties.....	63
		Concrete Representational Abstract.....	65
		Number Tracks and Number Lines.....	69
		Mathematical Language.....	73
		Correcting 'teen' and 'ty' Errors.....	78
		Place Value Arrow Cards.....	82
		Number Cards.....	83
		The Evidence Base of Bond Blocks	
		Counting to 10 & 20.....	84
Screening Test	37		
Counting to 10 & 20 Screening Test.....	38		

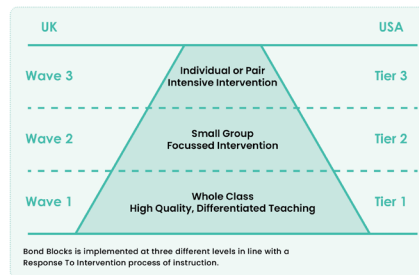


Introduction

Introduction

Response to Intervention

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a **Response To Intervention** process of instruction.



Tier One

Firstly, the Bond Blocks Counting to 10 & 20 is implemented at a **tier one whole class** level as part of a whole school approach to teaching counting to and from twenty, including from any number, with fluency and understanding.

- Bond Blocks typically **requires four, 8 minute sessions per week** as part of the lesson warm up.
- Whole class implementation requires a 4:1 ratio of students to blocks. For example,
 - A class of 24 students requires 6 sets of Bond Blocks.
 - A class of 28 students requires 7 sets of Bond Blocks.

Prevention is better than a cure

The goal of using Bond Blocks Counting to 10 & 20 as Tier One teaching in Pre-Foundation and Foundation is to reduce the number of students requiring intervention in the future.

Tier Two and Three

Secondly, the Bond Blocks Counting Kit is implemented at tier two and three as an intervention program for students from Pre-Foundation onwards who have specific difficulties with counting skills up to twenty.

- Intervention using the Bond Blocks Counting Kit **requires four, 10 minute sessions per week.**
- Tier Two intervention is run in small groups of four students.
- Tier Three intervention is run as an individualised intervention program with either one or two students.
- In an intervention setting students need one set of blocks each to maximise time on task.

© N. RICE & P. SWAN

5

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

Counting to 10 & 20 Kit Overview

Three Types of Activities
The Bond Blocks Counting to 10 & 20 kit includes three types of activities.

46 Teacher Led Activities

One A3 Teacher Led Activity board is used by a pair of students with one set of Bond Blocks.

Chapter: A Little Easier

Counting forwards to 8
8 activity boards

17 Exploratory Activities

One A4 Exploratory Activity board is used per set of Bond Blocks.

Counting Kit Activities

Teacher Led Activity is completed on one A3 activity board by a pair of students.

Activity Board Title specifying Mathematical Focus

Number of players

Number of Bond Blocks

Chapter: A Little Easier
Used to practise counting forwards with one set of Bond Blocks

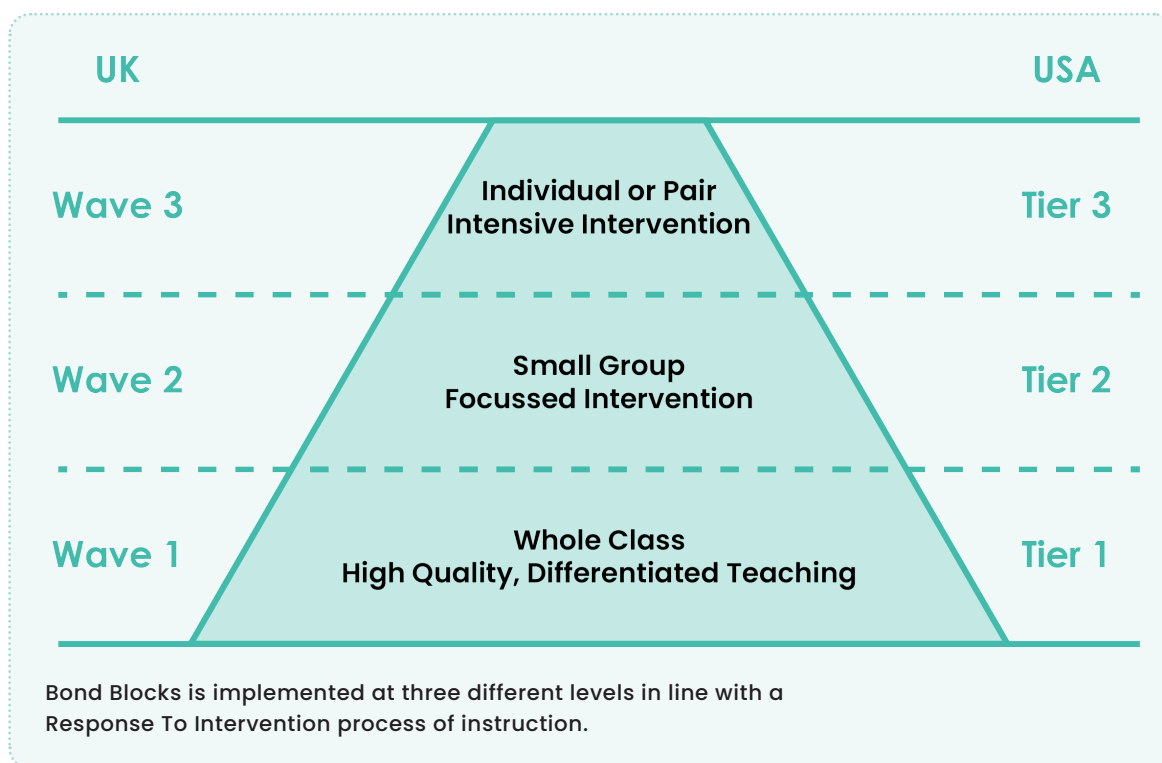
Exploratory Activity
Used to explore mathematical concepts

Introduction

Response to Intervention

The Bond Blocks System has been designed to be implemented at a whole school level.

Implementation occurs at three different levels in line with a **Response To Intervention** process of instruction.



Tier One

Firstly, the Bond Blocks Counting to 10 & 20 is implemented at a **tier one whole class** level as part of a whole school approach to teaching counting to and from twenty, including from any number, with fluency and understanding.

- Bond Blocks typically **requires four, 8 minute sessions per week** as part of the lesson warm up.
- Whole class implementation requires a 4:1 ratio of students to blocks. For example,
 - A class of 24 students requires 6 sets of Bond Blocks.
 - A class of 28 students requires 7 sets of Bond Blocks.

Tier Two and Three

Secondly, the Bond Blocks Counting Kit is implemented at tier two and three as an intervention program for students from Pre-Foundation onwards who have specific difficulties with counting skills up to twenty.

- Intervention using the Bond Blocks Counting Kit **requires four, 10 minute sessions per week.**
- Tier Two Intervention is run in small groups of four students.
- Tier Three Intervention is run as an individualised intervention program with either one or two students.
- In an intervention setting students need one set of blocks each to maximise time on task.

Prevention is better than a cure

The goal of using Bond Blocks Counting to 10 & 20 as Tier One teaching in Pre-Foundation and Foundation is to reduce the number of students requiring intervention in the future.

Counting Skills Sequence

The Bond Block Counting to 10 & 20 activities specifically target the counting skills identified as predictive of difficulty in mathematics. These skills relate to **number line thinking** which involves understanding the **size of numbers** and **how they relate to each other**. This is referred to as “magnitude comparison”.

For more information, read the **Teacher Note “Predictors of Maths Difficulties”**.

The activities are ordered using this Counting Skills Sequence.

Chapter	Counting Skills
Counting Forwards 1 to 5	<ul style="list-style-type: none"> Counting forwards 1 to 5.
Counting Forwards 1 to 10	<ul style="list-style-type: none"> Count forwards 1 to 10. Count forwards to 10, with a missing number. Count forwards to 10*, from any number. Identify the number after, from numbers 1 to 9.
Counting Backwards 10 to 1	<ul style="list-style-type: none"> Count backwards from 10 to 1.* Count backwards from 10, with a missing number. Count backwards from any number (less than 10). Identify the number before, up to 10.
Counting Forwards 10 to 20	<ul style="list-style-type: none"> Count forwards 10 to 20. Count forwards 10 to 20, with a missing number. Count forwards to 20 from any number (greater than 10). Identify the number after, from numbers 10 to 19.
Counting Backwards 20 to 10	<ul style="list-style-type: none"> Count backwards 20 to 1.* Count backwards 20 to 1, with a missing number. Count backwards to 10 from any number (between 10 and 20). Identify the number before, from 11 to 20.

*Introduce zero in contexts that are appropriate.

Progression of Play

The Bond Blocks Counting to 10 & 20 Kit includes three types of activities.



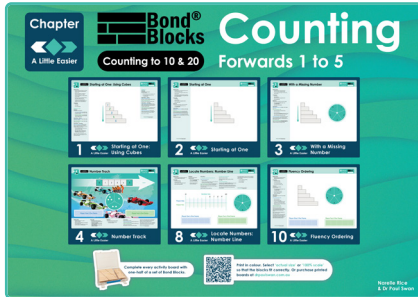
Counting to 10 & 20 Kit Overview

Three Types of Activities

The Bond Blocks Counting to 10 & 20 Kit includes three types of activities.

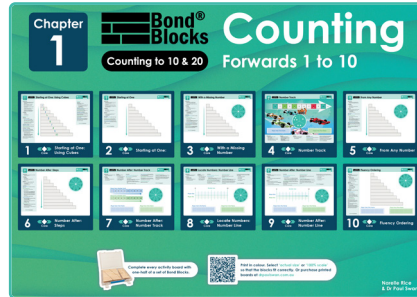
46 Teacher Led Activities

One A3 Teacher Led Activity board is used by a **pair** of students with **one-half of a set** of Bond Blocks.



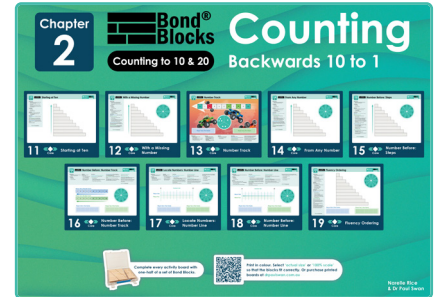
Chapter 'A Little Easier'

Counting Forwards 1 to 5
6 activity boards



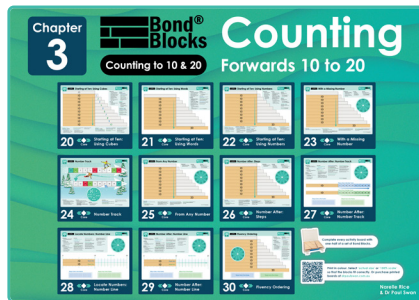
Chapter 1

Counting Forwards 1 to 10
10 activity boards



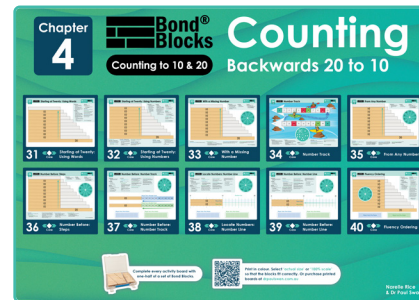
Chapter 2

Counting Backwards 10 to 1
9 activity boards



Chapter 3

Counting Forwards 10 to 20
11 activity boards



Chapter 4

Counting Backwards 20 to 10
10 activity boards

17 Exploratory Play Activities

One A4 Exploratory Play card is used per **student** with **one whole set** of Bond Blocks.



128 Guided Play Activities

One A4 Guided Play card is used per **student** with **one whole set** of Bond Blocks.



Matching Cards
32 activities



Choosing Cards
32 activities



Building Cards
32 activities



Filling Cards
32 activities

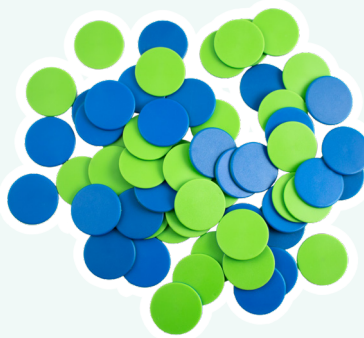
Other Materials

The Counting to 10 & 20 Kit also includes:

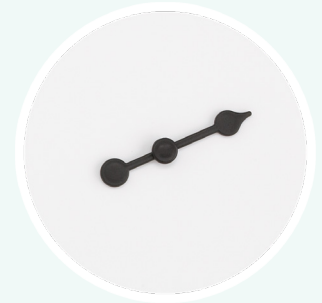
6 × Sets of Bond Blocks



Two-Sided Counters

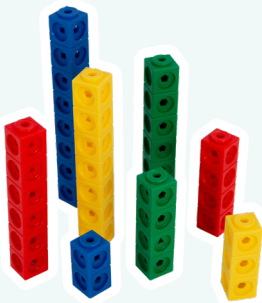


15 × Round Transparent Spinners

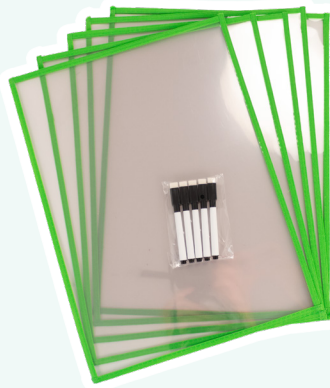


1000 × Cubes

In red, yellow, blue and green.



15 × Write & Wipe (Paper-Saving) Sleeves



Counting to 10 & 20 USB

Contains all written material (whole school licence for printing).



Implementation Planners

Download Counting to 10 & 20 Implementation Planners from bondblocks.com



**Tier One
Foundation**
(AC v9)



**Tier 2 & 3
Intervention**



**Tier One
Pre-Foundation**
(WA/TAS)



**Tier One
Foundation**
(WA/TAS)

See bondblocks.com for planners, differentiation, videos modelling Teacher Led Activities and more.



The Counting Kit Activities

Teacher Led Activities

Every Bond Blocks Counting to 10 & 20 **Teacher Led Activity** is completed on one A3 activity board by a pair of students.

The diagram illustrates the layout of an activity board. It is divided into four main columns: A. Activity Number, B. Chapter Title, C. Activity Board Title specifying Mathematical Focus, and H. Number of players. Below these are sections D. Differentiation, E. Mathematics, F. Language, and G. Teacher Instructions. A sample board for 'Starting at One: Using Cubes' is shown, featuring a staircase of 10 steps numbered 1 to 10. The board includes sections for Mathematics, Language, Materials, and Instructions. A callout box on the right states: 'The Teacher Led Activities are used by pairs of students with one-half of a box of Bond Blocks.'

A. Activity Number

Activity boards are sequenced from 1 to 40.

B. Chapter Title

The Chapter Title for an activity board identifies the counting sequence on which it focusses.

C. Activity Board Title specifying Mathematical Focus

Bond Blocks Counting to 10 & 20 chapters feature a similar progression of activities. These are identified here and feature similar names.

D. Differentiation

The activity boards are differentiated.



Core

Core activity boards have the rotated square coloured in black.



A little easier

The icon for 'a little easier' has the left arrow in black. Not all students will use these boards.



A little harder

The icon for 'a little harder' board has the right arrow in black.

Counting to 10 & 20 does not feature Teacher Led Activities with dedicated 'a little harder' boards. Differentiation instructions are provided on corresponding web pages.

E. Mathematics

This part of the activity board title indicates the mathematics involved. The mathematics is elaborated on the activity's web page. These can be used to create specific learning intentions.

F. Language

The mathematical language to be used is specified on every board in dot-points. Examples are given in **bold italic** in the instructions written on the board.

G. Teacher Instructions

The lightly shaded part of the board, with small sized font is for the teacher. This section contains the activity mathematics, language, materials and instructions for setting up and doing the activity.

H. Number of Players

All Teacher Led Activities require **two players**. Each board is completed by a pair of students or one student and a teacher, education assistant or parent.

For ease of understanding, one player has been labelled the '**teacher role**' and the other the '**student role**'. Typically, the teacher role does the setup, the student role does the counting activity.

Exploratory Play Activities


Every Bond Blocks Counting to 10 & 20 **Exploratory Play Activity** is completed on one A4 activity board by one student.

When first opening a box of Bond Blocks students need to complete a range of Introductory Activities to explore characteristics of the blocks and relationships between them. Students need to engage in these activities **before** beginning the Teacher Led Activities.

The activities are sequenced from easiest to the hardest.

Numbered in Sequence

Activity Title




Bond Blocks Counting to 10 & 20
Exploratory Play Activities use **one whole** box of Bond Blocks per student.

8

Building Towers

Exploratory Play



Activity

Examples of Student Speech

Examples of Teacher Speech

Mathematical Language (Bold Italic)

Counting Forwards

Prompt students to:

"Build towers starting with the shortest block."

After they have done this ask the students to **count aloud**, starting at one, **touching the top** of each tower as they say the **number name**.

"One, two, three, four, five ..."

"Which block is the tallest?"

"Which block is the shortest?"

"How many blocks did you use?"

Images to show to students to help them build.

Teacher Information

Activity

Examples of Student Speech

Examples of Teacher Speech

Mathematical Language (Bold Italic)

Counting Backwards

Prompt students to:

"Build towers starting with the longest block."

After they have done this ask the students to **count aloud**, starting at ten, **touching the top** of each tower as they say the **number name**.

"Ten, nine, eight, seven, six ..."

"Which block is the tallest?"

"Which block is the shortest?"

"How many blocks did you use?"

Images to show to students to help them build.

Teacher Information

Height is the vertical (up and down) representation of length, which is a horizontal (side to side) representation. Both representations are needed in maths. Number lines run both horizontally and vertically. Vertical number lines are used widely. For example, thermometers, measuring jugs and the vertical axis of graphs.

Teacher Information

© N. Rice & P. Swan

Bond Blocks Counting to 10 & 20 Exploratory Play

© N. RICE & P. SWAN

11

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

Guided Play Activities

Every Bond Blocks Counting to 10 & 20 **Guided Play Activity** is completed on one A4 activity board by one student. There are 32 designs, repeated in 4 different types of A4 cards: **Matching, Choosing, Building, Filling**. The four **types** increase in this order of difficulty: Matching, Choosing, Building, Filling. The cards within each type have been sequenced in difficulty from easiest to hardest.

Number Skills

The Matching and Choosing cards focus on number skills.



About the Activities

- Matching Cards have **actual size** images of every Bond Block that needs to be placed.
- Students match the blocks, placing them directly on the card, while **saying** the number name.

Student Thinking

- Students focus on **connecting** the spoken number name, written number and length of the block.

Teacher Focus

- The teacher can use Matching Cards to assess students' skills matching the spoken number name to the written number:
- Receptive language:

"Point to the number _"

- Expressive language:

"Say the number that I point to."

- Teachers can draw attention to **patterns**. For example,

"Each step on the hill gets taller by one"



About the Activities

- Choosing Cards have actual size images of every Bond Block that needs to be placed, but the block images are **not numbered**.
- Students **choose** the blocks based on length and in relation to other blocks already placed on the card.

Student Thinking

- Students focus on the **size of numbers in relation** to each other. This type of thinking is essential for success in mathematics. Refer to the Teacher Notes about predictors of difficulty.

Teacher Focus

- Teachers can help students connect mathematical language related to comparing numbers. For example, a student might say,

"The 3 block was too short, but the 4 fitted."

- The teacher can build on this saying,

"Yes, 4 is one more than 3"



Guided Play Activities use **one whole** box of Bond Blocks per student.

Spatial Skills

The Building and Filling cards focus on **spatial skills**.



About the Activities

- Building Cards have images of every Bond Block that needs to be placed, but the images of the blocks have been **reduced**. The blocks do not fit on the cards.
- Students use the image as an instruction to **build** the image next to the card, on the table.

Student Thinking

- Students focus on the **position** of the blocks in relation to other blocks placed.

Teacher Focus

- The teacher can describe the student's actions to model shape and positional language. For example,

**"You slid the 4 block down.
Now it is below the 5 block."**



About the Activities

- Filling Cards have a list of every Bond Block that needs to be placed directly onto the card, but the individual block **outlines have been removed**.
- Students collect the specified blocks, then use them to fill the image, covering it with all of the specified blocks.

Student Thinking

- Students focus on **problem solving, spatial reasoning** and **persistence**.

Teacher Focus

- The teacher can ask students who have finished a Filling Card to do it again using different blocks. For example, swapping a 3 block for a 2 and 1. When doing this, students should only have access to one set of blocks.
- The teacher can ask students to create their own design using Bond Blocks on top of a piece of A3 paper.

Numbered in Sequence

Activity Title

Instructions

Type of Guided Play activity

1
Guided Play Building

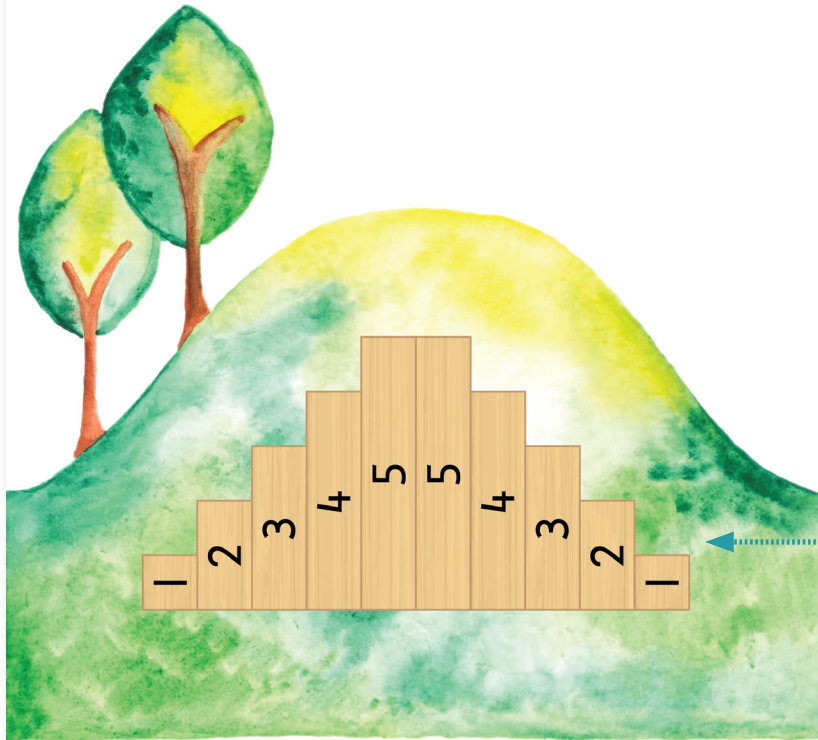
Hill

Take out the blocks listed below. Use them to build the design next to the activity card.

1, 1, 2, 2, 3, 3, 4, 4, 5, 5

Bond
Blocks®
Counting to 10 & 20

Some boards feature a list of Blocks to get out



Teacher Information

Guided Play - Building

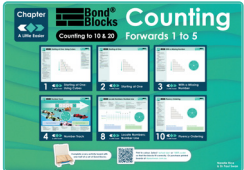

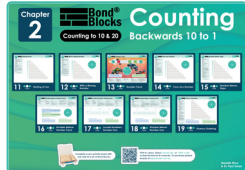
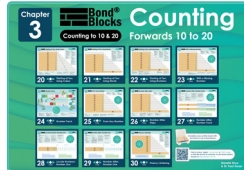
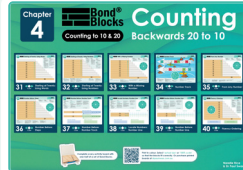
www.bondblocks.com

© N. Rice & P. Swan

General Implementation Instructions

Screening Test

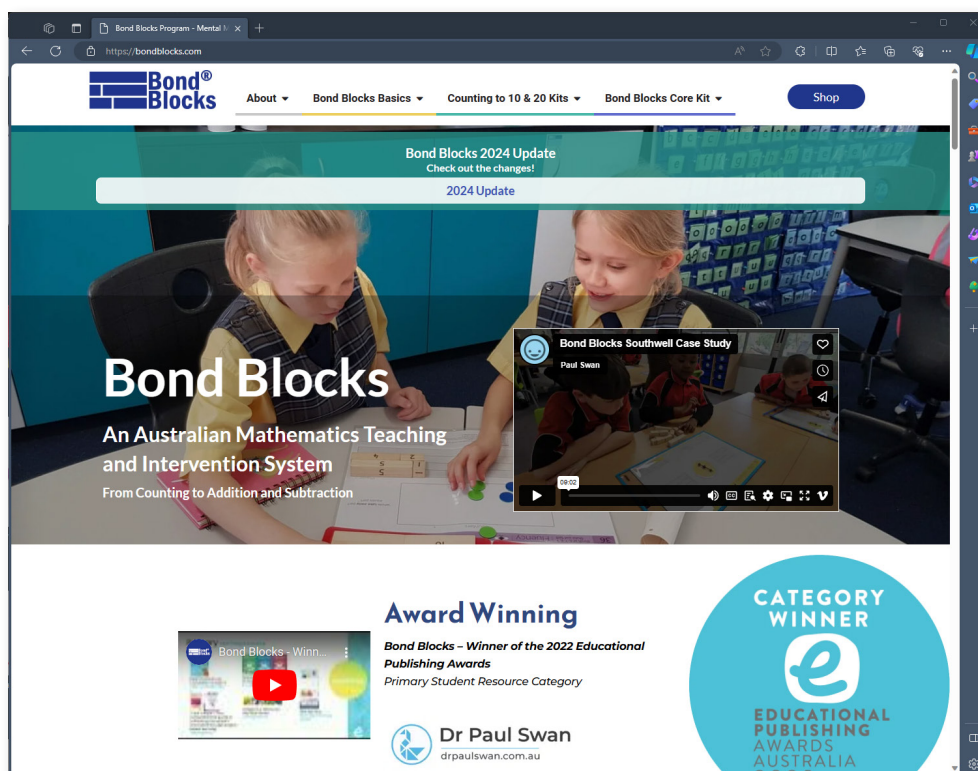
The five question “**Screening Test**” can be used to quickly identify which chapter of activities different students need to complete. Each question relates to one chapter of activities. For more information, read the “**Screening Test**” instructions.

Screener Question and related chapter of Counting to 10 or Counting to 20 Teacher Led Activities				
				
3, 4, ?	7, 8, ?	? 6, 7	13, 14, ?	? 17, 18
Chapter 'A Little Easier': Forwards 1 to 5	Chapter 1: Forwards 1 to 10	Chapter 2: Backwards 10 to 1	Chapter 3: Forwards 10 to 20	Chapter 4: Backwards 20 to 10

Activity Web Pages for Teacher Led Activities

Each **Teacher Led Activity** has its own web page that contains:

- **A video** modelling the activity. These have been made to show to the students so that they receive consistent teaching from year to year. They are also for explaining the activity to education assistants and parent helpers.
- **Activity notes** specifying the **mathematical concepts** and **mathematical language**.
- **Differentiation** suggestions to make the activity either a little easier or a little harder.
- Links to relevant pages of **Teacher Notes** for more in depth information about the mathematical concept. These are useful for ongoing professional learning.



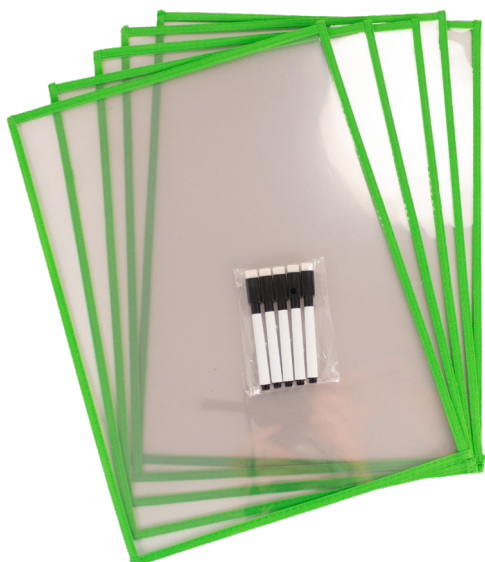
The screenshot shows the Bond Blocks website interface. At the top, there is a navigation menu with 'About', 'Bond Blocks Basics', 'Counting to 10 & 20 Kits', and 'Bond Blocks Core Kit'. A 'Shop' button is also visible. Below the navigation is a banner for the 'Bond Blocks 2024 Update'. The main content area features a video player titled 'Bond Blocks Southwell Case Study' by Paul Swan, showing two children using Bond Blocks. Below the video, there is a section for 'Award Winning' with a small video thumbnail and text stating 'Bond Blocks - Winner of the 2022 Educational Publishing Awards Primary Student Resource Category'. At the bottom right, there is a circular badge for 'CATEGORY WINNER' and 'EDUCATIONAL PUBLISHING AWARDS AUSTRALIA 2022'.

Printing Activity Boards

The original set of Teacher Led, Exploratory Play and Guided Play cards included in the kit are for teacher use. Print the boards from the PDF on the USB provided for student use.

- **Teacher Led Activities** – Print one A3 board per pair in colour.
- **Exploratory Play Activities** – Print one A4 board per student in colour.
- **Guided Play Activities** – Print one A4 board per student in colour.

Tip: When printing ensure that you select **'actual size'** or **'100% scale'** so that the blocks fit correctly. The activity boards are colour coded and should not be printed in black and white.



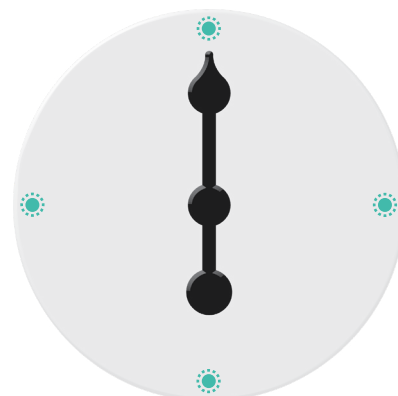
Write and Wipe (Paper Saver) Sleeves

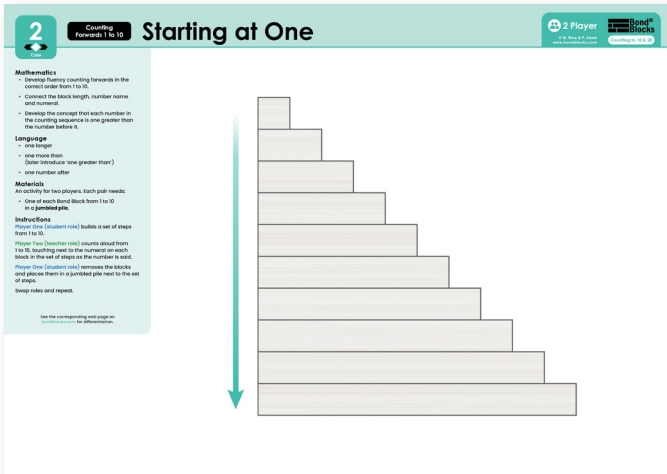
Place the A3 board being used for the week in a write and wipe sleeve. At the end of each week collect the boards and store them in an A3 display file.

Once students are familiar with the routine, two boards can be placed back-to-back in the write and wipe sleeve. Place the board for one week face up on the front of the write and wipe sleeve and the board for the next week face up on the back. Turn the write and wipe sleeve over after the first week to see the next week's board. This means the write and wipe sleeves only need to be changed every second week.

Spinners

Included with each spinner are four silicone feet. Place these at 3, 6, 9 and 12 o'clock positions. These feet 'stick' to the plastic on the write and wipe sleeve and stop the spinner from sliding around when it is flicked.





Materials

An activity for two players. Each pair needs:

- One of each Bond Block from 1 to 10 in a **jumbled pile**.

Take Out the Specified Blocks Only

Every Teacher Led Counting to 10 & 20 Core activity board can be completed with **one half of a set of wooden Bond Blocks**.

On each activity board there is a “Materials” heading that lists the specific blocks needed for that board. Students should begin by taking out the blocks listed on the activity board under the heading “Materials” and **ONLY these blocks**.

After this, students should shut the lid on the case so they cannot access the other blocks. Some students benefit from clicking the case shut and storing the box of blocks on the floor under their chair while they are completing the activity. This helps to reduce visual distraction. If students do not follow this routine they can become distracted and build towers with the blocks instead of focusing on the activity.

The materials list will often specify placing the blocks required for the activity in a **“jumbled pile”**. Following this instruction is essential. If the specified blocks are taken out of the box and placed on the desk ready for play, in the same order as they were in the box, the students will not have to do any thinking. The blocks will already be organised into counting order!

Packing Away Bond Blocks

Teach students how to pack away a set of Bond Blocks:

1. Put **all** the Bond Blocks away. Use the template inside the box to make sure no blocks are lost.
2. When students are ready to learn about the correct **orientation** of numbers, they should use the template to make sure blocks are not returned with the numbers upside down.
3. Ensure that students **click shut both clips**, listening for two clicks, before they pick up the box of blocks by the handle. Otherwise, the blocks will spill out all over the floor.
4. Show students where the box of blocks live in the classroom and how to return it with the **sticker face up** and the **handle out**. This makes it easier for the next person to use the blocks.



The template inside the box includes numbers and lines to help students pack the blocks away in the correct places.

Packing Away Cubes

When using cubes please instruct the students to pack them away in **sticks of 10**. This makes setting up and packing away more efficient.

Building sticks of ten is very important mathematically. The top two predictors of difficulty in maths at this age relate to students who hold onto counting from one, instead of developing fluency with how numbers relate to each other and mental number line thinking.

By starting with cubes joined in a stick of ten, students can first count from one to check there are 10, but can then move on to find other numbers without counting from one. For example,

- 9 is **one fewer** than 10
- 8 is **one fewer** than 9.
- 5 can be found by splitting the stick into two **equal** length sticks.
- 4 is **one fewer** than 5
- 6 is **one more** than 5
- 1, 2 and 3 can be seen without counting.



Curriculum Links

Linked to all Australian Curricula

- Australian Curriculum Links v9 Foundation
- Victoria v2.0 Foundation
- Victoria Levels B-D
- Western Australia Foundation
- Western Australian Pre-Foundation
SCASA Kindergarten Curriculum Guidelines
- ABLEWA
- New South Wales Early Stage 1, Stage 1
- New South Wales Access Content Points
- Early Years Learning Framework



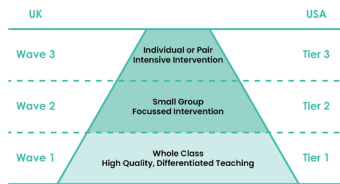
Tier 1

Whole Class

Implementation

Tier 1 Whole Class Implementation

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a Response To Intervention process of instruction. This section focuses on tier one whole class implementation.



Bond Blocks is implemented at three different levels in line with a Response To Intervention process of instruction.

Tier One Implementation Planners

There are two different lesson-by-lesson Planners for Foundation. Download the one that is relevant to your state:

- **"Tier One Implementation Planner: Foundation (ACV9)"**
- **"Tier One Implementation Planner: Foundation (WA/TAS)"**

There is a separate **"Tier One Implementation Planner: Pre-Foundation (WA/TAS)"**.

The planners are a guide. Please use teacher judgement to adopt the implementation to suit students.

There is a separate planner for intervention at a tier two or three level.



Download from bondblocks.com/counting-kit/counting-kit-implementation-tier-1/

Sets of Bond Blocks Required

A foundation class of 24 students requires 6 sets of Bond Blocks. This is enough blocks for:

- Every student to participate in the A3, Teacher Led Activities at the same time.
- Six students to complete the A4, play activities (either Exploratory or Guided) at the same time.

The ratio of students to blocks is 4:1. For example,

- A class of 28 students requires 7 sets of Bond Blocks.
- A class of 20 students requires 5 sets of Bond Blocks.

Counting to 10 and 20 Foundation Overview:

The following pages contain an annual overview for **"Bond Blocks Counting to 10 and 20" Tier One Whole Class Teaching**.

© N. RICE & P. SWAN

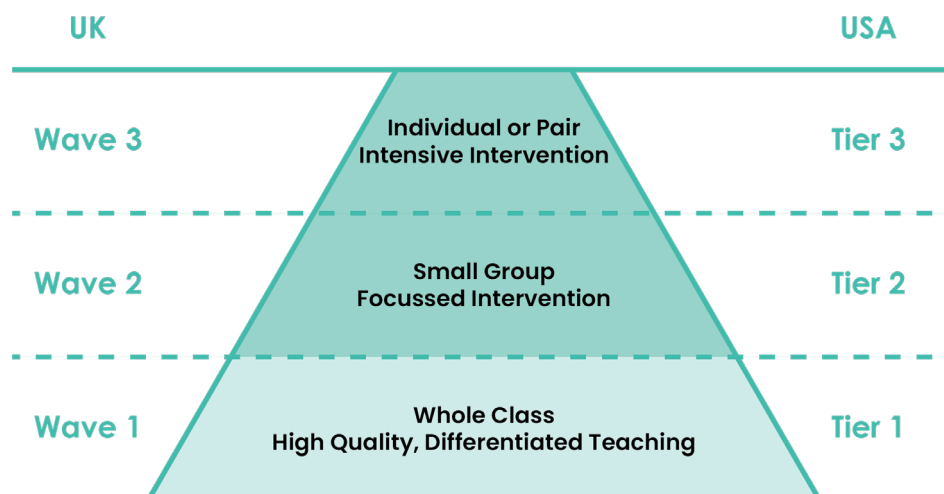
21

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20



Tier 1 Whole Class Implementation

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a Response To Intervention process of instruction. This section focuses on tier one whole class implementation.



Bond Blocks is implemented at three different levels in line with a Response To Intervention process of instruction.

Tier One Implementation Planners

There are two different lesson-by-lesson Planners for Foundation. Download the one that is relevant to your state:

- “Tier One Implementation Planner: Foundation (ACv9)”
- “Tier One Implementation Planner: Foundation (WA/TAS)”

There is a separate “Tier One Implementation Planner: Pre-Foundation (WA/TAS)”.

The planners are a guide. Please use teacher judgement to adapt the implementation to suit students.

There is a separate planner for Intervention at a tier two or three level.



Download from bondblocks.com/counting-kit/counting-kit-implementation-tier-1/

Sets of Bond Blocks Required

A foundation class of 24 students requires 6 sets of Bond Blocks. This is enough blocks for:

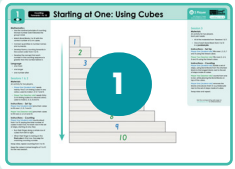


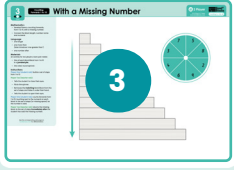




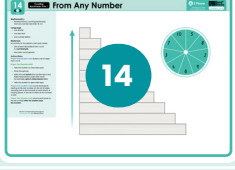

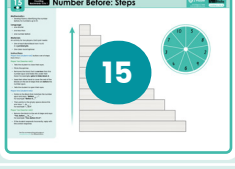
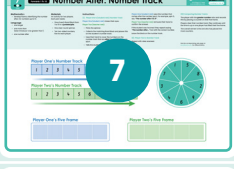
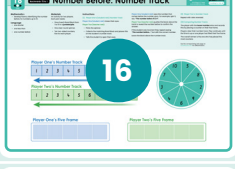
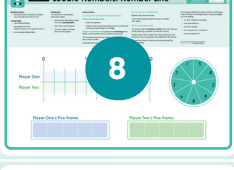
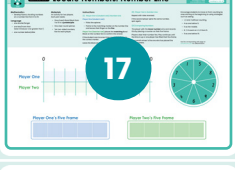
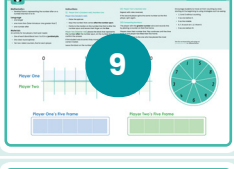
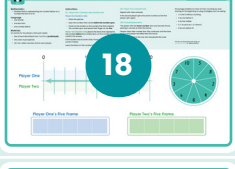
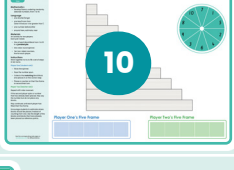
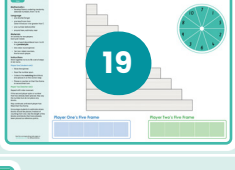











- Every student to participate in the A3, Teacher Led Activities at the same time.
- Six students to complete the A4, play activities (either Exploratory or Guided) at the same time.

The ratio of students to blocks is 4:1. For example,

- A class of 28 students requires 7 sets of Bond Blocks.
- A class of 20 students requires 5 sets of Bond Blocks.

Counting to 10 and 20 Foundation Overview:

The following pages contain an annual overview for “Bond Blocks Counting to 10 and 20” Tier One Whole Class Teaching.

Focus	Term 1 – Counting Forwards 1 to 10	Term 2 – Counting Backwards 10 to 1
Counting in order using: <ul style="list-style-type: none"> • Cubes • Words • Numbers 	 	
Counting with a Missing Number		
Number Track		
Counting From Any Number		
Number After/Before: Steps		
Number After/Before: Number Track		
Locate Numbers: Number Line		
Number After/Before Number Line		
Fluency Ordering		
Guided Play Activities	 <div style="text-align: center; border: 2px solid teal; border-radius: 15px; padding: 5px; display: inline-block; background-color: white; color: teal; font-weight: bold;"> Matching 1 – 32 </div>	 <div style="text-align: center; border: 2px solid teal; border-radius: 15px; padding: 5px; display: inline-block; background-color: white; color: teal; font-weight: bold;"> Choosing 1 – 32 </div>
Exploratory Play Activities	    	   

Term 3 – Counting Forwards 10 to 20

Term 4 – Counting Backwards 20 to 10

Starting at Ten: Using Cubes

Starting at Ten: Using Words

Starting at Ten: Using Numbers

Starting at Twenty: Using Words

Starting at Twenty: Using Numbers

With a Missing Number

With a Missing Number

Number Track

Number Track

From Any Number

From Any Number

Number After: Steps

Number Before: Steps

Number After: Number Track

With a Missing Number

Locate Numbers: Number Line

Number Before: Number Track

Number After: Number Line

Number Before: Number Line

Fluency Ordering

Fluency Ordering



Building 1 - 32



Filling 1 - 32

EP.10

EP.11

EP.12

EP.13

EP.14

EP.15

EP.16

EP.17

Tier One Teaching Routine


Four sessions per week:

- Three **whole class teaching sessions** using the A3 Teacher Led Activity Boards. All students complete the same board at the same time. Refer to each specific Teacher Led Activity board web-page for differentiation.
- One **group rotation teaching session** using the A4 Guided Play or Exploratory Play Activity Boards. Bond Blocks would be **one of the four rotational activities**. Four Guided Play Activity Cards have been allocated to this rotation. Some students will complete one card, others all four.

Whole Class Teaching

Whole class teaching is completed:

- three times a week.
- using one A3 Teacher Led Activity Board per week, repeated over the three sessions.
- in pairs, using one board and one-half of a set of Bond Blocks.

Most of these boards are **fluency activities**. Fluency activities are completed during the lesson **warm-up**. On the planner, fluency activities are denoted with an 8 minute timer symbol . These activities typically have one video per week, shown on the first session.

i. Day 1: “I do” explicit instruction.

The teacher models the activity as per the activity video. Teachers can choose to either show the video to the class or replicate the teaching shown in the video with students.

This is followed by one “We do” practice where the students repeat the activity once with the teacher’s support.


ii. Day 2: “We do”.

The students repeat the activity once with the teacher’s support. For example, on the mat.

This is followed by “You do”, independent practice. During this time the teacher can support students using the ‘a little easier’ activities and extend others using the ‘a little harder’ activities.

iii. Day 3: “You do”.

Independent practice.

A small number of boards are **understanding activities**. These are completed as the **main body** of the lesson. During this lesson, do a non-Bond Block activity for the warm-up. On the planner, understanding activities are denoted with a 40 minute timer symbol . These have a **different video** for every session.

- Day 1:** Complete the **Session 1** part of the activity board. Show the Session 1 video and complete as instructed.
- Day 2:** Complete the **Session 2** part of the activity board. Show the Session 2 video and complete as instructed.
- Day 3:** Complete the **Session 3** part of the activity board. Show the Session 3 video and complete as instructed.

Timer Symbols for the A3 Teacher-Led Activity Boards

Fluency: Lesson Warm Up



8 min

8 minutes denotes a fluency session.
This does not include set-up
and pack-away time.

Understanding: Lesson Body



40 min

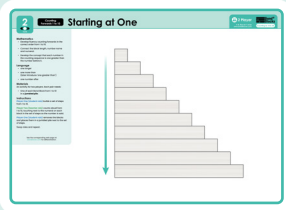
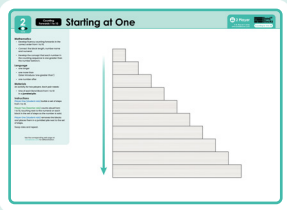
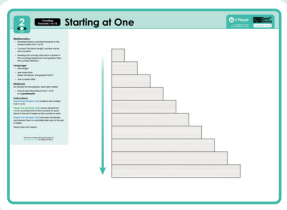

40 minutes denotes an understanding lesson.
This is the main body of the lesson.

Group Rotation Teaching

Group rotation teaching is completed:

- once a week for 8 to 10 minutes.
- using the A4 Guided Play or Exploratory Play Activity Boards.
- by an individual student using one A4 Board and one set of Bond Blocks.

Below is a sample from the “Tier One Implementation Planner: Foundation (v9)”.

	Day 1 – Teacher Led Activity 8 min <input type="checkbox"/> Completed	Day 2 – Teacher Led Activity 8 min <input type="checkbox"/> Completed	Day 3 – Teacher Led Activity 8 min <input type="checkbox"/> Completed	Day 4 – Guided Play 8 min <input type="checkbox"/> Completed
2	 2) Starting at One	 2) Starting at One	 2) Starting at One	 Matching Activities 1 to 4

Teacher Led Activity Board 2 from week two of term one is a **fluency activity**.

Establishing Routines

By taking time to develop an efficient whole class routine, the Teacher Led Bond Blocks Activity sessions can go from initially taking 30 minutes, down to 15 minutes. Within the 15 minutes students engage in the specific Bond Blocks activity for 8 minutes. It takes a lot of Term One to develop this routine. This is time well spent! Through this routine young students can be taught and learn how to:

- follow instructions.
- respect materials through packing away and using them appropriately.
- listen attentively to explicit teaching.
- take turns.

These are essential skills required for effective learning in a whole class setting.

Mathematical Language

The mathematical language that relates to each Teacher Led Counting Activity has been specified on each board under the heading “Language”. There are several phrases, listed in dot points, that can be used on each board. Start using one phrase for a week until the students are familiar with it. Then use a different phrase the following week.

In the first session of the week the teacher tells the class the mathematical word/phrase they are focusing on and writes this on the board. For example,

Teacher: “Today we are using the maths words, “one more”.

Teacher: Writes “one more” on the board.

Teacher: “When we play the game, we need to say...”

Students: “one more” [choral response as the teacher points to the words written on the board].

For more information, read the related Teacher Note “Mathematical Language”.

When to move on

Typically, students complete one Teacher Led Activity per week. Do not expect students to be fluent counting after the first activity in a chapter. Students should still progress to the next activity the following week. Fluency with the targeted counting sequence will take all term. Students who are experiencing difficulty should be supported using the 'a little easier' differentiation information on the web page for each activity.

Intervention

If at the end of the term a student is still experiencing significant difficulty counting forwards/backwards from any number, they need one extra session each week as per the Intervention Implementation instructions.

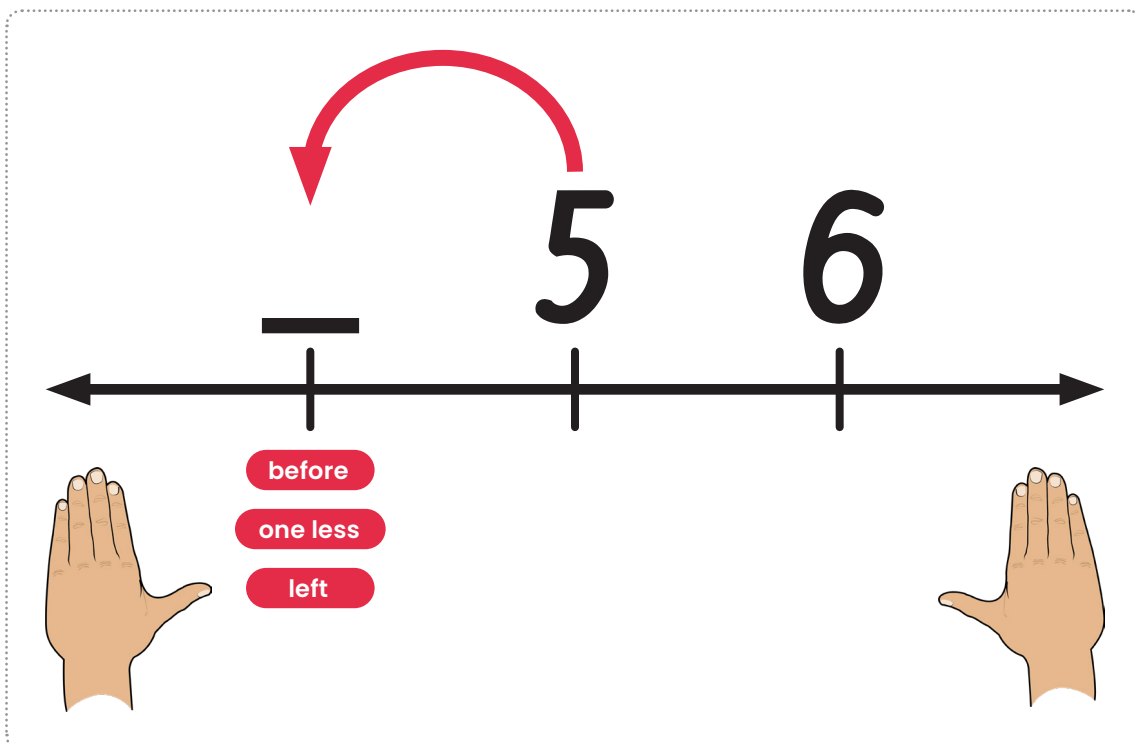
Before/After

It is common for students in Foundation to confuse 'before' and 'after'.

- At the end of a counting forwards term check these students can identify 'one more', without counting starting at one/ten.
- At the end of a counting backwards term check these students can identify 'one less', without counting back from ten/twenty.

Being able to identify one more/less without saying the whole counting sequence is important because it relates to the top two predictors of difficulty.

There can be a range of different reasons for students confusing the terms 'before' and 'after'. Some reasons include language, directional and executive functioning difficulties. Use desk visuals, pointing prompts and pre-loading to support these students to develop fluency with these terms.



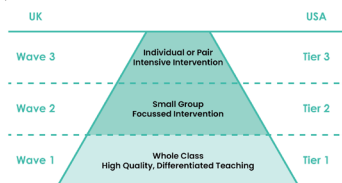
A number line with three tick marks. The first tick mark is labeled '4', the second is labeled '5', and the third is a blank space. A red curved arrow starts above the '5' and points to the blank space. Below the number line, there are two hands, one on the left and one on the right. Between the hands, there are three red rounded rectangular boxes containing the text: 'after', 'one more', and 'right'.

A number line with three tick marks. The first tick mark is labeled '4', the second is a blank space, and the third is labeled '6'. Two red curved arrows start above the '4' and '6' respectively and both point to the blank space. Below the number line, there are two hands, one on the left and one on the right. Below the blank space, there is a red rounded rectangular box containing the text: 'between'.

Tier 2 & 3 Intervention Implementation

Tier 2 & 3 Intervention Implementation

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a Response To Intervention process of instruction. This section focuses on tier two and three intervention implementation.



Bond Blocks is implemented at three different levels in line with a Response To Intervention process of instruction.

Tier Two & Three Intervention Implementation Planner

Download the lesson-by-lesson "Tier Two & Three Intervention Implementation Planner".

This planner is a guide. Please use teacher judgement to adapt the implementation to suit students.

- Implement Tier 2 intervention in small groups of 4 students.
- Implement Tier 3 intervention with individual students.

Students work individually with a teacher/education assistant as their partner. Occasionally, two students can work as a pair, overseen by the teacher/education assistant.

Intervention using "Bond Blocks Counting to 10 and 20" requires a **minimum of four, 10 minute sessions per week**.

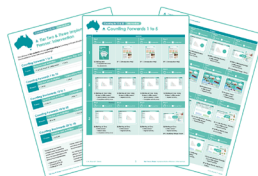
Intervention requires one set of Bond Blocks per student.



Download from bondblocks.com/counting-kit/counting-kit-implementation-tier-2-3/

Counting to 10 and 20 Intervention Overview:

The following pages contain an overview for "Bond Blocks Counting to 10 and 20" Tier Two and Three Intervention.



© N. RICE & P. SWAN

29

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

YOUR IMPLEMENTATION

Intervention in Addition to Tier One Teaching
Students participating in Bond Blocks Counting to 10 and 20 in class first attend a 10 minute intervention. Days 1 to 4 are outlined in "Tier One Whole Class Implementation".
Students repeat a Teacher Led Activity on top of tier one class math teaching. This additional session occurs



Intervention sessions are copied with Teacher and will require more

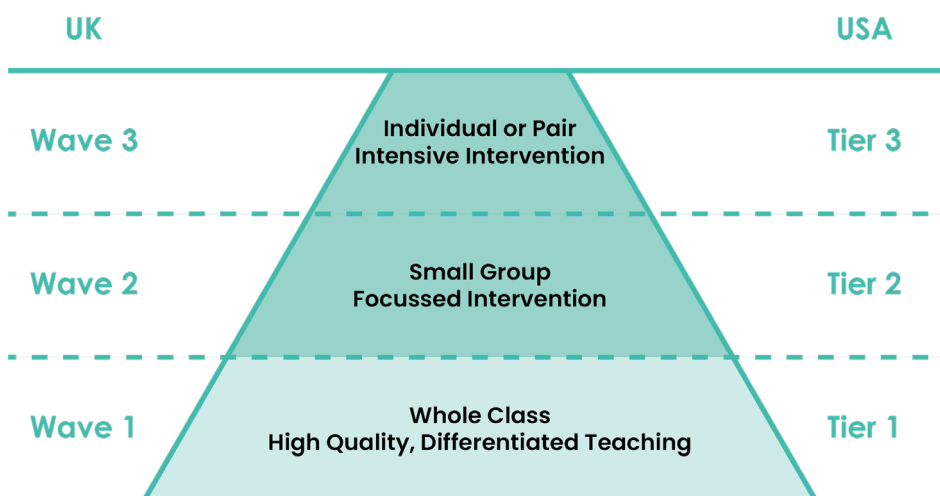
© N. RICE & P. SWAN



Intervention requires one set of Bond Blocks per student.

Tier 2 & 3 Intervention Implementation

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a Response To Intervention process of instruction. This section focuses on tier two and three intervention implementation.



Bond Blocks is implemented at three different levels in line with a Response To Intervention process of instruction.

Tier Two & Three Intervention Implementation Planner

Download the lesson-by-lesson **“Tier Two & Three Intervention Implementation Planner”**.

This planner is a guide. Please use teacher judgement to adapt the implementation to suit students.

- Implement Tier 2 intervention in small groups of 4 students.
- Implement Tier 3 intervention with individual students. Students work individually with a teacher/education assistant as their partner. Occasionally, two students can work as a pair, overseen by the teacher/education assistant.

Intervention using “Bond Blocks Counting to 10 and 20” requires **a minimum of four, 10 minute sessions per week**.

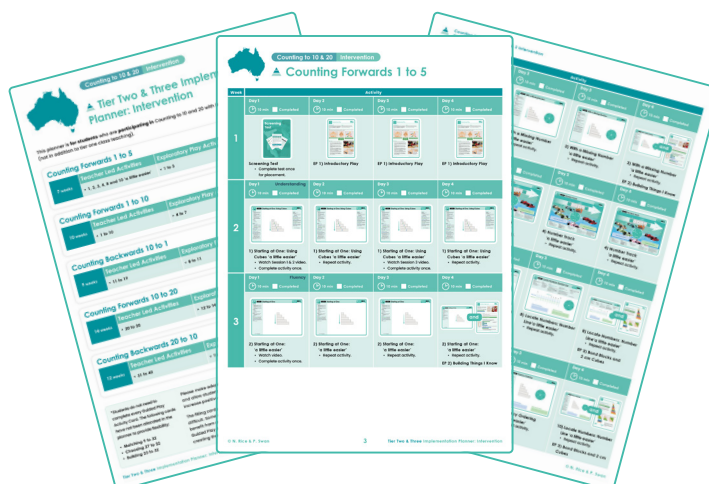
Intervention requires one set of Bond Blocks per student.



Download from bondblocks.com/counting-kit/counting-kit-implementation-tier-2-3/

Counting to 10 and 20 Intervention Overview:

The following pages contain an overview for **“Bond Blocks Counting to 10 and 20” Tier Two and Three Intervention**.



Focus	Counting Forwards 1 to 5	Counting Forwards 1 to 10	Counting Backwards 10 to 1
Counting in order using: <ul style="list-style-type: none"> Cubes Words Numbers 			
Counting with a Missing Number			
Number Track			
Counting From Any Number			
Number After/Before: Steps			
Number After/Before: Number Track			
Locate Numbers: Number Line			
Number After/Before: Number Line			
Fluency Ordering			
Guided Play Activities			
Exploratory Play Activities			

Counting Forwards 10 to 20

Matching Cards
Matching
 18, 20, 22, 24, 26, 28, 30 & 32

Choosing Cards
Choosing
 17, 19, 21, 23, 25, 27, 29 & 31

EP 11 - 14

Counting Backwards 20 to 10

Building Cards
Building
 18, 20, 22, 24, 26, 28, 30 & 32

Filling Cards
Filling
 17, 19, 21, 23, 25, 27, 29 & 31

EP 15 - 17

Bond Blocks as Intervention Only

These instructions apply to students who are participating in Counting to 10 and 20 with Bond Blocks as **intervention** only (not in addition to tier one class teaching).

Four Intervention Sessions

Intervention occurs on top of tier one class maths teaching. Intervention occurs outside of English and Maths lessons.

Students who are participating in Counting to 10 and 20 with Bond Blocks as intervention only (not tier one class teaching) require four, 10 minute sessions per week.

Fluency Activities

Most of the Teacher Led Activity Boards are **fluency activities**. Fluency activities have **one video** per activity. This is shown on Day 1 of the week. That board is then repeated once at the beginning of each Intervention Session.

Teacher Led Activities have been complemented with the A4 Exploratory and Guided Play Activities. The planner has allocated one of these engaging activities at the end of each session. This is a guide. Some groups work better completing the Teacher Led Activity on Day 1, 2 and 3, then doing the A4 Exploratory or Guided Play cards on Day 4. Please use teacher judgement and make adjustments to increase positive student engagement. This can mean making alterations week-to-week depending on the type of A3 Teacher Led Activity.

i. Day 1: Introduce the Teacher Led Activity (🕒 10 min).

- “I do” explicit instruction. The teacher models activity as per the activity video.
- The teacher can choose to show the video to the students or replicate the video with their students.
- This is followed by “We do”. The students repeat the activity once with the teacher’s support.

ii. Day 2: 🕒 10 min

Repeat the Teacher Led Activity (🕒 7 min).

- “We do”. The students repeat the activity with the teacher’s support.
- This is followed by “I do”, independent practice.

Finish the session with a Guided Play Activity Card (🕒 3 min)

iii. Day 3: 🕒 10 min

Repeat the Teacher Led Activity (🕒 7 min).

- “You do”, independent practice.

Finish the session with a Guided Play Activity Card (🕒 3 min)

iv. Day 4: 🕒 10 min

Repeat the Teacher Led Activity (🕒 7 min).

- “You do”, independent practice.

Finish the session with an Exploratory Play Activity Card (🕒 3 min)

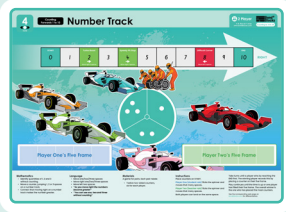
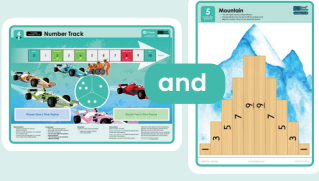


Understanding Activities

The remaining A3 Teacher Led Activities are **understanding activities**. These activities each have **several videos** per one activity card. The concepts and mathematical language complex and require explicit instruction. These videos have been broken up over the 4 sessions of the week depending on the content of the videos.

Exploratory and Guided Play Activities have been allocated to help balance these weeks and make them a little lighter. Please note levels of student engagement and use teacher judgement about when to move on.

Remember these Teacher Led Activities are about developing understanding, not fluency. Students often cement understanding during fluency. If students have difficulty with an understanding activity complete the activity once and move on. If needed return to it later in the term, after several weeks of fluency activities.

Below is week four of “Counting to Forwards 1 to 10” in the **“Tier Two & Three Implementation Planner: Intervention”**.

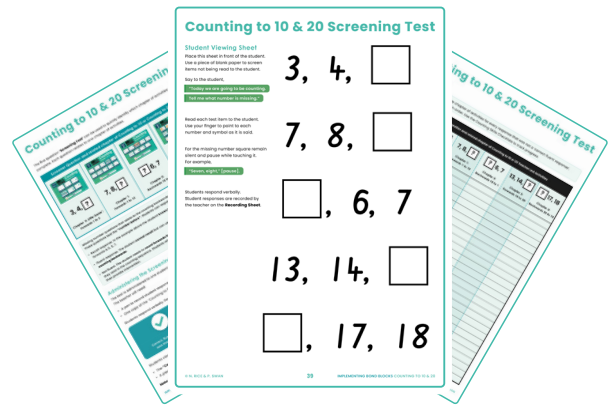
4	Day 1 Fluency 10 min <input type="checkbox"/> Completed	Day 2 10 min <input type="checkbox"/> Completed	Day 3 10 min <input type="checkbox"/> Completed	Day 4 10 min <input type="checkbox"/> Completed
				
	4) Number Track	4) Number Track and Matching Activity 5	4) Number Track and Matching Activity 6	4) Number Track and EP 5) Building Roads: Routes

Tier Two & Three Implementation Planner: Teacher Led Activities

Use the **“Tier Two & Three Implementation Planner”** as a guide. Use teacher judgement to adapt the pace of Teacher Led Activities (using the activity differentiation suggestions) to suit students. Students receiving tier two intervention will progress through the activities more quickly than students in tier three.

Screening Test

Use the Screening Test to identify which chapter of Teacher Led Activities in the Implementation Planner to start.



Tier Two & Three Implementation Planner: Exploratory and Guided Play Activities



Students **do not** have to complete every Exploratory and Guided Play activity. These cards are sequenced from easy to hard. Please choose cards at the level and interest of the students. Positive engagement is essential.

- Each Exploratory Play Activity card has been allocated in the Implementation Planner. If the students do not engage well with the activity, please choose something else.
- There are more Guided Play Activity cards than intervention sessions. Students can be offered a selection of cards and choose the ones they want to complete.

Exploratory Play





Guided Play

The **Matching** and **Choosing** cards focus on number.

Guided Play

The **Building** and **Filling** cards focus on shape.

Bond Blocks Intervention in Addition to Tier One Teaching

These instructions apply to students who are participating in Bond Blocks Counting to 10 and 20 in class four times a week as tier one teaching and require intervention. Days 1 to 4 are outlined in “**Tier One Whole Class Implementation**”.

Intervention students require **one additional 10 minute session** on top of the four, tier one sessions.

- In the **additional intervention session** students repeat a **Teacher Led Activity**.
- The additional intervention session **occurs on top of tier one class maths teaching**. This additional session occurs outside of English and Maths lessons.

Term 1 – Week 2	Monday	Tuesday	Wednesday	Thursday	Friday
Tier One Whole Class Teaching					
Additional Bond Blocks Session for Intervention				 Additional Intervention Session	

*Choosing the Teacher Led Activity

During the intervention sessions the students either:

- Repeat the Teacher Led Activity from the tier one class session or
- Review a previous Teacher Led Activity to maintain fluency.

Which Teacher Led Activity the students complete will be dependent on how well the students coped with Teacher Led Activity during the tier one class sessions. Some Teacher Led Activities are harder than other and will require more repetition than others.

Mathematical Language

The mathematical language that relates to each Teacher Led Counting Activity has been specified on each board under the heading “Language”. There are several phrases, listed in dot points, that can be used on each board. Start using one phrase for a week until the students are familiar with it. Then use a different phrase the following week.

In the first session of the week the teacher tells the class the mathematical word/phrase they are focusing on and writes this on the board. For example,

Teacher: “Today we are using the maths words, “one more”.

Teacher: Writes “one more” on the board.

Teacher: “When we play the game, we need to say...”

Students: “one more” [choral response as the teacher points to the words written on the board].

For more information, read the related “Teacher Note”.

When to Move On

Activities: When to Move On

Students complete one Teacher Led Activity per week. Do not expect students to be fluent counting after the first activity in a chapter. Students should still progress to the next activity the following week. Fluency with the targeted counting sequence will take the whole chapter. Students who are experiencing difficulty should be supported using the ‘a little easier’ differentiation information on the related activity web page.

The system builds gradually and is **cyclically reviewed** every term. Students are constantly re-exposed to activities.

Chapters: When to Move On

Before/After

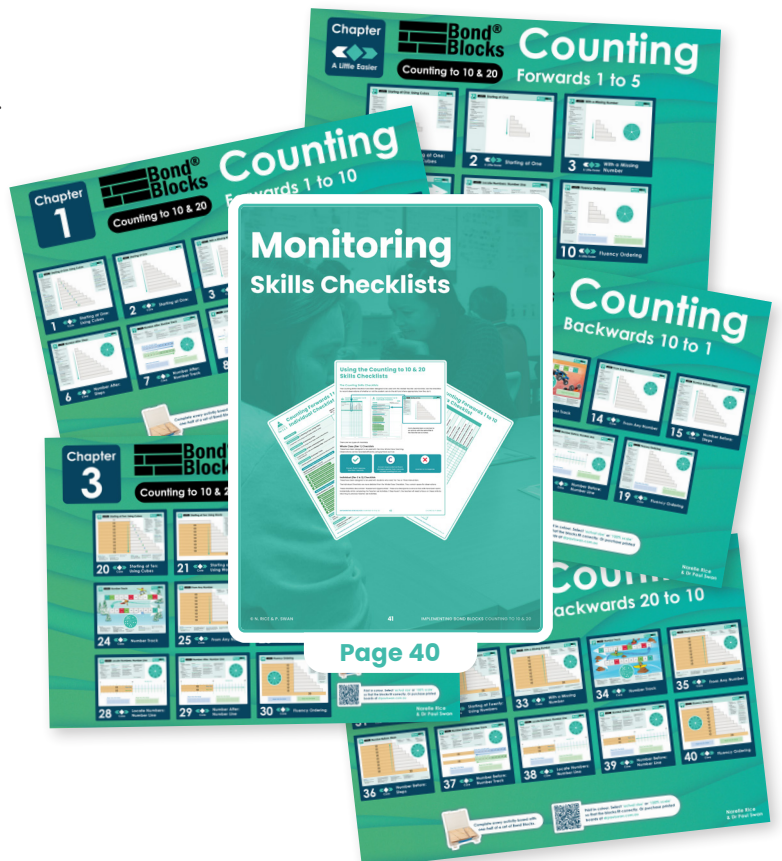
It is common for students to confuse ‘before’ and ‘after’.

- At the end of a counting forwards chapter check that students who do this can identify ‘one more’, without counting starting at one/ten.
- At the end of a counting backwards chapter check that students who do this can identify ‘one less’, without counting back from ten/twenty.

Being able to identify one more/less without saying the whole counting sequence is important because it relates to the top two predictors of difficulty in maths.

There can be a range of different reasons for students confusing the terms ‘before’ and ‘after’. Some reasons include language, directional and executive functioning difficulties. Use desk visuals, pointing prompts and pre-loading to support these students to develop fluency with these terms.

Fluency with these skills can be assessed and recorded using the Tier Two and Three “**Monitoring: Skills Checklists**”.



From Any Number

If at the end of the chapter a student is still experiencing significant difficulty **counting forwards or backwards from any number**, move on to the next chapter but come back and review this. For example, if the student can count from 1 to 10, including with a single missing number, but still needs scaffolding to count forwards from any number, move onto the “Counting Backwards 10 to 1” Chapter. The reason for moving on is that learning the counting backwards sequence will reinforce the counting forwards sequence. However, during each week of the Counting Backwards Chapters repeat one of the **counting forwards from any number** activities each week.

Up to 20

If at the end of “Counting Backwards from 20 to 10” students are still confusing ‘teen’ and ‘ty’ numbers, when saying or writing them, move onto larger two-digit numbers.

- The counting sequence from 10 to 20, often referred to as the ‘teens’, is notoriously difficult. The order we say the parts of the teen number names, does not match the order the digits are written and corresponding place value. A common error is writing these numbers as the word sounds. This results in reversed place value, for example “fourteen” written incorrectly as “41”.
- The counting sequence spoken in English does not become consistent until the sixties.
- Once students have engaged with two-digit numbers up to 100, they will often self-correct writing errors in the teens saying things like,

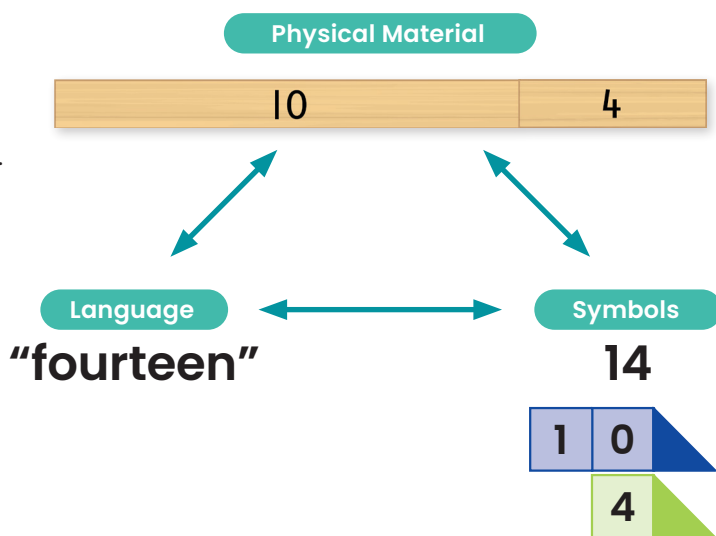
“Oops, I wrote 41, I meant 14”.

For more information about supporting students with “teen” and “ty” difficulties read the related Teacher Note “Correcting ‘teen’ and ‘ty’ Errors”.

Tier Three

Students working at a tier three level may take two or more years to cover this one year of counting curriculum in Counting to 10 and 20.

This is okay. It is better to work at the rate of the student if they are on an individualised education plan. However, please take heed of the previous note about the difficulties with “teens”.



Addition and Subtraction Core Kit Intervention

Students in Year One onwards who are participating in Bond Blocks Counting to 10 and 20 should also be tested using the test from the Bond Blocks Core Kit. The Bond Blocks Core Kit focuses on addition and subtraction. Students can participate in both intervention for Counting to 10 and 20 and intervention using the Core Kit, because they focus on different skills that should be developed concurrently.





Please note that students who have engaged in intervention with Bond Blocks Counting to 10 and 20 will not need to do the first chapter of the Core Kit because this focuses on counting.

Screening Test

Counting to 10 & 20 Screening Test

The five question 'Screening Test' can be used to quickly identify which chapter of activities different students need to complete. Each question relates to one chapter of activities.

Screening Question and related chapter of Counting to 10 or Counting to 20 Teacher Led Activities

1	2	3	4
			
3, 4, ?	7, 8, ?	? 6, 7	13, 14, ?
Chapter 'A Little Easier': Forwards 1 to 5	Chapter 1: Forwards 1 to 10	Chapter 2: Backwards 10 to 1	Chapter 3: Forwards 10 to 20
			Chapter 4: Backwards 20 to 10

Missing number questions that relate to the counting backwards sequence are presented as $7, 6, 7$. These questions test the "number before". Students can respond at three different levels:

- Recall response. In the example above the student **knows the missing number is 5**. They know the counting sequence forwards is 5, 6, 7.
- Fluent response. The student **cannot recall** but can use the known numbers to work out the unknown missing number by **counting backwards**.
- Not fluent. The student needs to **count forwards from one**, until they get to the given numbers, then say the missing number they said in the counting sequence. Students who do this are **at risk**. It is essential teachers identify students who do this and then provide intervention.

Administering the Screening Test

The test is administered to one student at a time. Sit next to the student being tested. The teacher will need:

- A pen to record student responses.
- One copy of the 'Counting to 10 and 20 Screening Test - Recording Sheet'.

Students respond verbally. Record student responses on the Recording Sheet using one of these symbols.

		
Correct, fluent response. Less than 3 seconds.	Correct response but not fluent. Strategies greater than 3 seconds. Includes counting from one.	Incorrect or no response.

Students view the questions using:

- The "Counting to 10 and 20 Screening Test - Student Viewing Sheet".
- A piece of paper that covers items not currently being read to the student.

Note: Print the Recording Sheet and Student Viewing Sheet separately, **not double-sided**.

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

38

© N. RICE & P. SWAN

Student Viewing Sheet

Place this sheet in front of the student. Use a piece of blank paper to screen items not being read to the student. Say to the student:

- "Today we are going to do counting."
- "The missing number is missing."

Read each test item to the student. Use your finger to point to each number and symbol as it is read.

For the missing number square remain silent and pause while touching it. For example:

- "Seven, eight, ? (pause)."

Students respond verbally. Student responses are recorded by the teacher on the Recording Sheet.

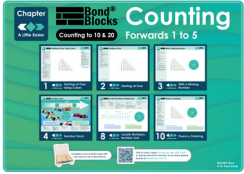
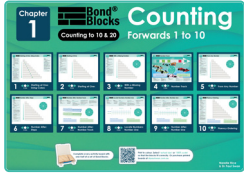
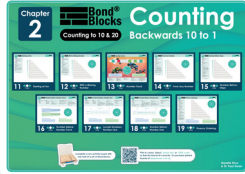
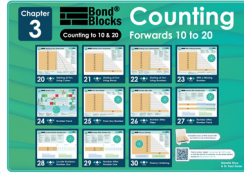
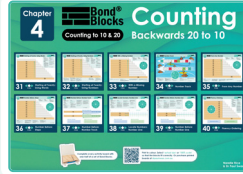
Counting to 10 & 20 Screening Test

Number of activities for every response that was not a 'Correct fluent response'. Use the Counting Skills Checklist to track progress.

Chapter	Response	Count
Chapter 1: Forwards 1 to 10	?	8
Chapter 2: Backwards 10 to 1	?	6, 7
Chapter 3: Forwards 10 to 20	?	13, 14
Chapter 4: Backwards 20 to 10	?	17, 18

Counting to 10 & 20 Screening Test

The five question 'Screening Test' can be used to quickly identify which chapter of activities different students need to complete. Each question relates to one chapter of activities.

Screener Question and related chapter of Counting to 10 or Counting to 20 Teacher Led Activities				
 <p>3, 4, ?</p> <p>Chapter 'A Little Easier': Forwards 1 to 5</p>	 <p>7, 8, ?</p> <p>Chapter 1: Forwards 1 to 10</p>	 <p>? 6, 7</p> <p>Chapter 2: Backwards 10 to 1</p>	 <p>13, 14, ?</p> <p>Chapter 3: Forwards 10 to 20</p>	 <p>? 17, 18</p> <p>Chapter 4: Backwards 20 to 10</p>

Missing number questions that relate to the counting backwards sequence are presented as ?, 6, 7. These questions test the "number before". Students can respond at three different levels:

- Recall response. In the example above the student **knows the missing number is 5**. They know the counting sequence forwards is 5, 6, 7.
- Fluent response. The student **cannot recall** but can use the known numbers to work out the unknown missing number by **counting backwards**.
- Not fluent. The student needs to **count forwards from one**, until they get to the given numbers, then say the missing number they said in the counting sequence. Students who do this are **at risk**. It is essential teachers identify students who do this and then provide intervention.

Administering the Screening Test

The test is administered to one student at a time. Sit next to the student being tested.

The teacher will need:

- A pen to record student responses.
- One copy of the 'Counting to 10 and 20 Screening Test - Recording Sheet'.

Students respond verbally. Record student responses on the Recording Sheet using one of these symbols.



Correct, fluent response.
Less than 3 seconds.



Correct response but not fluent.
Strategies greater than 3 seconds.
Includes counting from one.



Incorrect or no response.

Students view the questions using:

- The "Counting to 10 and 20 Screening Test - Student Viewing Sheet".
- A piece of paper that covers items not currently being read to the student.

Note: Print the Recording Sheet and Student Viewing Sheet separately, **not double-sided**.

Counting to 10 & 20 Screening Test

Student Viewing Sheet

Place this sheet in front of the student.
Use a piece of blank paper to screen items not being read to the student.

Say to the student,

"Today we are going to be counting.

Tell me what number is missing."

Read each test item to the student.
Use your finger to point to each number and symbol as it is said.

For the missing number square remain silent and pause while touching it.
For example,

"Seven, eight," [pause].

Students respond verbally.
Student responses are recorded by the teacher on the **Recording Sheet**.

3, 4,

7, 8,

, 6, 7

13, 14,

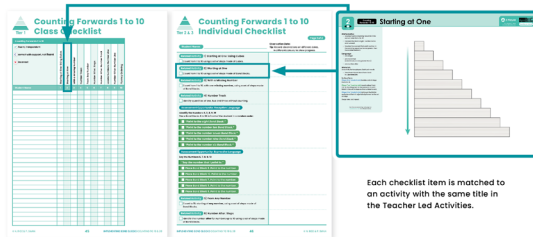
, 17, 18

Monitoring Skills Checklists

Using the Counting to 10 & 20 Skills Checklists

The Counting Skills Checklists

The Counting Skills Checklists have been designed to be used with the related Teacher Led Activities. Use the checklists to record observations of whether or not the student can do the skill and where appropriate, how they do it.



Each checklist item is matched to an activity with the same title in the Teacher Led Activities.

There are two types of checklists:

Whole Class (Tier 1) Checklists

These have been designed to be used with Tier One, Whole Class Teaching. Observations can be recorded efficiently using symbols such as:



Individual (Tier 2 & 3) Checklists

These have been designed to be used with students who need Tier Two or Three intervention.

The Individual Checklists are more detailed than the Whole Class Checklists. They contain space for observations.

These checklists also contain "Assessment Opportunities". These are checkpoints to ensure that skills have been learnt incidentally whilst completing the Teacher Led Activities. If they haven't, the teacher will need to focus on these skills by returning to previous Teacher Led Activities.

Using the Counting to 10 & 20 Skills Checklists

The Counting Skills Checklists

The Counting Skills Checklists have been designed to be used with the related Teacher Led Activities. Use the checklists to record observations of whether or not the student can do the skill and where appropriate, how they do it.

The image shows three pages of checklists. The first page is a 'Class Checklist' for Tier 1, featuring a grid for recording student performance across various skills. The second page is an 'Individual Checklist' for Tiers 2 & 3, providing detailed observation notes and specific activities like 'Starting at One Using Cubes' and 'Starting at One' with bond blocks. The third page is a 'Starting at One' activity for 2 players, showing a staircase diagram and instructions for counting.

Each checklist item is matched to an activity with the same title in the Teacher Led Activities.

There are two types of checklists:

Whole Class (Tier 1) Checklists

These have been designed to be used with Tier One, Whole Class Teaching. Observations can be recorded efficiently using symbols such as:



Correct, fluent response.
Less than 3 seconds.



Correct response but not fluent.
Strategies greater than 3 seconds.
Includes counting from one.



Incorrect or no response.

Individual (Tier 2 & 3) Checklists

These have been designed to be used with students who need Tier Two or Three Intervention.

The Individual Checklists are more detailed than the Whole Class Checklists. They contain space for observations.

These checklists also contain "Assessment Opportunities". These are checkpoints to ensure that skills have been learnt incidentally whilst completing the Teacher Led Activities. If they haven't, the teacher will need to focus on these skills by returning to previous Teacher Led Activities.

Individual (Tier 2 & 3) Checklists

Instructions for the teacher to say are written in *italics*.

Related Activity 2) Starting at One 'a little easier'

- Count from 1 to 5 using a set of steps made of Bond Blocks.

Related Activity

This indicates this is a Teacher Led Counting Activity. Complete as instructed.

Assessment Opportunity: Receptive Language

Identify the Numbers 1, 2, 3, 4, 5

Place Bond Blocks 1 to 5 in front of the student in a **random order**.

"Point to the number three Bond Block."

"Point to the number five Bond Block."

"Point to the number two Bond Block."

"Point to the number four Bond Block."

"Point to the number one Bond Block."

Assessment Opportunity

This indicates this is a checkpoint to ensure that skills have been learnt incidentally whilst completing the Teacher Led Counting Activities.

Counting Skills Number Cards

0	1	2
3	4	5
<u>6</u>	7	8
<u>9</u>	10	

Page 58

10	11	12
13	14	15
16	17	18
19	20	

Page 59

Some assessment opportunities make use of number cards.

The Counting Skills Number Cards are located at the end of the Monitoring: Skills Checklists section.

Counting Forwards 1 to 5 Individual Checklist

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 1) Starting at One: Using Cubes 'a little easier'

Count from 1 to 5 using a set of steps made of cubes.

Related Activity 2) Starting at One 'a little easier'

Count from 1 to 5 using a set of steps made of Bond Blocks.

Related Activity 3) With a Missing Number 'a little easier'

Count from 1 to 5, with one **missing number**, using a set of steps made of Bond Blocks.

Related Activity 4) Number Track 'a little easier'

Identify quantities of one, two and three without counting.

Assessment Opportunity: Receptive Language

Identify the Numbers 1, 2, 3, 4, 5

Place Bond Blocks 1 to 5 in front of the student in a **random order**.

"Point to the number three Bond Block."

"Point to the number five Bond Block."

"Point to the number two Bond Block."

"Point to the number four Bond Block."

"Point to the number one Bond Block."

Assessment Opportunity: Expressive Language

Say the Numbers 1, 2, 3, 4, 5

"Say the number that I point to."

Place Bond Block 3. Point to the number.

Place Bond Block 5. Point to the number.

Place Bond Block 2. Point to the number.

Place Bond Block 4. Point to the number.

Place Bond Block 1. Point to the number.

Related Activity 8) Locate Numbers: Number Line 'a little easier'

Locate numbers 1 to 5 on a number line.

Related Activity 10) Fluency Ordering 'a little easier'

Develop fluency ordering randomly selected numbers from 1 to 5 using a set of steps made of Bond Blocks.

Counting Forwards 1 to 10 Individual Checklist

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 1) Starting at One: Using Cubes

Count from 1 to 10 using a set of steps made of cubes.

Related Activity 2) Starting at One

Count from 1 to 10 using a set of steps made of Bond Blocks.

Related Activity 3) With a Missing Number

Count from 1 to 10, with one **missing number**, using a set of steps made of Bond Blocks.

Related Activity 4) Number Track

Identify quantities of one, two and three without counting.

Assessment Opportunity: Receptive Language

Identify the Numbers 6, 7, 8, 9, 10

Place Bond Blocks 6 to 10 in front of the student in a **random order**.

"Point to the eight Bond Block."

"Point to the number ten Bond Block."

"Point to the number seven Bond Block."

"Point to the number nine Bond Block."

"Point to the number six Bond Block."

Assessment Opportunity: Expressive Language

Say the Numbers 6, 7, 8, 9, 10

"Say the number that I point to."

Place Bond Block 8. Point to the number.

Place Bond Block 10. Point to the number.

Place Bond Block 7. Point to the number.

Place Bond Block 9. Point to the number.

Place Bond Block 6. Point to the number.

Related Activity 5) From Any Number

Count to 10, starting at **any number**, using a set of steps made of Bond Blocks.

Related Activity 6) Number After: Steps

Identify the number **after** for numbers up to 10 using a set of steps made of Bond Blocks.

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 7) Number After: Number Track

Identify the number after for numbers up to 10 using a number track.

Related Activity 8) Locate Numbers: Number Line

Locate numbers 1 to 10 on a number line, without counting from 1.

Related Activity 9) Number After: Number Line

Identify the number after for numbers up to 10 using a number line.

Assessment Opportunity

Number After* 1 to 4

Say the number after, for numbers from 1 to 4.

Place each block in front of the student one at a time.

"Say the number that is one after the number that I point to."

Point to 3.

Point to 1.

Point to 4.

Point to 2.

*The mathematical concept of **"one more"** is essential. Using **"one more"** is an appropriate adjustment for students with language difficulties who confuse **"before"** and **"after"**.

Assessment Opportunity

Number After* 5 to 9

Say the number after, for numbers from 5 to 9.

Place each block in front of the student one at a time.

"Say the number that is one after the number that I point to."

Point to 9.

Point to 7.

Point to 5.

Point to 8.

Point to 6.

*The mathematical concept of **"one more"** is essential. Using **"one more"** is an appropriate adjustment for students with language difficulties who confuse **"before"** and **"after"**.

Related Activity 10) Fluency Ordering

Develop fluency ordering randomly selected numbers from 1 to 10 using a set of steps made of Bond Blocks.

Counting Backwards 10 to 1 Individual Checklist

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 11) Starting at Ten

Count from 10 to 1 using a set of steps made of Bond Blocks.

Related Activity 12) With a Missing Number

Count from 10 to 1, with one missing number, using a set of steps made of Bond Blocks.

Related Activity 13) Number Track

Count from 1 to 10, with one **missing number**, using a set of steps made of Bond Blocks.

Related Activity 14) From Any Number

Identify quantities of one, two and three without counting.

Related Activity 15) Number Before: Steps

Identify the number **before** for numbers up to 10 using a set of steps made of Bond Blocks.

Related Activity 16) Number Before: Number Track

Identify the number **before** 1 to 10 on a number track.

Related Activity 17) Locate Numbers: Number Line

Locate numbers 1 to 10 on a number line, without counting from 1.

Related Activity 18) Number Before: Number Line

Identify the number **before** for numbers up to 10 using a number line.

Assessment Opportunity

Number Before* 1 to 5

Say the number **before**, for numbers from 1 to 5.

Place each block in front of the student one at a time.

"Say the number that is one before the number that I point to."

Point to 4.

Point to 1.

Point to 3.

Point to 5.

Point to 2.

*The mathematical concept of **"one less"** is essential. Using **"one less"** is an appropriate adjustment for students with language difficulties who confuse **"before"** and **"after"**.

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Assessment Opportunity

Number Before* 6 to 10

Say the number **before**, for numbers from 6 to 10.
Place each block in front of the student one at a time.

"Say the number that is one before the number that I point to."

- Point to 9.
- Point to 6.
- Point to 8.
- Point to 10.
- Point to 7.

*The mathematical concept of **"one less"** is essential. Using **"one less"** is an appropriate adjustment for students with language difficulties who confuse **"before"** and **"after"**.

Related Activity 19) Fluency Ordering

- Develop fluency ordering randomly selected numbers from 1 to 10 using a set of steps made of Bond Blocks.



Tier 1

Counting Forwards 10 to 20 Class Checklist

Counting Forwards 1 to 10											
<input checked="" type="checkbox"/> fluent, independent	Starting at Ten: Using Cubes	Starting at Ten: Using Words	Starting at Ten: Using Numbers	With a Missing Number	Number Track	From Any Number	Number After: Steps	Number After: Number Track	Locate Numbers: Number Line	Number After: Number Line	Fluency Ordering
<input type="checkbox"/> correct with support, not fluent											
<input type="checkbox"/> incorrect											
Student Name	20	21	22	23	24	25	26	27	28	29	30

Counting Forwards 10 to 20 Individual Checklist

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 20) Starting at Ten: Using Cubes

Count from 10 to 20 using a set of steps made of cubes.

Related Activity 21) Starting at Ten: Using Words

Count from 10 to 20 using a set of steps made of Bond Blocks.

Related Activity 22) Starting at Ten: Using Numbers

Count from 10 to 20 using a set of steps made of Bond Blocks, using Place Value Arrow Cards.

Count from 10 to 20 using a set of steps made of Bond Blocks, using Number Cards.

Related Activity 23) With a Missing Number

Count from 10 to 20, with one **missing number**, using a set of steps made of Bond Blocks.

Related Activity 24) Number Track

Identify quantities of one, two, three, four and five, in a standard arrangement, without counting.

Assessment Opportunity: Receptive Language

Identify the Numbers 11, 12, 13, 14, 15

Place Number Cards 11 to 15 in front of the student in a **random order** organised in one row.

"Point to eleven."

"Point to fifteen."

"Point to twelve."

"Point to fourteen."

"Point to thirteen."

Assessment Opportunity: Receptive Language

Identify the Numbers 16, 17, 18, 19, 20

Place Number Cards 16 to 20 in front of the student in a **random order** organised in one row.

"Point to sixteen."

"Point to twenty."

"Point to seventeen."

"Point to nineteen."

"Point to eighteen."

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Assessment Opportunity: Expressive Language

Say the Numbers 11, 12, 13, 14, 15

Place Number Cards 11 to 15 in front of the student in a **random order** organised in one row.

"Say the number that I point to."

Point to 11.

Point to 15.

Point to 12.

Point to 14.

Point to 13.

Assessment Opportunity: Expressive Language

Say the Numbers 16, 17, 18, 19, 20

Place Number Cards 16 to 20 in front of the student in a **random order** organised in one row.

"Say the number that I point to."

Point to 16.

Point to 20.

Point to 17.

Point to 19.

Point to 18.

Related Activity 25) From Any Number

Count to 20, starting at **any number**, using a set of steps made of Bond Blocks.

Related Activity 26) Number After: Steps

Identify the number **after** for numbers up to 20 using a set of steps made of Bond Blocks.

Related Activity 27) Number After: Number Track

Identify the number after for numbers up to 20 using a number track.

Related Activity 28) Locate Numbers: Number Line

Locate numbers 11 to 20 on a number line, without counting from 10.

Related Activity 29) Number After: Number Line

Identify the number after for numbers up to 20 using a number line.

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Assessment Opportunity

Number After* 10 to 14

Say the number **after**, for numbers from 10 to 14.

Place Number Cards 10 to 14 in front of the student in a **random order** organised in one row.

"Say the number that I point to."

Point to 10.

Point to 13.

Point to 12.

Point to 14.

Point to 11.

*The mathematical concept of "**one more**" is essential. Using "**one more**" is an appropriate adjustment for students with language difficulties who confuse "**before**" and "**after**".

Assessment Opportunity

Number After* 15 to 19

Say the number **after**, for numbers from 15 to 19.

Place Number Cards 15 to 19 in front of the student in a **random order** organised in one row.

"Say the number that I point to."

Point to 19.

Point to 17.

Point to 16.

Point to 18.

Point to 15.

*The mathematical concept of "**one more**" is essential. Using "**one more**" is an appropriate adjustment for students with language difficulties who confuse "**before**" and "**after**".

Related Activity 30) Fluency Ordering

Develop fluency ordering **randomly** selected numbers from 10 to 20 using a set of steps made of Bond Blocks.



Counting Backwards 20 to 10 Class Checklist

Counting Forwards 1 to 10

- ✓ fluent, independent
- C correct with support, not fluent
- ✗ incorrect

Starting at Twenty: Using Words

Starting at Twenty: Using Numbers

With a Missing Number

Number Track

From Any Number

Number Before: Steps

Number Before: Number Track

Locate Numbers: Number Line

Number Before: Number Line

Fluency Ordering

Student Name 31 32 33 34 35 36 37 38 39 40

Counting Backwards 20 to 10 Individual Checklist

Student Name: _____

Observation Date:

Tip: Record observations on different dates, in different colours, to show progress.

Related Activity 31) Starting at Twenty: Using Words

Count from 20 to 10 using a set of steps made of Bond Blocks.

Related Activity 32) Starting at Twenty: Using Numbers

Count from 20 to 10 using a set of steps made of Bond Blocks, using Place Value Arrow Cards.

Count from 20 to 10 using a set of steps made of Bond Blocks, using Number Cards.

Related Activity 33) With a Missing Number

Count from 20 to 10, with one **missing number**, using a set of steps made of Bond Blocks.

Related Activity 34) Number Track

Identify quantities of one, two, three, four and five, in a standard arrangement, without counting.

Related Activity 35) From Any Number

Count from 20, starting at **any number**, using a set of steps made of Bond Blocks.

Related Activity 36) Number Before: Steps

Identify the number **before** for numbers up to 20 using a set of steps made of Bond Blocks.

Related Activity 37) Number Before: Number Track

Identify the number **before** for numbers up to 20 using a number track.

Related Activity 38) Locate Numbers: Number Line

Locate numbers 11 to 20 on a number line, without counting from 10.

Related Activity 39) Number Before: Number Line

Identify the number **before** for numbers up to 20 using a number line.

Student Name: _____

Observation Date:

Tip: Record observations on different dates,
in different colours, to show progress.**Assessment Opportunity****Number Before* 11 to 15**Say the number **before**, for numbers from 11 to 15.Place Number Cards 11 to 15 in front of the student in a **random order** organised in one row.*"Say the number that is one before the number that I point to."* Point to 11. Point to 14. Point to 13. Point to 15. Point to 12.

*The mathematical concept of "**one less**" is essential. Using "**one less**" is an appropriate adjustment for students with language difficulties who confuse "**before**" and "**after**".

Assessment Opportunity**Number Before* 16 to 20**Say the number **before** for numbers from 16 to 20.Place Number Cards 16 to 20 in front of the student in a **random order** organised in one row.*"Say the number that is one before the number that I point to."* Point to 20. Point to 18. Point to 17. Point to 19. Point to 16.

*The mathematical concept of "**one less**" is essential. Using "**one less**" is an appropriate adjustment for students with language difficulties who confuse "**before**" and "**after**".

Related Activity 40) Fluency Ordering Develop fluency ordering **randomly** selected numbers from 10 to 20, using a set of steps made of Bond Blocks.

Counting Skills Number Cards

0	1	2
3	4	5
<u>6</u>	7	8
<u>9</u>	10	

10	11	12
13	14	15
16	17	18
19	20	

Teacher Notes

About the Blocks

A Set of Bond Blocks
A set of Bond Blocks contains:

Linear Bond Blocks

Linear Ten Blocks
(Join to make twenty)

More Linear Blocks
An extra 1, 2, 3, 4 and two 5 Blocks. Used for more complex three-part bonds when bridging ten.

© N. RICE & P. SWAN 63 IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

Predictors of Maths Difficulties

Developing counting is an essential skill. However, counting by rote is not a predictor of maths learning disabilities (MLD) or low achievement (LA).
"Most school children quickly learn to count by rote, and this in and of itself is not a useful indicator of MLD or LA status." (Geary, 2009, p. 9)

The counting sequence is one component of number line thinking. Number line thinking relates to the top two predictors of difficulty in mathematics for students from the Foundation to Year 2.

Key predictors of difficulties in mathematics of this stage of development are:

1. Fluently identifying which is the **greater** of two numbers. That is, without counting from one.
 - "Which is bigger," meaning is worth the most things?"

Students of rote take a long time to answer, often counting from one. They lack a sense of how numbers relate to each other on a mental number line.

After **Between** **Before**

After **Between** **Before**

3. Working Memory
4. Subitising

The strongest of these predictors are the first two, which relate to number line thinking.

By Year 2, knowledge of basic addition and subtraction facts and use of immature counting strategies such as counting by ones on fingers, become the strongest predictors of students at mathematical risk.

"The concept of which number is worth more or less is essential. Use language the students are familiar with. For more information, see the Teacher Note 'Mathematical Language'."

Geary, D. C., Bailey, D. H., Littlefield, A., Wood, P., Hoard, M. K., Nugent, L. (2009). First-grade predictors of mathematical learning disability – a latent class trajectory analysis. *Cognitive Development*, 24(4), 48–63. <https://doi.org/10.1016/j.cogdev.2009.10.001>

Concrete Representational Abstract

Mathematical Manipulatives

A Mathematical Manipulative is something that can be picked up and moved (manipulated) to help teach.



While manipulatives may come in virtual as well as physical form, the authors believe young children need to physically handle manipulatives prior to having a virtual experience. This is even more the case when working with young children, which is one of the reasons why Bond Blocks are made of wood.

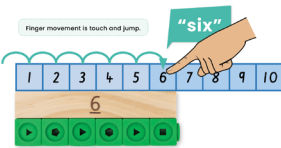
Manipulating the blocks helps students to develop concepts about number, length and shape.



Number Tracks and Number Lines

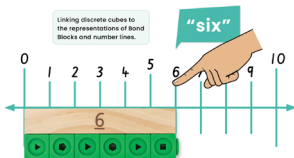
Number Track

One of the first representations of number, linked to the concrete material, is a number track. Each object is represented by one cell on the track. The number representing the set is written in the space inside the cell. When counting on a number track students say the number as they touch the number inside the cell. This is different from a number line.



Number Lines

Next, discrete countable materials such as cubes and Bond Blocks are linked to number lines.



When using number lines, the number representing the set is written above or below the vertical line that marks the end of the length of the Bond Block (not in the space between the vertical marker lines as per a number track). For this reason the number line requires zero to be placed, marking the start of the block. Students say the number as they touch the vertical marker indicating the end of the length of the Bond Block.

Mathematical Language

Language Routines

The mathematical language that relates to each Teacher Led Counting Activity has been specified on each board. There are several phrases, listed in dot points, that can be used on each board. Start using one phrase for a week until the students are familiar with it. Then use a different phrase the following week.

In the first lesson of the week the teacher tells the class the mathematical phrase they are focusing on and writes this on the board. For example:

Teacher: "Today we are using the maths words, "one more". When we play the game, we need to think about saying "one more". The maths words we are using are..."

Students: choral response.

The specified mathematical language is sequentially built and cyclically reviewed throughout the Teacher Led Activities.

Number Comparison Language

The initial language in each chapter relates to the step activities. Each phrase on the board relates to one mathematical direction only, either forwards or backwards.

Language Used	Activity
	Counting Forwards 1 to 10
	Counting Forwards 10 to 20
One more One longer One number after One greater than	Activities 1, 2, 3, 4, 5, 6 and 7 Activities 20, 21, 22, 23, 24, and 24
One less One shorter One number before One less than	Counting Backwards 10 to 1 Counting Backwards 20 to 10 Activities 11, 12, 14, and 15 Activities 31, 32, 33, 35 and 34

The Evidence Base of Bond Blocks Counting to 10 & 20

Defining 'Evidence-Based'

"Is Bond Blocks evidence-based?" This is a great question and one we are often asked. However, it is also a term that is often misunderstood. We describe Bond Blocks as being "research-informed" and "using evidence-informed practice". We do this because strictly speaking, "evidence-based" is a research term that requires rigorous controlled trials. This is common in the medical field.

To answer the question "Is the evidence-based?" in an educational setting we refer to Professor Geoff Masters the CEO of the Australian Council for Educational Research (2018).

Evidence-based teaching involves the use of evidence to: (1) establish where students are in their learning; (2) decide on appropriate teaching strategies and interventions; and (3) monitor student progress and evaluate teaching effectiveness. (p. 4)

We recommend reading the entire article.

https://research.acer.edu.au/cgi/viewcontent.cgi?article=1325&context=research_conference

The salient points are that the medical profession, despite having access to controlled research studies, also relies on other tests and evidence, including observations. Doctors try a course of treatment, monitor progress and alter the treatment according to observations. Masters explains that this comprehensive understanding of what an "evidence-based" approach actually is, should also be applied to education.

"Policies and discussions of 'evidence-based teaching' sometimes overlook the importance of this broader, more integrated understanding of the role of evidence in teaching and learning." (p. 4)

Collecting Evidence

Bond Blocks has several tools built in to do what Masters (2018) defines as evidence-based teaching.

That is, collect data as evidence to:

- establish where student are in their learning.
- Monitor student progress.
- Evaluate teaching effectiveness.

All Bond Block resources include assessment and monitoring resources to evaluate the effectiveness of teaching and learning.

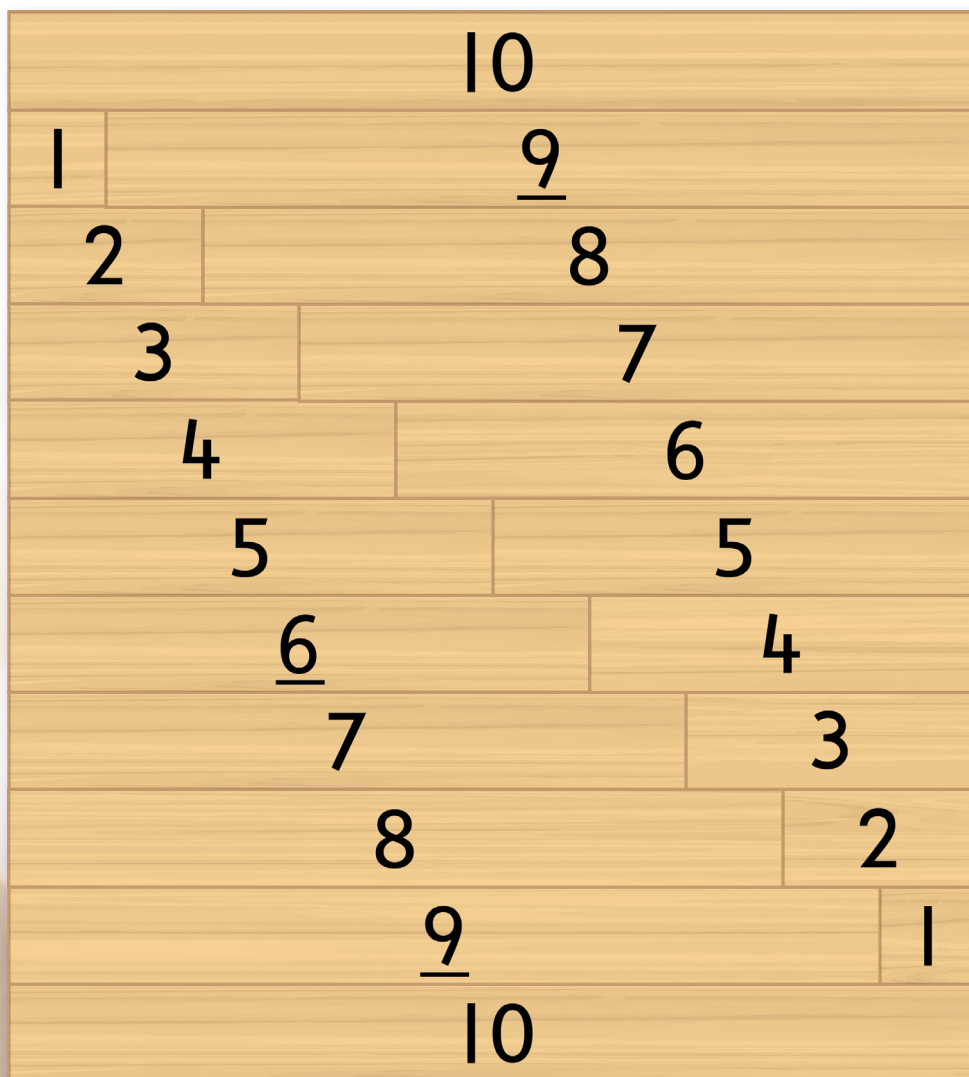
For more information refer to the Bond Blocks Counting to 10 & 20 Screening Test and Monitoring Skills Checksheets.



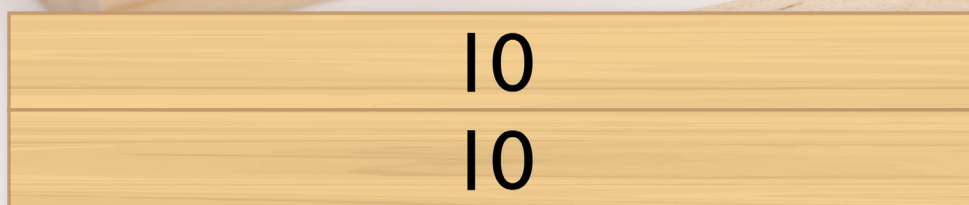
About the Blocks

A Set of Bond Blocks

A set of Bond Blocks contains:



Linear Bond Blocks



Linear Ten Blocks

(Join to make twenty)



More Linear Blocks

An extra 1, 2, 3, 4 and two 5 Blocks. Used for more complex three-part bonds when bridging ten.

Bond Block Features

Bond Blocks are a **representational manipulative** that have been designed to help students move **from counting to calculating** with numbers.

They are a representational manipulative because the quantity of the number is represented by:

1. The length of the block and
2. The written numeral on the block.

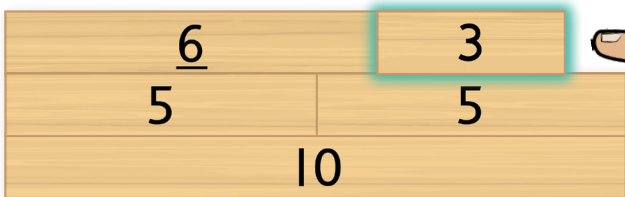
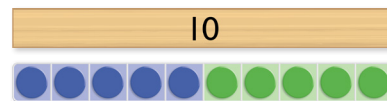
Other unique features:

- They are **not scored** with individual unit lines.
- The **length** of the block helps to develop the concept of a mental number line.
- The **natural wood** (sustainably sourced pine) reduces the distraction of coloured plastic and focuses attention on the **written numeral**.
- They can be used with other common manipulatives, such as 2 cm cubes because they match in size. They are a **ratio of one unit to 2 cm** making them easy to manipulate.
- **Self-checking.** Develop number sense and estimation using them.



Linear Ten Block

Similar to ten strip.



"I thought 3 would fit but it is one too short.

I'll get the 4 block and check."

Predictors of Maths Difficulties

Developing counting is an essential skill. However, counting by rote is not a predictor of maths learning disabilities (MLD) or low achievement (LA).

“Most school children quickly learn to count by rote, and this in and of itself is not a useful indicator of MLD or LA status.” (Geary, 2009, p. 3)

The counting sequence is one component of number line thinking. Number line thinking relates to the top two predictors of difficulty in mathematics for students from Pre-Foundations to Year 2.

Key predictors of difficulties in mathematics at this stage of development are:

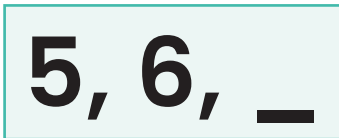
1. **Fluently** identifying which is the **greater** of two numbers. That is, without counting from one.

“Which is bigger*, meaning is worth the most things?”



Students at risk take a long time to answer, often counting from one. They lack a sense of how numbers relate to each other on a mental number line.

2. Being able to identify a missing number in each of these positions:



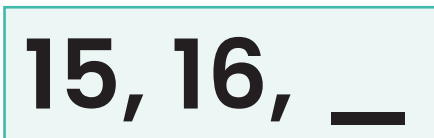
After



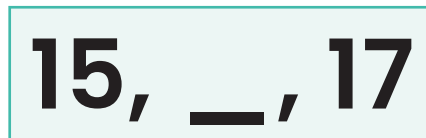
Between



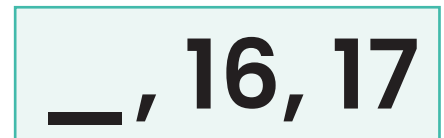
Before



After



Between



Before

3. Working Memory

4. Subitising

The strongest of these predictors are the first two, which relate to number line thinking.

By Year 2, knowledge of basic addition and subtraction facts and use of immature counting strategies such as counting by ones on fingers, become the strongest predictors of students at mathematical risk.

*The concept of which number is worth more or less is essential. Use language the students are familiar with. For more information, see the Teacher Note “Mathematical Language”.

Geary, D. C., Bailey, D. H., Littlefield, A., Wood, P., Hoard, M. K., Nugent, L. (2009). *First-grade predictors of mathematical learning disability – a latent class trajectory analysis. Cognitive Development, 24(4)*, 411–429.
<https://doi.org/10.1016/j.cogdev.2009.10.001>

Number Line Thinking

Bond Blocks are linear to help develop number line thinking and increase their understanding of the relationships between numbers. Bond Block counting activities require students to:

- Count forwards and backwards in sequence starting at one, ten or twenty.
- Count forwards and backwards in sequence starting at one, ten or twenty with missing numbers.
- Count forwards and backwards to twenty from any number. This is extended to identifying number before and after.

4, 5, _

Number After

14, 15, _

Number After

4, _, 6

Number Between

14, _, 16

Number Between

_, 5, 6

Number Before

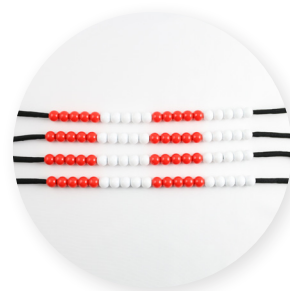
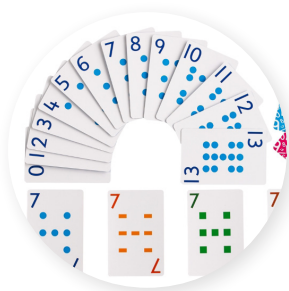
_, 15, 16

Number Before

Concrete Representational Abstract

Mathematical Manipulatives

A Mathematical Manipulative is something that can be picked up and moved (manipulated) to help teach.



While manipulatives may come in virtual as well as physical form, the authors believe young children need to physically handle manipulatives prior to having a virtual experience. This is even more the case when working with young children, which is one of the reasons why Bond Blocks are made of wood.

Manipulating the blocks helps students to develop concepts about number, length and shape.





Where Bond Blocks Fit

Bond Blocks are used within a Concrete-Representational-Abstract approach to teaching.

Bond Blocks are a **representational manipulative** designed to help students move from the concrete stage to the abstract. The goal is for students to stop using the blocks.

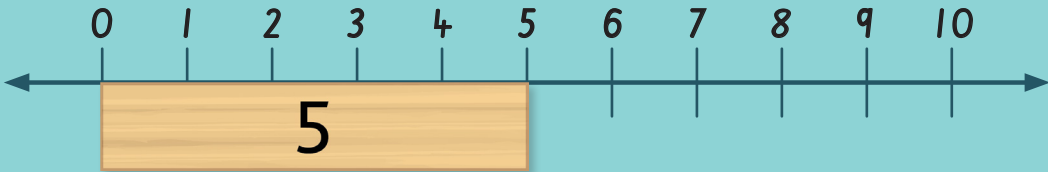
Concrete



"I need to count this."

"I can see five without counting."

Representational



Abstract

"five"

5

Concrete Prerequisite

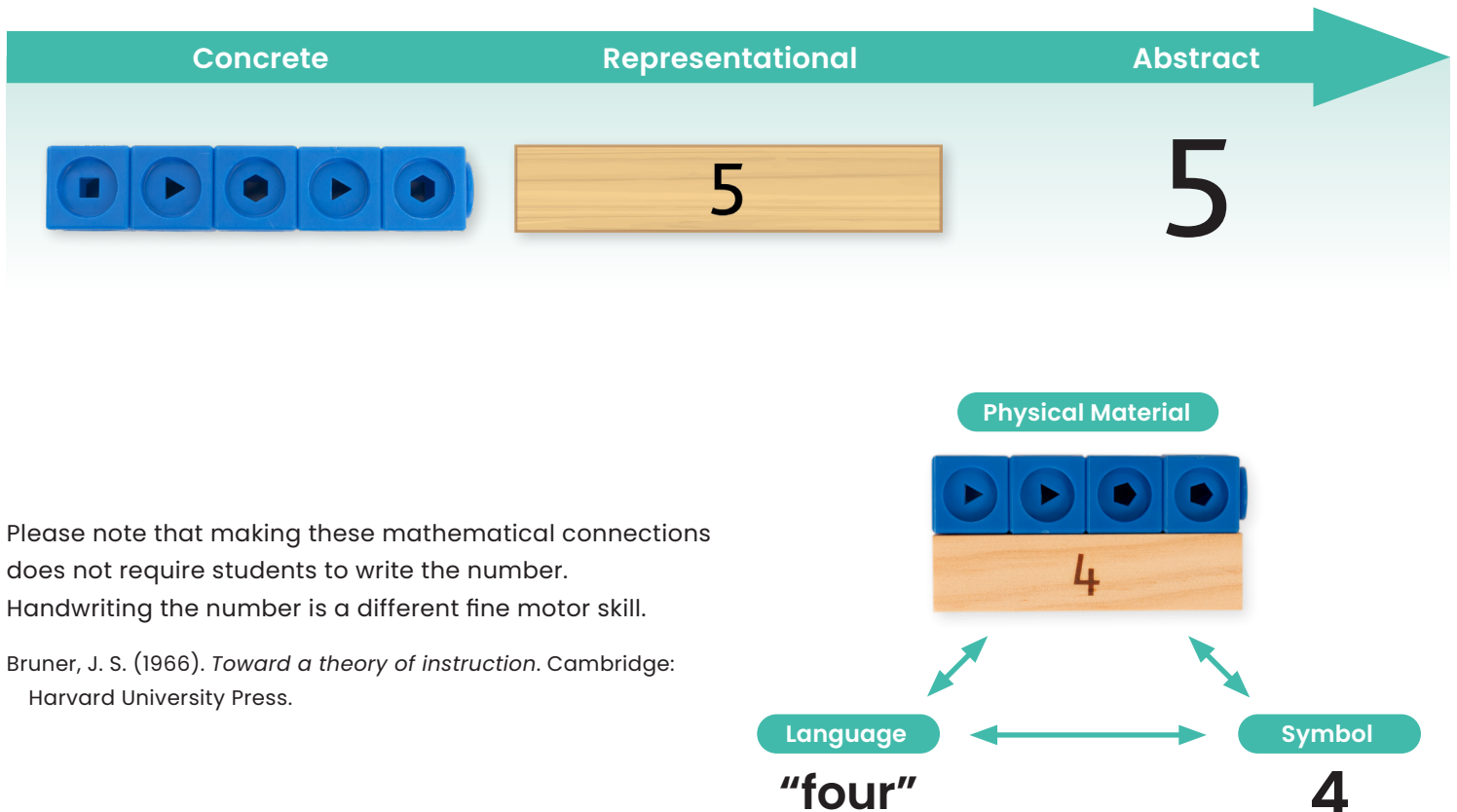
Before using **Bond Blocks** students need to be confident counting up to 10 single objects using the **first three counting principles**.

- 1 Stable Order**
Number names are said in the conventional order.
- 2 One-to-One Correspondence**
Each item is counted once, as the corresponding word is said.
- 3 Cardinal Value**
The last number said indicated the total for the group.

Gelman, R. & Gallistel, C. (1978) *The Child's Understanding of Number*.
Cambridge, MA. Harvard University Press.

Begin using Bond Blocks in conjunction with discrete objects that can be counted with one-to-one correspondence. Bond Blocks were designed to be the same size as standard 2 cm cubes for this reason. Using discrete materials such as 2 cm cubes in conjunction with Bond Blocks helps students move towards a length based concept of number.

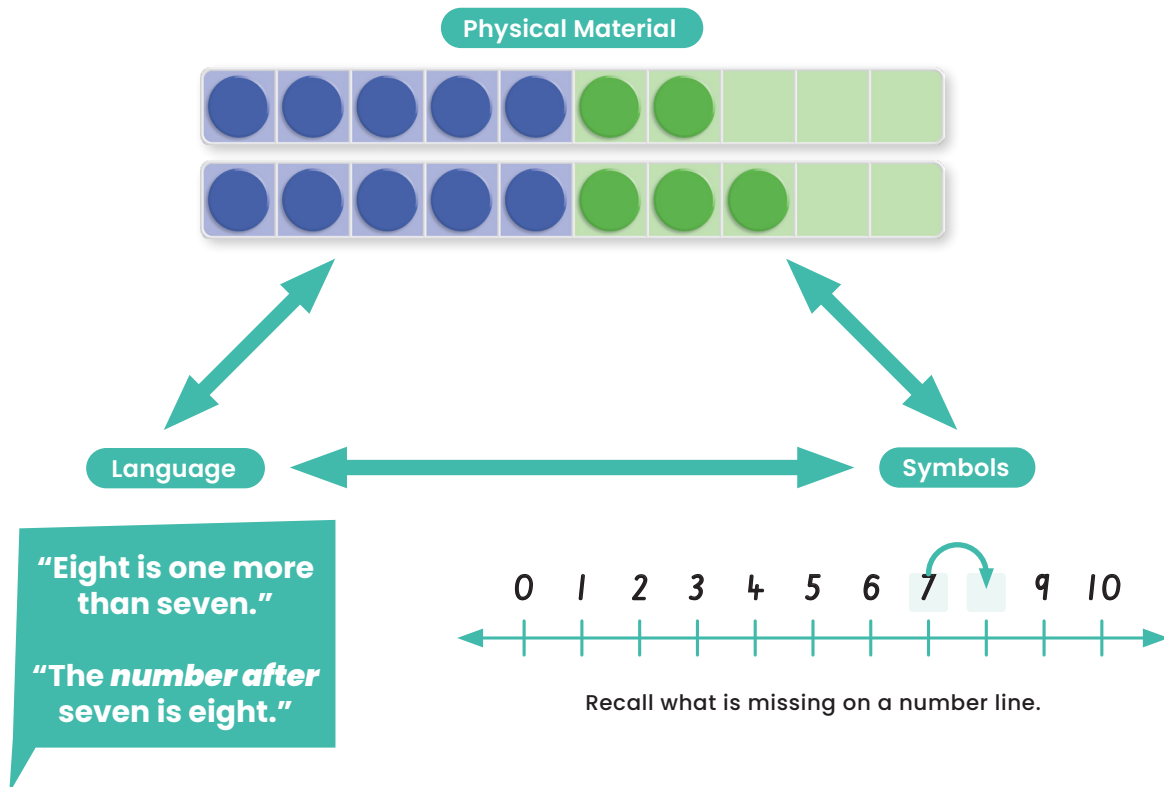
This follows Bruner's (1966) pedagogical principle of moving from Concrete to Representational to Abstract.



Structuring Concrete Materials

Using length based representations such as Bond Blocks, Ten Strips, Number Tracks and Number Lines helps students increase their understanding of the relationships between numbers. Once students can count from one to ten using the first three counting principles, organise countable manipulatives to develop number line thinking. To do this the manipulative should be organised so that students can identify how many **without having to count the collection from one**, but can instead look for relationships between quantities. For example, this ten strip is coloured in two fives so as quantities to ten can learn to be identified without counting from one.

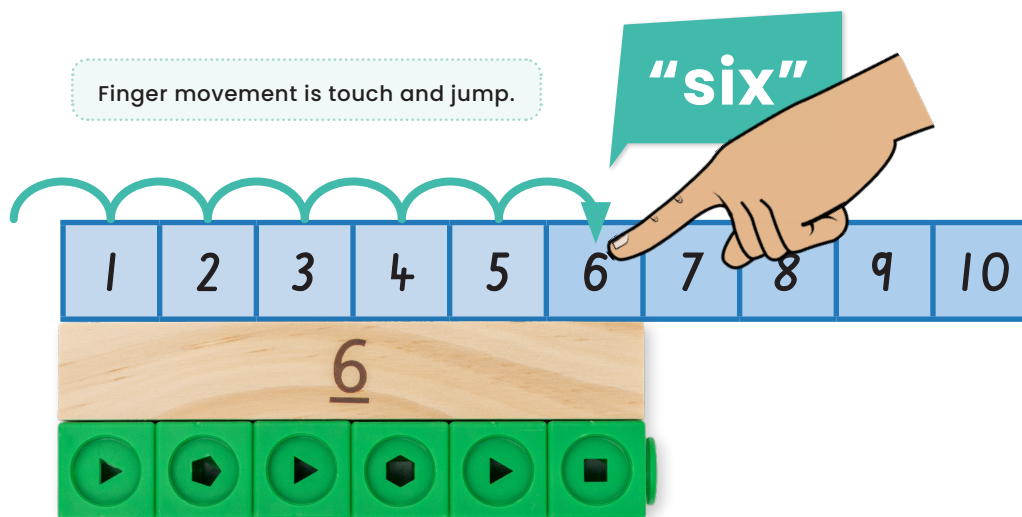
- 1, 2, and 3 **can be seen without counting** (perceptual subitising)
- 4 is **one fewer/less** than 5
- 5 is one colour filled. It looks like half.
- 6 is **one more** than 5
- 7 and 8 can be found by **counting on from 5**.
- 9 is **one fewer/less** than 10
- 10 is the frame filled.



Number Tracks and Number Lines

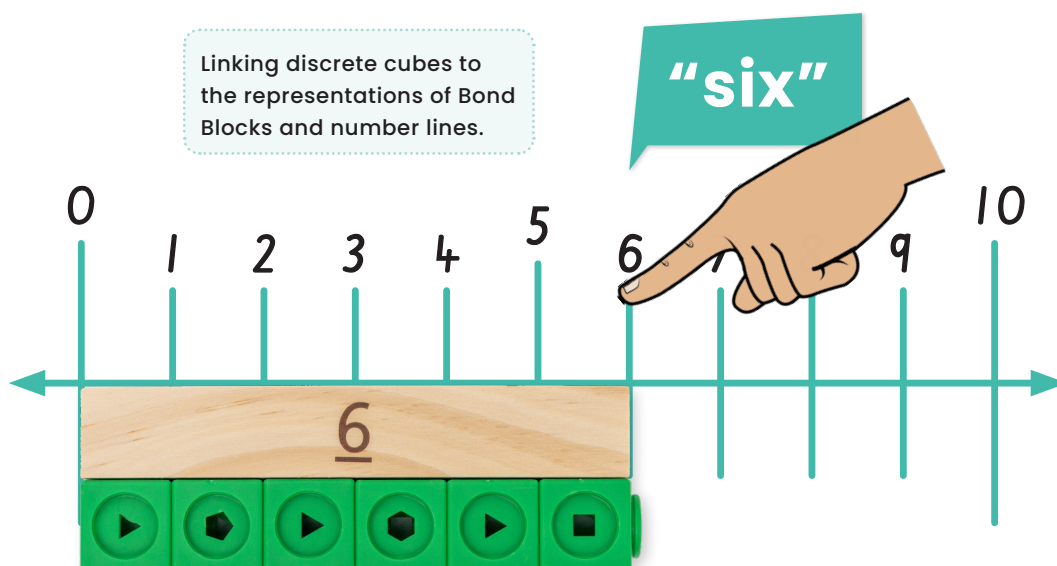
Number Track

One of the first representations of number, linked to the concrete material, is a number track. Each object is represented by one cell on the track. The number representing the set is written in the space inside the cell. When counting on a number track students say the number as they touch the number inside the cell. This is different from a number line.



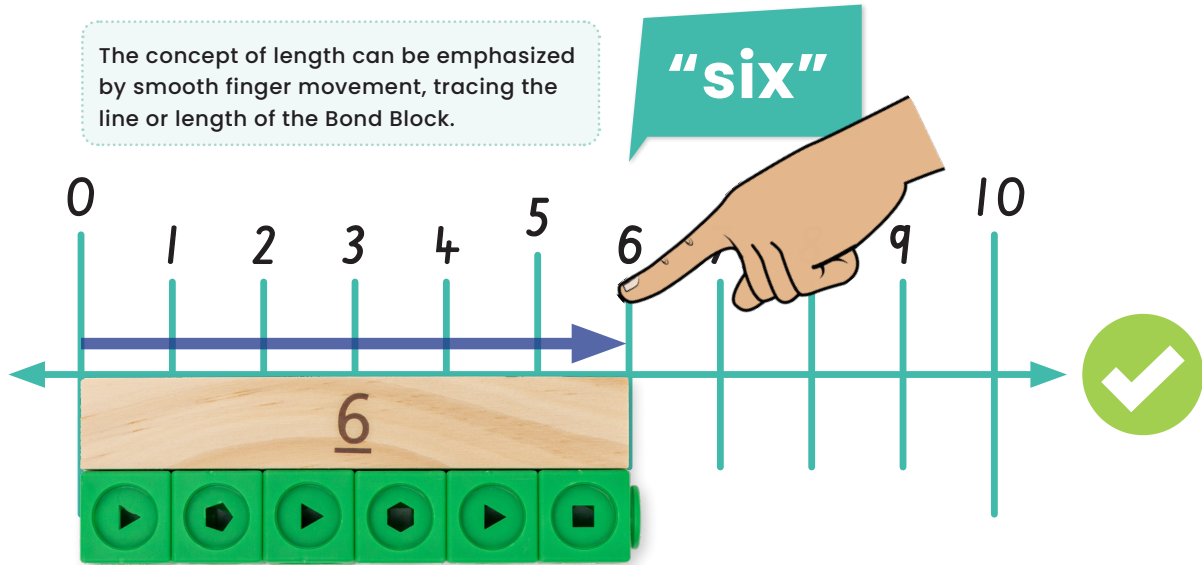
Number Lines

Next, discrete countable materials such as cubes and Bond Blocks are linked to number lines.

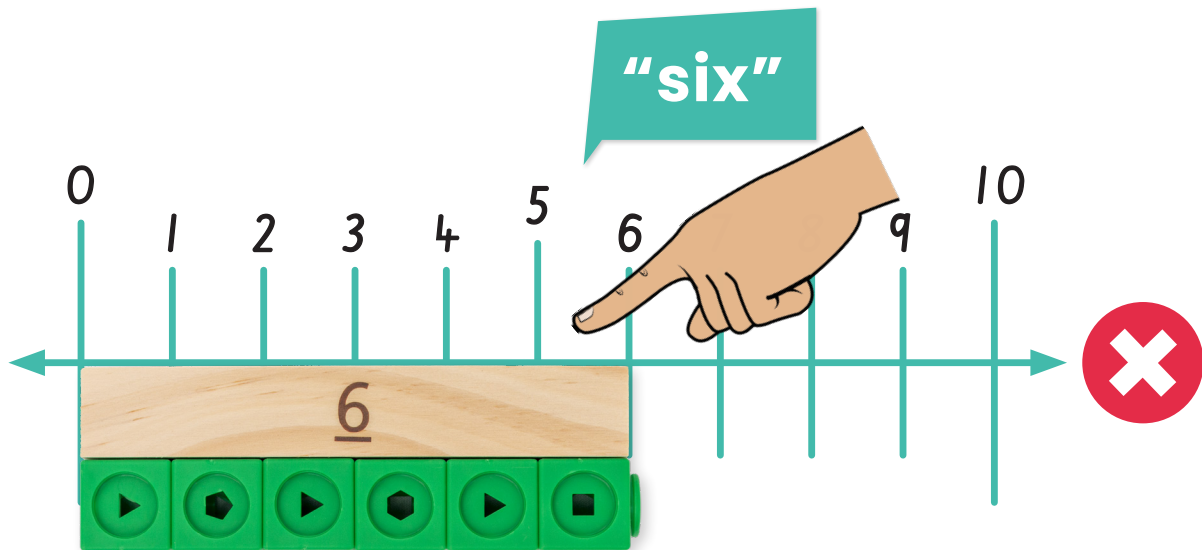


When using number lines, the number representing the set is written above or below **the vertical line** that marks the **end of the length of the Bond Block** (not in the space between the vertical marker lines as per a number track). For this reason the number line requires **zero** to be placed, marking the start of the block. Students say the number as they **touch the vertical marker indicating the end of the length of the Bond Block**.

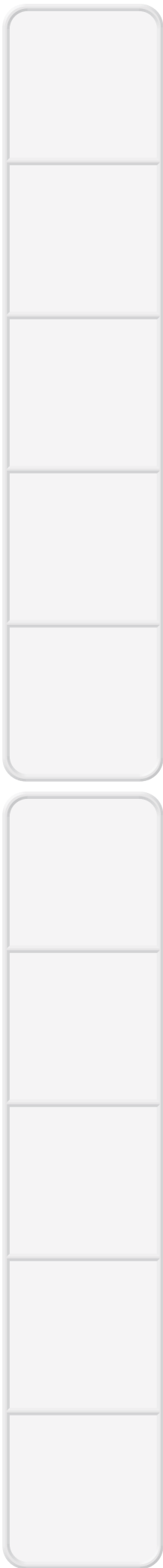
The concept of length can be emphasized by smooth finger movement, tracing the line or length of the Bond Block.



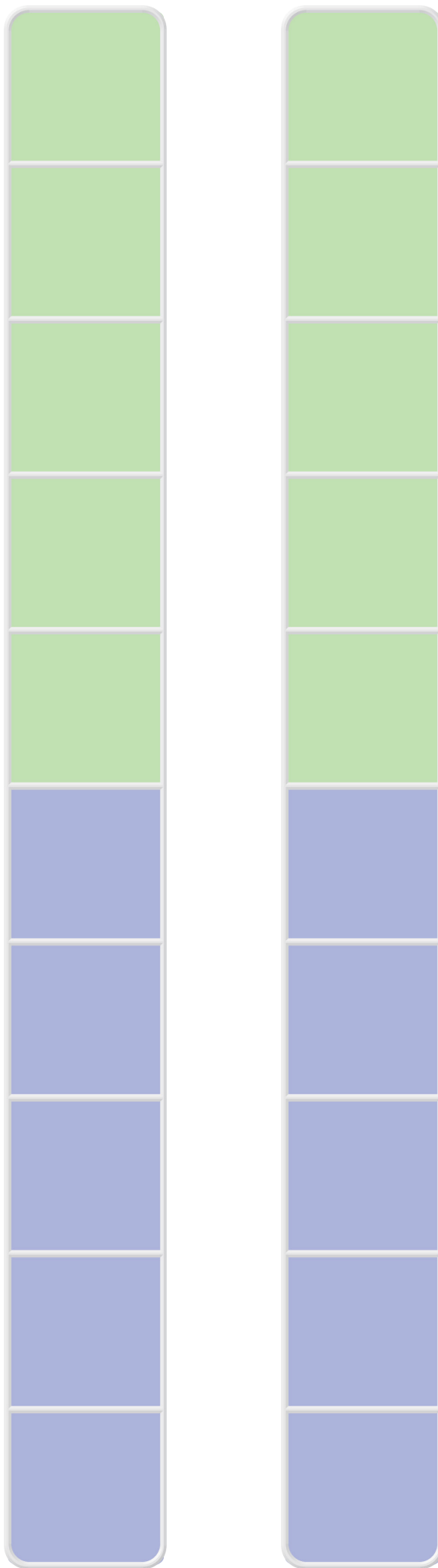
When locating whole numbers on a number line it is **incorrect** to point to the space between the whole numbers and say the whole number (as per a number track). For example, in this diagram the finger is pointing to a number between five and six, approximately five and one half.



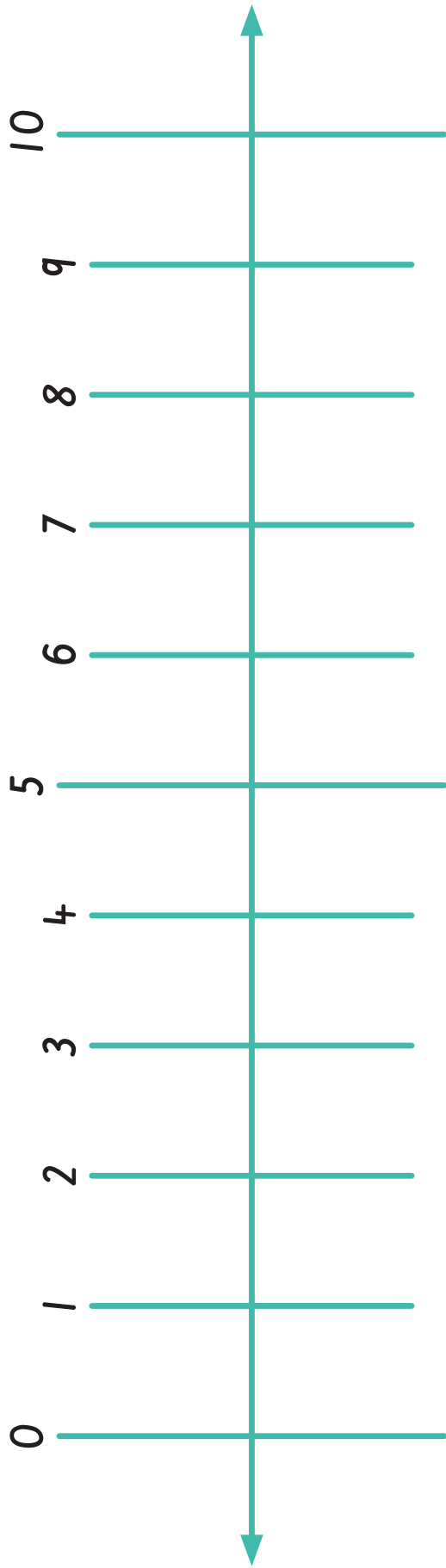
Five Frame



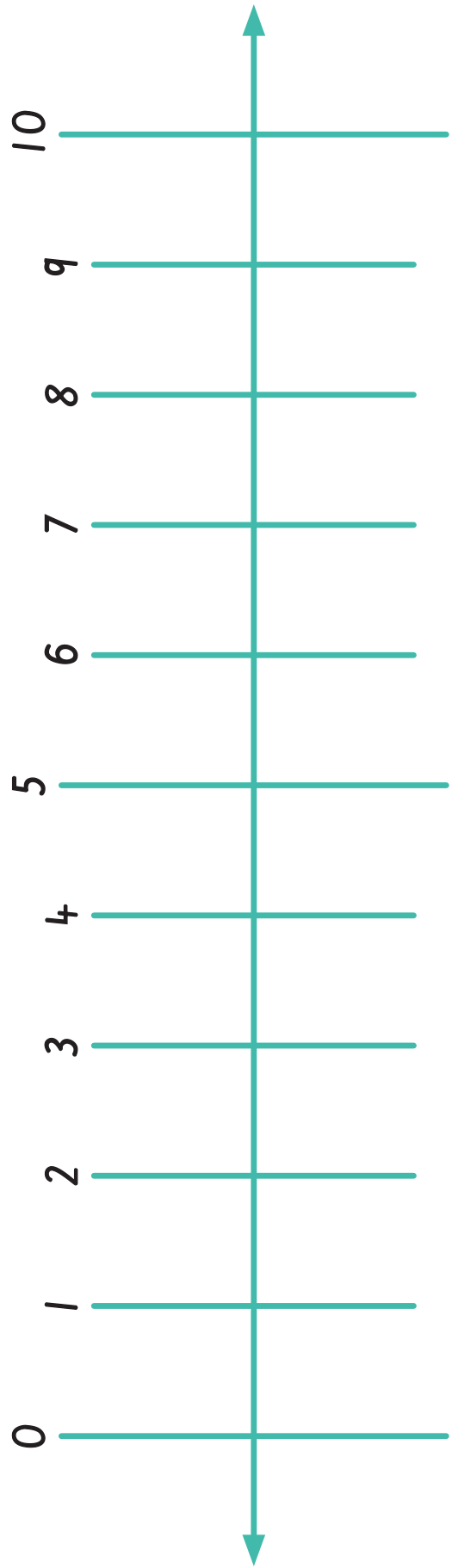
Tens Strip



Number Line



Number Line



Mathematical Language

Language Routines

The mathematical language that relates to each Teacher Led Counting Activity has been specified on each board. There are several phrases, listed in dot points, that can be used on each board. Start using one phrase for a week until the students are familiar with it. Then use a different phrase the following week.

In the first lesson of the week the teacher tells the class the mathematical phrase they are focusing on and writes this on the board. For example,

Teacher: "Today we are using the maths words, "one more". When we play the game, we need to think about saying "one more". The maths words we are using are..."

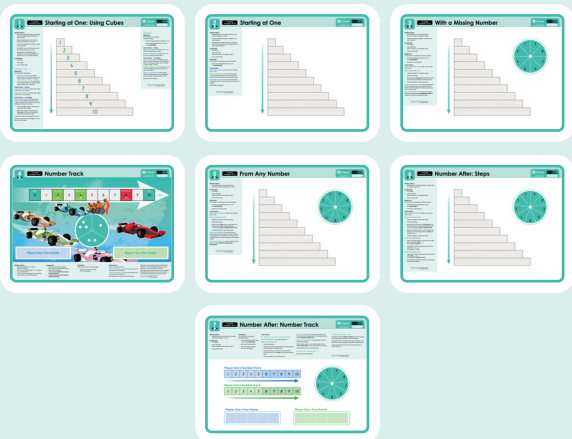


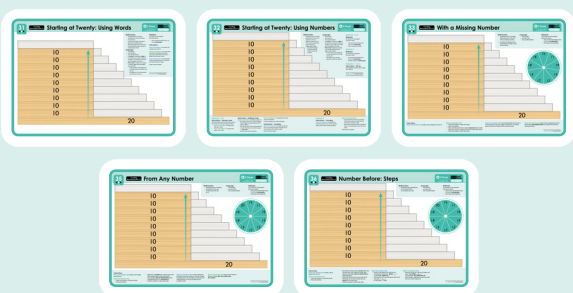
Students' choral response.

The specified mathematical language is sequentially built and cyclically reviewed throughout the Teacher Led Activities.

Number Comparison Language

Introducing Number Comparison Language

The initial language in each chapter relates to the step activities. Each phrase on the board relates to **one mathematical direction only**, either forwards or backwards.

Language Used	Activity
	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <h4 style="text-align: center;">Counting Forwards 1 to 10</h4>  <p style="text-align: center;">Activities 1, 2, 3, 4, 5, 6 and 7</p> </div> <div style="width: 48%;"> <h4 style="text-align: center;">Counting Forwards 10 to 20</h4>  <p style="text-align: center;">Activities 20, 21, 22, 23, 25, and 26</p> </div> </div>
<ul style="list-style-type: none"> One more One longer One number after One greater than 	
	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <h4 style="text-align: center;">Counting Backwards 10 to 1</h4>  <p style="text-align: center;">Activities 11, 12, 14, and 15</p> </div> <div style="width: 48%;"> <h4 style="text-align: center;">Counting Backwards 20 to 10</h4>  <p style="text-align: center;">Activities 31, 32, 33, 35 and 36</p> </div> </div>
<ul style="list-style-type: none"> One less One shorter One number before One less than 	

Applying Number Comparison Language

The language after these boards, towards the end of the chapter, lists terms related to one direction as the lesson focus. However, during these activities students have the opportunity to start to use language related to both directions, forwards and backwards. This helps students apply the initial language in the correct context.


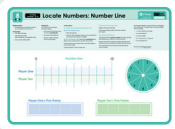
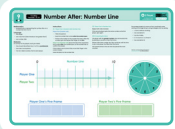

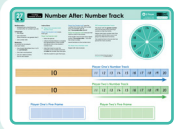
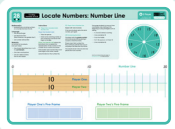
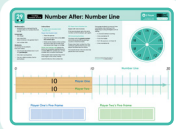

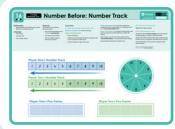
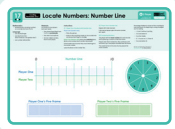
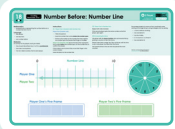

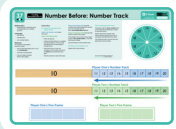
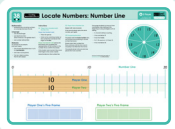
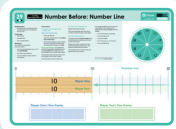

During these activities students are competing against each other to make the greatest/least number. Using these terms in context, from their own point of view, helps them make sense of the size of their number in comparison to another number and the related comparative maths language.

Teachers can build on the language students use. For example,

Student: "I won because my number is bigger."

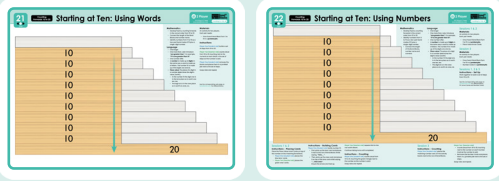
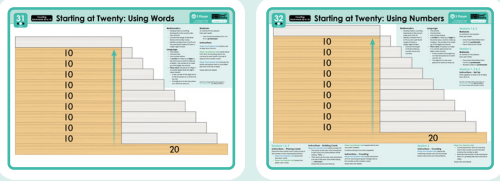
Teacher: "Yes, your number is greater. Today we are focusing on using the maths word 'greater'".

The final activity in each chapter is "Fluency Ordering". This activity specifies that students use language related to **both directions, forwards and backwards**.

Language Used	Activity	
One more/less One longer/shorter One number after/before One greater than/less than	<p style="text-align: center;">Counting Forwards 1 to 10</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Activities 7, 8, 9, 10</p>	<p style="text-align: center;">Counting Forwards 10 to 20</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Activities 27, 28, 29, 30</p>
	<p style="text-align: center;">Counting Backwards 10 to 1</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Activities 16, 17, 18, 19</p>	<p style="text-align: center;">Counting Backwards 20 to 10</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Activities 37, 38, 39, 40</p>

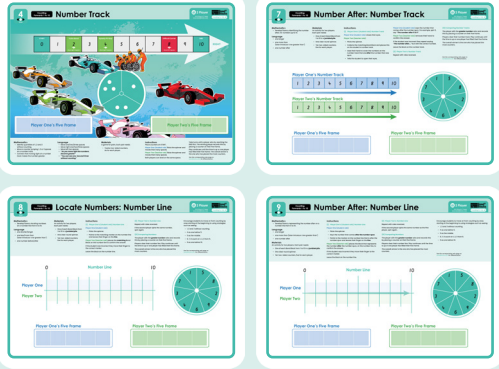
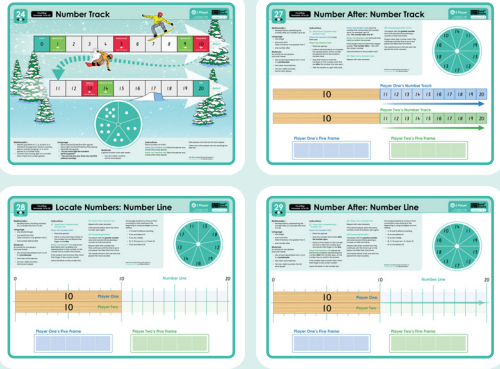
Place Value Language

As soon as numbers go to two-digits place value language is needed.

Language Used	Activity	
	Counting Forwards 10 to 20	Counting Backwards 20 to 10
Number	 <p>Activities 21 and 22</p>	 <p>Activities 31 and 32</p>
Digits		
Place value		
Tens place		
Ones place		
Worth		
Teen		

Number Track and Number Line Language







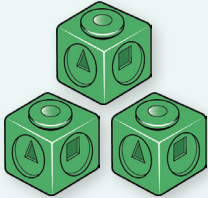
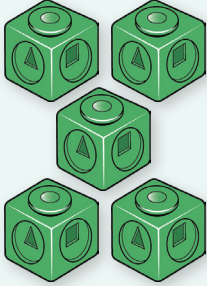
These boards also introduce language related to number tracks and number lines.

Language Used	Activity	
	Counting Forwards 1 to 10	Counting Forwards 10 to 20
Countable Items	 <p>Activities 4, 7, 8 and 9</p>	 <p>Activities 24, 27, 28 and 29</p>
More		
Directional		
Right		
Position		
first/last start/middle/end between		
Ordinal	<p>Counting Backwards 10 to 1</p>	<p>Counting Backwards 20 to 10</p>
first, second, third, fourth, fifth		
Countable Items		
Fewer		
Directional		
Left		
Position		
first/last start/middle/end between		
Ordinal	<p>Activities 13, 16, 17 and 18</p>	<p>Activities 34, 37, 38 and 39</p>
first, second, third, fourth, fifth		

Start with comparative language **familiar to the students** such as 'bigger' and 'smaller' then gradually introduce other related mathematical language. As students become familiar using one word for a concept introduce another related word, one at a time.

Here is an example of counting related comparison mathematical language:

Comparison Language Chart

smaller		size		bigger → larger
shorter		length		longer
less		measurement		more
fewer		countable objects		more
less than	3	numbers	5	greater than
before	_, 4, 5	order	3, 4, _	after

Developing the concept of which number is **worth more or less** is an essential component of number sense. For this reason, when comparing numbers, start with words the students understand such as 'bigger/smaller'. However, mathematically these words describe size. When appropriate, introduce the mathematically correct words of "**less than**" and "**greater than**".

Fewer vs Less

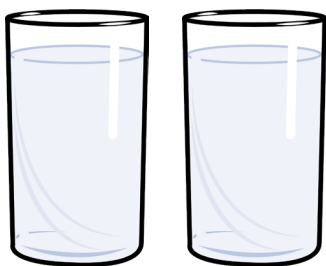
Definitions

“Fewer” is the correct term for discrete measure, that is items that can be counted with one-to-one correspondence. Use this term when referring to collections of cubes and counters.

“Less” is the correct term for continuous measure, that is things that are not counted with one-to-one correspondence but can be infinitely broken down into decimal units.

For example,

“I had fewer glasses of water, so drank less water”.



Fewer glasses. Less water.



More glasses. More water.

The glasses are discrete countable items whereas the liquid is a continuous type of measure.

Teaching Specific Vocabulary

In society the word **‘fewer’** is rarely used. The word **‘less’** is often used, albeit incorrect mathematically. For example, shopping centre express aisles are labelled “10 Items Or Less”. Mathematically this would be written “10 Items OR Fewer”. It is common for mathematical language to be used **colloquially**, and often incorrect mathematically, in society. For example, when two people are sharing food it is common to hear, “Can I have the big half?”. Mathematically if there is a ‘big half’ and a ‘small half’ then the pieces are not halves! Students need to be taught how language changes depending on context.

When teaching it is important not to get so worried about using the wrong term that you become hesitant to use mathematical language. The **concept of ‘more’ and ‘less’ is essential**, especially in the years around Year One considering the predictors of difficulty in mathematics.

Word Problem Language

However, it is important that teachers focus on using the word ‘fewer’, at specific times, so that students learn this term. Not only is ‘fewer’ used in standardised assessments it is essential to certain mathematics such as word problems.

From Year One on students solve addition and subtraction word problems. There are two types (structures) of addition and subtraction word problems (i) part-part-whole and (ii) comparison. Comparison word questions use the term **“fewer”**. For example,

“Jax scored 3 points. This was two fewer than his friend Chen. How many points did Chen score?”

Using the word ‘fewer’ in the context of counting collections builds a solid foundation for solving these types of problems. The Bond Blocks Core Kit, which follows Counting to 10 and 20 with Bond Blocks, systematically covers addition and subtraction in Years 1 to 3, including word problems and the associated language.

Correcting 'teen' and 'ty' Errors

The counting sequence from 10 to 20, often referred to as the 'teens', is notoriously difficult. This is primarily due to the English language.

The way we say numbers does not use place value related language consistently until the sixties. Consider these number names:

20	spoken as "twenty"	not "two-ty"
30	spoken as "thirty"	not "three-ty"
40	"forty" is said using the pattern of place value	but not spelt "fourty"
50	spoken as "fifty"	not "five-ty"

In addition to these inconsistencies the number names in counting sequence between 10 and 20 are not consistent.

11, 12	"eleven" and "twelve" do not follow the "teen" pattern
13, 15	spoken as "thirteen" and "fifteen", not "three-teen" and "five-teen" respectively
14, 16 - 19	spoken consistently as the ones-digit, then "teen"

The 'teens' are spoken by saying the ones-digit, then "teen". This does not match the order the digits are written and corresponding place value, whereas the two-digit numbers from 20 on do. For example, 68, which is 60 and 8 is spoken as "sixty-eight". However, 16, which is 10 and 6 is spoken in reverse as "sixteen" not "teen-six".

Many languages other than English do not have these inconsistencies. Understanding these inconsistencies can help teachers identify why typical errors are made and direct the focus of intervention.

Errors can be made in three different modes:

- speaking the number name,
- writing the numeral and
- identifying the numeral.

This Teacher Note will deal with each of these in turn.

Speaking Errors “ty” not “teen”

Sometime students say “ty”, instead of “teen”. For example, saying 13 as “thirty”, 14 as “forty”. This often happens when students are learning to count forwards. After this is corrected, the error often reappears when students count backwards from 20 because of the increased intrinsic cognitive load of the task.

Some students have difficulty hearing the differences in these sounds and saying the different sounds. To increase their awareness of this draw attention to:

- the written spelling of ‘ty’ and ‘teen’ and
- the correct placement of the tongue when making the ‘n’ sound, which is against the roof of the mouth, behind the teeth.

How to correct students saying ‘ty’ instead of ‘teen’ using Bond Blocks is modelled in video on the website under Counting to 10 and 20, Teacher Notes, Correcting “teen” and “ty” Errors.

Writing Errors

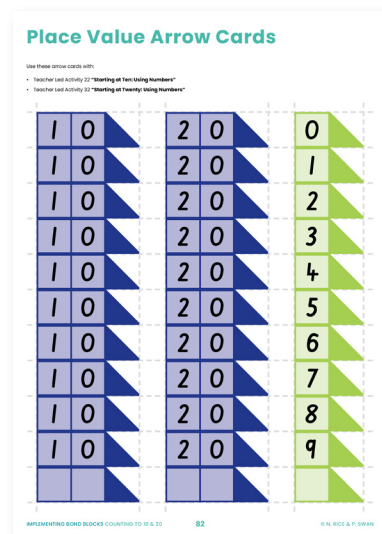
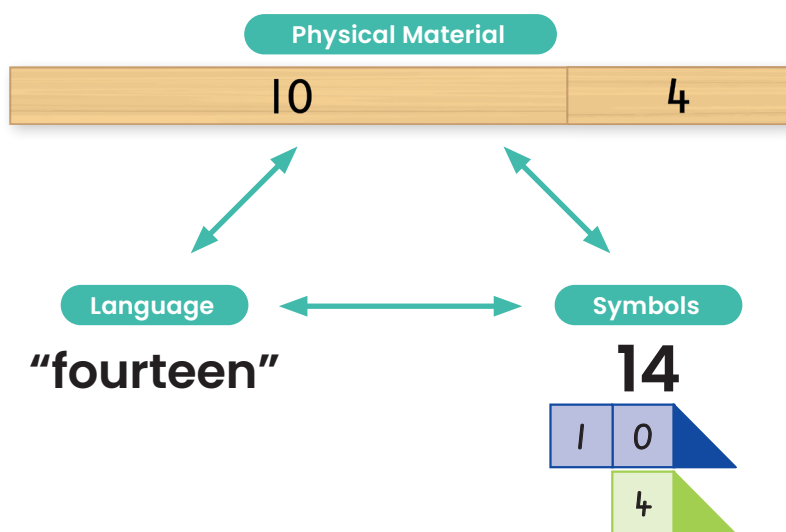
The order we say the parts of the teen number names, does not match the order the digits are written and corresponding place value. This causes errors when writing ‘teen numbers’. For example, writing “fourteen” as “41”. Students write the digits in the order they hear them. They are applying the same strategy of ‘sounding out’ they have been hard at work learning when reading and writing English. It is a very understandable error.

Connecting the Blocks and Words

For this reason Bond Blocks activities **first link** the **blocks with the spoken word**. Students need to be fluent with Teacher Led Activity “21 Starting at Ten: Using Words” before starting the Teacher Led Activity “22 Starting at Ten: Using Numbers”.

Connecting the Blocks, Words and Numerals

Once students are fluent connecting the block and spoken word, the written numerals are introduced using **place value arrow cards**.



It is important that students make the written numeral first using the place value arrow cards, before using the number cards.

Place Value Arrow Cards

Use these arrow cards with:

- Teacher Led Activity 22 "Starting at Ten: Using Numbers"
- Teacher Led Activity 32 "Starting at Twenty: Using Numbers"

IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20 82 © N. RICE & P. SWAN

➔

Number Cards

10	20
11	21
12	22
13	23
14	24
15	25
16	26
17	27
18	28
19	29
20	30

Use these number cards with:

- Teacher Led Activity 22 "Starting at Ten: Using Numbers"
- Teacher Led Activity 32 "Starting at Twenty: Using Numbers"

© N. RICE & P. SWAN 83 IMPLEMENTING BOND BLOCKS COUNTING TO 10 & 20

Place Value Arrow Cards

Number Cards

Use "Place Value Arrow Cards" and "Number Cards" with each of these activity boards.

22 Counting **Forwards 10 to 20**

2 Player **Counting to 10 & 20**

Mathematics

- Develop fluency counting backwards in the context of ten from 10 to 20.
- Identify numbers from 11 to 20 in a ten-rod partitioned model of 10 plus 1 to single-digit numbers.
- Connect the length of the bond blocks, number name and numeral.

Language

- One longer
- One more than. Later introduce 'one greater than' for electronic 'one greater than 10'.
- A number is made up of eight/six in response to a word in language of letters. The number 10 is made up of eight/six one and six.

Place value: The place of a digit in a number is its value.

Place value: The place of a digit in a number is its value.

Sessions 1 & 2

Materials

- One each Bond Block from 10 to 20 in a partitioned pile.
- Place Value Arrow Cards.

Session 3

Materials

- One each Bond Block from one ten, ten.
- 10 to 20 in a partitioned pile.
- Number Cards in a partitioned pile.

Sessions 1, 2 & 3

Instructions - Set Up

Work together to build a set of steps from 10 to 20.

See the corresponding web page on the next page for the instructions.

Sessions 1 & 2

Instructions - Placing Cards

Place the Bond Value Arrow Cards on top of the number on the matching Bond Block.

- Player One (Teacher role) places the blue ten cards.
- Player Two (Teacher role) places the green one cards.

Instructions - Building Cards

Player One (Teacher role) builds number 10.

- Find, pick up the ten card and place it next to the ten of Bond Blocks while saying "Ten".
- Then, pick up the one card and place it on top of the ten card while saying "Eleven".
- Repeat the process one card at a time.

Instructions - Counting

Player One (Teacher role) counts aloud from 10 to 20, touching the green ten card next to the number on the number in a set.

Swap roles and repeat.

Counting forwards 10 to 20.

32 Counting **Backwards 20 to 10**

2 Player **Counting to 10 & 20**

Mathematics

- Develop fluency counting backwards in the context of ten from 20 to 10.
- Identify numbers from 11 to 20 in a ten-rod partitioned model of 10 plus 1 to single-digit numbers.
- Connect the length of the bond blocks, number name and numeral.

Language

- One shorter
- One less than.
- One number before.
- A number is made up of eight/six in response to a word in language of letters. The number 10 is made up of eight/six one and six.
- Place value: The place of a digit in a number is its value.

Place value: The place of a digit in a number is its value.

Sessions 1 & 2

Materials

- One each Bond Block from 10 to 20 in a partitioned pile.
- Place Value Arrow Cards.
- Number Cards in a partitioned pile.

Session 3

Materials

- One each Bond Block from one ten, ten.
- 10 to 20 in a partitioned pile.
- Number Cards in a partitioned pile.

Sessions 1, 2 & 3

Instructions - Set Up

Work together to build a set of steps from 20 to 10.

See the corresponding web page on the next page for the instructions.

Sessions 1 & 2

Instructions - Placing Cards

Place the Bond Value Arrow Cards on top of the number on the matching Bond Block.

- Player One (Teacher role) places the blue ten cards.
- Player Two (Teacher role) places the green one cards.

Instructions - Building Cards

Player One (Teacher role) builds number 20.

- Find, pick up the ten card and place it next to the ten of Bond Blocks while saying "Ten".
- Then, pick up the one card and place it on top of the ten card while saying "Twenty".
- Repeat the process one card at a time.

Instructions - Counting

Player One (Teacher role) counts aloud from 20 to 10, touching the green ten card next to the number on the number in a set.

Swap roles and repeat.

Counting backwards 20 to 10.

Using the place value arrow cards helps students connect the physical blocks of 10 and one other block, with the value of each written digit. This is especially important in the teens where the spoken word contradicts the written order.

Handwriting the numbers is a different skill that can be focused on in a separate activity. The emphasis of this activity is to connect the physical material, spoken word and written numeral. Students with learning difficulties often have difficulties focusing on the **mathematics and fine motor skill at the same time**.

If difficulties persist writing the teen numerals after tier one teaching there is more information about how to correct this error using Bond Blocks on the website under Counting to 10 and 20, Teacher Notes, Correcting "teen" and "ty" Errors.

Please note that once students have engaged with two-digit numbers up to 100, they will often self-correct writing errors in the teens saying things like,

"Oops, I wrote 41, I meant 14".

Identifying Errors

Finally, students who make these errors need to be assessed to check whether they can correctly identify two-digit numbers that are written using the same digits, but in a different order.

First, assess identifying "teen" numbers. Write two numbers such as 41 and 14. Say to the student

"Point to fourteen".

Second, assess identifying "ty" numbers. Write two different numbers such as 61 and 16. Say to the student

"Point to sixty one".

To correct this:

- Write these numerals on separate post-it notes and place them in random order.

13, 14, 15, 16, 17, 18, 19

31, 41, 51, 61, 71, 81, 91

- Instruct the student to:

Sort them into two groups. Label one group "teen" and one group "ty".

Order each group from smallest to largest (least to greatest).

Circle these numbers on a 1 to 100 Number Board.

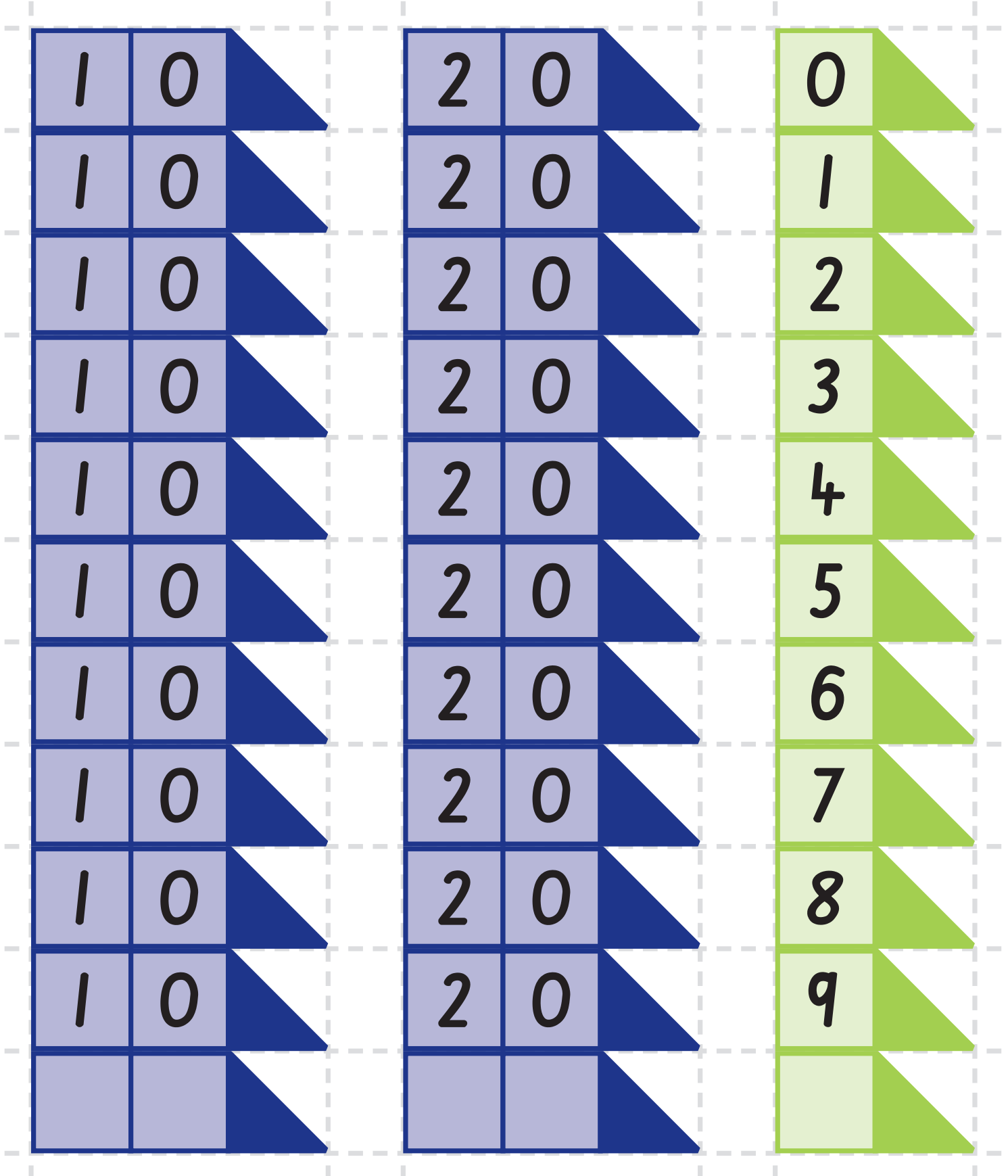
Say each "teen" number in order from least to greatest, pointing to them on the Number Board as they say the number name.

Say each "ty" number in order from least to greatest, pointing to them on the Number Board as they say the number name.

Place Value Arrow Cards

Use these arrow cards with:

- Teacher Led Activity 22 “Starting at Ten: Using Numbers”
- Teacher Led Activity 32 “Starting at Twenty: Using Numbers”



Number Cards

10	20
11	21
12	22
13	23
14	24
15	25
16	26
17	27
18	28
19	29
20	30

- Cut these number cards out and place them next to the matching Bond Blocks.
- Arrange Bond Blocks with the 10 blocks on the left according to place value.

Use these number cards with:

- Teacher Led Activity 22 **“Starting at Ten: Using Numbers”**

22 Starting at Ten: Using Numbers

Mathematics
Counting: counting forwards to 20

Language
Use number words to represent numbers up to 20.

Sessions 1 & 2
Materials
One ten-block Bond Block
Ten 10-pennies
Place value cards
Number cards 1-20

Session 3
Materials
One ten-block Bond Block
Ten 10-pennies
Number cards 1-20

Sessions 1, 2 & 3
Instructions - Set Up
Place the ten-block Bond Block on the table. Place the ten 10-pennies on top of it. Place the number cards 1-20 on the table next to the ten-block Bond Block.

- Teacher Led Activity 32 **“Starting at Twenty: Using Numbers”**

32 Starting at Twenty: Using Numbers

Mathematics
Counting: counting forwards to 30

Language
Use number words to represent numbers up to 30.

Sessions 1 & 2
Materials
One ten-block Bond Block
Ten 10-pennies
Place value cards
Number cards 1-20

Session 3
Materials
One ten-block Bond Block
Ten 10-pennies
Number cards 1-20

Sessions 1, 2 & 3
Instructions - Set Up
Place the ten-block Bond Block on the table. Place the ten 10-pennies on top of it. Place the number cards 1-20 on the table next to the ten-block Bond Block.

The Evidence Base of Bond Blocks Counting to 10 & 20

Defining 'Evidence-Based'

"Is Bond Blocks evidenced-based?" This is a great question and one we are often asked. However, it is also a term that is often misunderstood. We describe Bond Blocks as being "research-informed" and "using evidence-informed practice". We do this because strictly speaking, "evidence-based" is a research term that requires rigorous controlled trials. This is common in the medical field.

To answer the question "Is this evidence-based?" in an educational setting we refer to Professor Geoff Masters the CEO of the Australian Council for Educational Research (2018).

Evidence-based teaching involves the use of evidence to: (1) establish where students are in their learning; (2) decide on appropriate teaching strategies and interventions; and (3) monitor student progress and evaluate teaching effectiveness. (p. 4)

We recommend reading the entire article.

https://research.acer.edu.au/cgi/viewcontent.cgi?article=1335&context=research_conference

The salient points are that the medical profession, despite having access to controlled research studies, also relies on other tests and evidence, including observations. Doctors try a course of treatment, monitor progress and alter the treatment according to observations. Masters explains that this comprehensive understanding of what an "evidenced based" approach actually is, should also be applied to education.

"Policies and discussions of 'evidence-based teaching' sometimes overlook the importance of this broader, more integrated understanding of the role of evidence in teaching and learning." (p. 4)

Collecting Evidence

Bond Blocks has several tools built in to do what Masters (2018) defines as evidence-based teaching. That is, collect data as evidence to:

- Establish where student are in their learning,
- Monitor student progress,
- Evaluate teaching effectiveness.

All Bond Block resources include assessment and monitoring resources to evaluate the effectiveness of teaching and learning.

For more information refer to the Bond Blocks Counting to 10 & 20 Screening Test and Monitoring Skills Checklists.



Evidence-Informed Mathematics Teaching

Masters (2018) highlights that general, non-subject specific, evidence-based strategies “must be interpreted and implemented in the contexts of the subjects teachers teach... Teachers require evidence about the best ways to implement effective teaching strategies and interventions in subject-specific contexts” (p.5).

The following section outlines evidence informed principles that are embedded in both the “Bond Blocks Counting to 10 & 20” Kit and the “Bond Blocks Core Kit”.

Mathematics Specific Evidence-Informed Teaching Strategies

Bond Blocks incorporates the following key principles that have been identified by Sullivan (2011), and Anthony and Walshaw (2009), as effective for the teaching of **mathematics**.

Articulating Learning Goals*	The learning goals of every activity are provided.
Making Mathematical Connections	Connections are made between the concrete, representational and abstract elements of learning basic addition and subtraction facts through to pre-algebra and word questions.
Differentiated Teaching*	Activities are differentiated ‘a little harder’ and ‘a little easier’ alternatives.
Structuring Lessons*	The Bond Blocks session fits into standard lesson structures.
Promote Fluency and Transfer	The goal of the system is to do away with the Bond Blocks in favour of automatic recall. Activities are structured to move from using the blocks, to diagrams, to finally using numbers only.
Mathematical Language	Mathematical language is specified in the teacher notes for every activity and is modelled in the teaching videos.
Assessment for Learning	Tools include a placement test that is used to ascertain prior knowledge and monitor progress and a variety of recording sheets to document observational notes.
Improving Teacher Knowledge	Clear succinct teacher notes are provided for every activity and concept along with Professional Learning opportunities.








*Key principles that are also identified as general High Impact Teaching Strategies (Victoria Department of Education, 2020).

Bond Blocks incorporates these general High Impact Teaching Strategies:

Explicit Teaching	Explicit teaching is modelled in the videos that are provided for every activity.
Multiple Exposures	Bond Blocks activities are organised in cyclical chapters so that students return to the same concept, spaced over the teaching period.

Sequentially Built, Cyclically Reviewed

Bond Block activities are sequenced based on prerequisite knowledge to ensure students have the required prior knowledge to build new understandings. This reduces the risk students will rely on **counting from one to compare numbers** which is a major indicator that students will be at risk in mathematics. The activities are cyclically reviewed every chapter.

Mathematical Focus of each Counting to 10 & 20 Activity									
Activity Chapter	Counting in order using • Cubes • Words • Numbers	Counting With a Missing Number	Number Track	Counting From Any Number	Number After/Before: Number Line	Number After/Before: Number Track	Locate Numbers: Number Line	Number After/Before: Number Line	Fluency Ordering
'A little easier'  Counting Forwards 1 to 5	1  2 	3 	4 				8 		10 
1) Counting Forwards 1 to 10	1, 2	3	4	5	6	7	8	9	10
2) Counting Backwards 10 to 1	11	12	13	14	15	16	17	18	19
3) Counting Forwards 10 to 20	20, 21, 22	23	24	25	26	27	28	29	30
4) Counting Backwards 20 to 10	31, 32	33	34	35	36	37	38	39	40

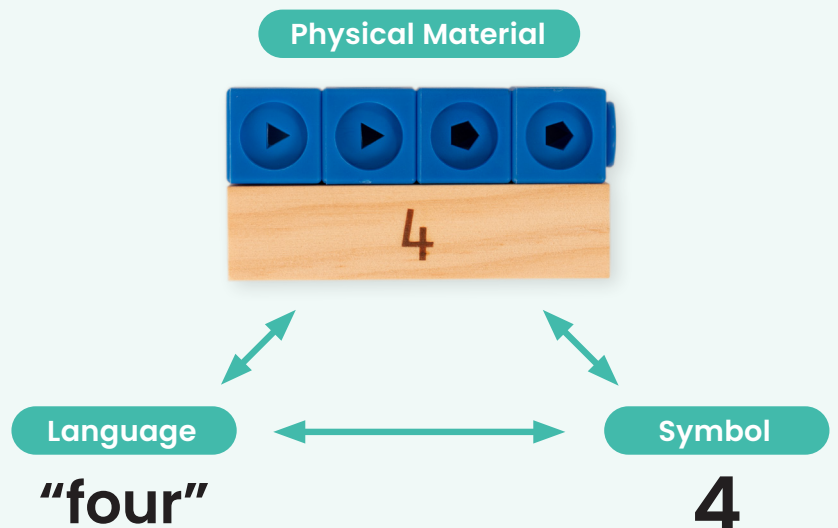
Numbers represent Teacher Led Activity boards.

Mathematical Language and Connections

Mathematical understanding is strengthened when connections are made between the physical materials, mathematical language and symbols (written numerals).

Counting to 10 & 20 Kit

For this reason students **say** the number name as they **touch** next to the written numeral on the block.



Concrete-Representational-Abstract

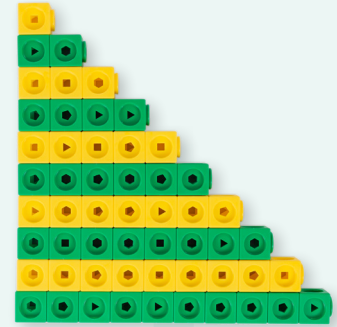
The Bond Block system is built using the **Concrete-Representational-Abstract approach**. This stems from the work of Bruner (1966). Bond Blocks are a **representational manipulative** that bridge the gap from concretely counting by ones to abstractly working with numbers and symbols.

Counting to 10 & 20 Kit

Concrete

Counting using Discrete Measure

Students begin counting discrete manipulatives with one-to-one correspondence. Many students don't progress from counting (for example, fingers or collections of objects) to compare numbers.



Representational

Developing Number Line Thinking and Magnitude Comparison using Continuous Measure

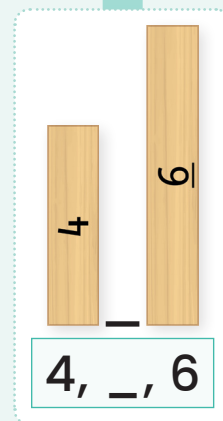
Bond Blocks Counting to 10 and 20 has been designed to help students:

- compare the **size of numbers**, relative to each other, using **number line thinking** (as opposed to counting by one from one).
- **count forwards and backwards from any number**, including identifying missing numbers.

Bond Blocks can help students develop these concepts because:

- they are **length based**, like the number line, which is continuous measure. They are not scored with discrete countable unit lines.
- they have the **numeral written** on them that the length represents. This helps students make connections between the abstract numeral, physical length and spoken number name.

"I can see 7 is greater than 4, because it is longer and closer to 10."



Abstract

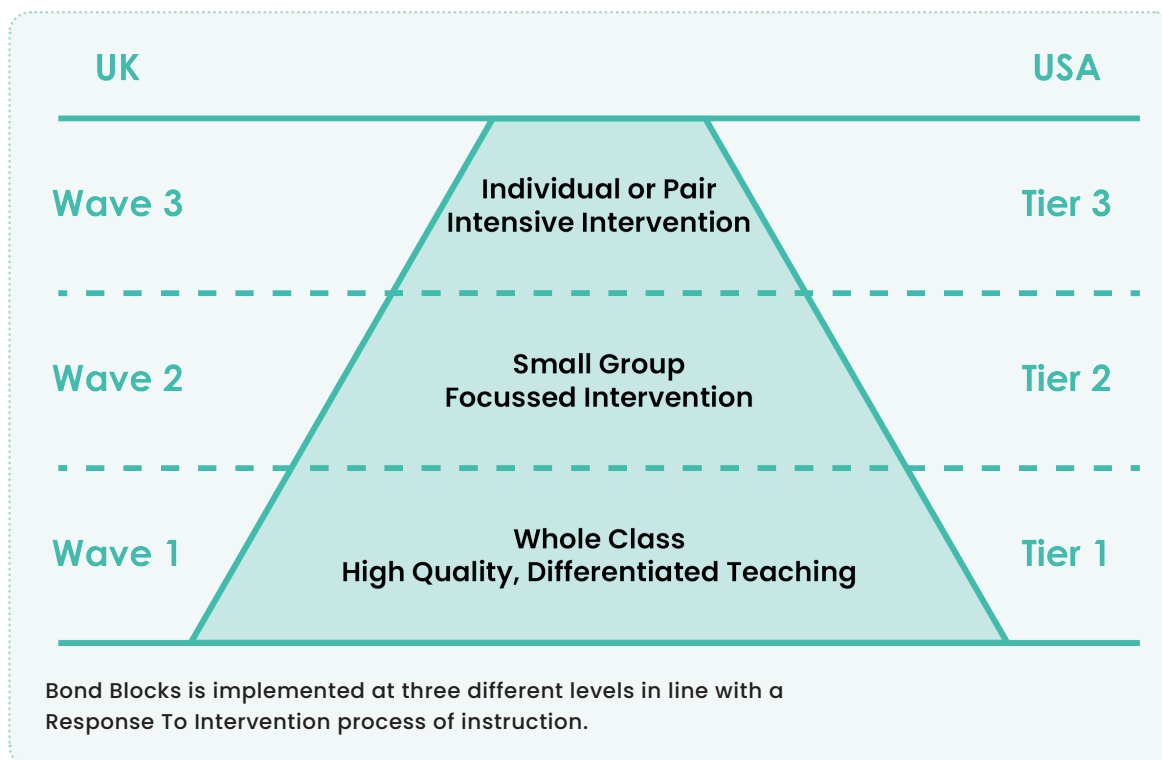
Developing Number Line Thinking and Magnitude Comparison using Numbers

Students can count on and back from any number and can abstractly compare numbers to identify which is greater or less.

Evidence-Informed Intervention

Implementing Bond Blocks using Response to Intervention

The Bond Blocks System has been designed to be implemented at a whole school level. Implementation occurs at three different levels in line with a Response To Intervention process of instruction.



Firstly, Bond Blocks Counting to 10 & 20 is implemented at a **tier one whole class** level as part of a whole school approach to teaching counting in **Pre-Foundation** and **Foundation**.

Secondly, Bond Blocks Counting to 10 & 20 is implemented at **tier two and three** as an **intervention program** for students who have specific difficulties counting.

Using Bond Blocks in these early years as a high-quality, differentiated teaching resource will reduce the numbers of students who require intervention.

The GRATTAN Institute

For more information about implementing Bond Blocks refer to the implementation guides. The GRATTAN Institute's report (2023) "**Tackling under-achievement: Why Australia should embed high-quality small-group tuition in schools**" strongly endorses using tier two intervention in **small groups of four** students, as is recommended in the Bond Blocks implementation guide, as a cost effective way to help reduce the gap between advantaged and disadvantaged students. The report also recommends intervening as early as possible, before the gap increases. Bond Blocks targets the skills that are predictors of difficulty in maths from the first years of schooling, identified by research, and provides a high-quality differentiated resource to help close the gap.

Learning Difficulties Information Guide Numeracy

Using a **Response to Intervention** approach is endorsed by the State of Victoria Department of Education and Training (2019) "Learning Difficulties Information Guide Numeracy". You can download this guide free from their site. One of our favourite quotes from this guide is, "**There is no 'one size fits all' approach to supporting students with learning difficulties in numeracy**" (p. 14). Instead Intervention needs to be differentiated based on the needs of the learner. For this reason every Bond Block activity has differentiation options. This quote is also in line with Masters (2018) definition of evidenced-based teaching. The effectiveness of the intervention needs to be constantly evaluated for every student. This is why the Bond Block recording sheets for monitoring progress at a tier two and three level have significant space for recording anecdotes.

Response to Intervention Recommendations

Implementation of Bond Blocks for tier two and three intervention enacts the top four recommendations of the Institute of Education Sciences for RTI in Maths (Gersten et. al., 2009, p. 5).

Recommendation	Level of Evidence	Bond Blocks
<p>Instruction during the intervention should be explicit and systematic.</p> <p>This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.</p>	Strong	<ul style="list-style-type: none"> • Explicit, video modelled teaching of every activity. • Systematically sequenced activities based on required prior knowledge and curriculum standards. • Verbalisation of mathematical process and content specified for every activity. • Mathematics is cyclically reviewed every chapter of activities. • Guided practice using gradual release model.
<p>Interventions should include instruction on solving word problems that is based on common underlying structures.</p>	Strong	<ul style="list-style-type: none"> • Word problem instruction uses underlying additive structures of part-part-whole and comparison problems, solved using Polya and the bar model. In depth teacher notes provided for professional learning.
<p>Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas</p>	Moderate	<ul style="list-style-type: none"> • Bond Blocks are a representational manipulative that is proportional. In each chapter students move from using the using physical Bond Blocks, to drawings of Bond Blocks, then to non-proportional part-part-whole diagrams.
<p>Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.</p>	Moderate	<ul style="list-style-type: none"> • Bond Blocks intervention specifies a minimum of four, ten minute sessions per week.

Research Informed

Each Bond Block resource has been designed to target the major predictors of maths difficulties, identified by research, with evidence-based teaching strategies. Therefore, Bond Blocks doesn't cover every area of the curriculum but focuses on:

- initial counting (Pre-Foundation and Foundation) using the "Bond Blocks Counting to 10 & 20" Kit and
- addition and subtraction (Year 1 to 3 level) using the "Bond Blocks Core" Kit.

"Critical early quantitative competencies that children must possess to learn mathematics include an understanding of the relation between number words, Arabic numerals, and the underlying quantities they represent, as well as skill at fluently manipulating these representations; knowledge of the mathematical number line; and basic skills in arithmetic (i.e., skilled use of counting procedures, decomposition, and fact retrieval in problem solving). These skills are easily assessed in young children and many have been shown to be highly responsive to instructional interventions." (Geary, 2011, p. 15-16)

Counting to 10 & 20

In the early years of schooling before Year One, the **top two predictors of difficulty** in maths are (Geary et al., 2009):

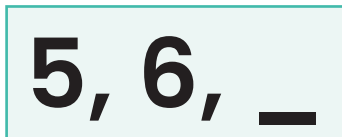
1. **Fluently** identifying which is the **greater** of two numbers. That is, not counting from one.

"Which is bigger, meaning is worth the most things?"



Students at risk take a long time to answer, often counting from one. They lack a sense of how numbers relate to each other on a mental number line.

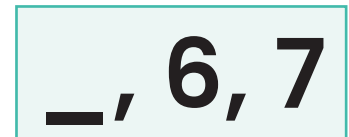
2. Being able to identify a missing number in each of these positions:



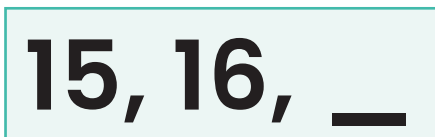
After



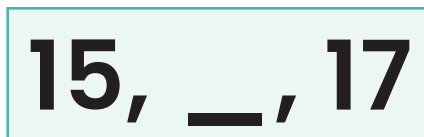
Between



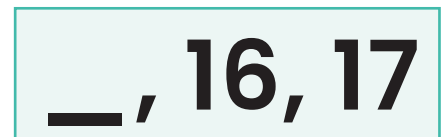
Before



After



Between



Before

Reid's paper "Changing Minds: Discussions in neuroscience, psychology and education - Counting on it: Early numeracy development and the preschool child" (2016, p. 4) prepared for the Australian Council for Educational Research lists the following content, as cited by Griffin (2004, p. 174), as requisite for number sense for five-year-old children:

- knowing numbers indicate quantity and thus have a magnitude
- understanding and using relative terms such as more, less, bigger and smaller
- knowing numbers in the counting sequence have a fixed position
- understanding the sequence of numbers, e.g. three comes before four
- knowing higher numbers reflect greater quantities, e.g. four is greater than three
- knowing each counting term represents a unit increase

Bond Blocks: Counting to 10 & 20 systematically targets each of the skills identified by Geary and Griffin as essential for students in Foundation.

We will conclude with our favourite quote from John Hattie (2016).

"Almost everything in published research works at least some of the time with some students. Our challenge as a profession is to become more precise in what we do and when we do it. Timing is everything, and the wrong practice at the wrong time undermines efforts." (p. 103)

References

- Anthony and Walshaw. 2009. *Effective pedagogy in mathematics*. Belley, France: Gonnet Imprimeur Download from: http://www.ibe.unesco.org/fileadmin/user_upload/Publications/Educational_Practices/EdPractices_19.pdf
- Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge: Harvard University Press.
- Geary, D. C. (2011). *Cognitive predictors of achievement growth in mathematics: a 5-year longitudinal study*. *Developmental psychology*, 47(6), 1539.
- Geary, D. C., Bailey, D. H., Littlefield, A., Wood, P., Hoard, M. K., Nugent, L. (2009). First-grade predictors of mathematical learning disability – a latent class trajectory analysis. *Cognitive Development*, 24(4), 411-429. <https://doi.org/10.1016/j.cogdev.2009.10.001>
- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). *Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools* (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>.
- Hattie, J., Fisher, D., Frey, N., Gojak, L. M., Moore, S. D., Mellman, W. (2016). *Visible Learning for Mathematics, Grades k -12*. SAGE. pp.103.
- High Impact Teaching Strategies (Victoria) Download from: www.education.vic.gov.au/school/teachers/teachingresources/practice/improve/Pages/hits.aspx
- Masters, G. N. (2018, August 13). The role of evidence in teaching and learning [Paper presentation]. Research Conference 2018 – Teaching practices that make a difference: Insights from research. https://research.acer.edu.au/research_conference/RC2018/13august/2
- Reid, K. (2016). Counting on it: Early numeracy development and the preschool child. Australian Council for Educational Research (ACER). https://research.acer.edu.au/learning_processes/19
- State of Victoria Department of Education and Training. (2019). Learning Difficulties Information Guide Numeracy. Download from <https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/english/reading/Pages/learningdifficulties.aspx>
- Sonnemann, J., & Hunter, J. (2023) "Tackling under-achievement: Why Australia should embed high-quality small-group tuition in schools". *Grattan Institute Report No. 20223-01*. Download from <https://grattan.edu.au/report/tackling-under-achievement/>
- Sullivan, P. (2011). *Teaching Mathematics: Using research-informed strategies*. Download from <https://research.acer.edu.au/aer/13>

Bibliography

- Geary, D. (2022). Setting the preschool foundation for success in mathematics.
- National Council of Teachers of Mathematics. (2014). Principles to Actions: Ensuring mathematical success for all. Reston, VA: Author. Download from: <https://www.nctm.org/Conferences-and-Professional-Development/Principles-to-Actions-Toolkit/Resources/7-EffectiveMathematicsTeachingPractices/>