

Pearson

mathology

**F-2**

Teaching Companion:

**Number,**

**Patterns**

**and Algebra**

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# F-2

## Teaching Companion: **Number, Patterns and Algebra**

This Teaching Companion is designed to be used alongside the Pearson Mathology TEACH digital tool.

It provides Australian Curriculum guidance, pedagogical and implementation advice, and formative assessment rubrics for each Pearson Mathology activity.

The Pearson Mathology activities are easy-to-implement, engaging, hands-on lesson activities and games to help teachers save time, create meaningful learning experiences, and promote understanding of the big ideas in maths.

This Companion presents these activities by maths strand and topic, and provides unique class Warm-up and Exit Ticket activity options for each topic.

# Table of Contents

<b>Introduction</b>	<b>v</b>	<b>Composing and Decomposing</b>	<b>62</b>	<b>7</b> Exchanging Money	142
<b>Curriculum Correlation</b>	<b>xi</b>	<b>1</b> Decomposing 10	66	<b>8</b> Earning Money	144
<b>Australian and West Australian Curriculum</b>	xii	<b>2</b> Numbers to 10	68	<b>9</b> Savings Plans	146
<b>Victorian Curriculum</b>	xix	<b>3</b> Numbers to 20	70	<b>Number Relationships 1</b>	<b>148</b>
<b>NSW Curriculum</b>	xxvi	<b>4</b> Composing and Decomposing to 20	72	<b>1</b> Ordinal Numbers 2	152
<b>Number Strand</b>	<b>2</b>	<b>5</b> Money Amounts	74	<b>2</b> Comparing Quantities	154
<b>Counting</b>	<b>4</b>	<b>6</b> Equal Groups	76	<b>3</b> Decomposing to 20	156
<b>1</b> Counting to 20	8	<b>Early Place Value</b>	<b>78</b>	<b>4</b> Ordering Quantities	158
<b>2</b> Counting On and Back	10	<b>1</b> Tens and Ones	82	<b>4</b> Estimating with Benchmarks	160
<b>3</b> Ordinal Numbers 1	12	<b>2</b> Building and Naming Numbers	84	<b>6</b> Odd and Even Numbers	162
<b>4</b> Counting to 50	14	<b>3</b> Different Representations	86	<b>7</b> Number Relationships Review	164
<b>5</b> Counting To and From 50	16	<b>4</b> Place Value	88	<b>Grouping and Place Value</b>	<b>166</b>
<b>6</b> Bridging Tens	18	<b>Operational Fluency</b>	<b>90</b>	<b>1</b> Building Numbers	170
<b>7</b> Consolidating Counting	20	<b>1</b> Investigating Addition	96	<b>2</b> Making a Number Line	172
<b>Spatial Reasoning</b>	<b>22</b>	<b>2</b> Adding to 20	98	<b>3</b> Grouping to Count	174
<b>1</b> Subitizing to 5	26	<b>3</b> Complements of 10	100	<b>4</b> Grouping and Place Value Review	176
<b>2</b> Estimating Small Sets	28	<b>4</b> More or Less	102	<b>Early Fractional Thinking</b>	<b>178</b>
<b>3</b> Subitizing to 10	30	<b>5</b> Subtracting to 20	104	<b>1</b> Equal Parts 1	182
<b>4</b> Estimating Quantities	32	<b>6</b> The Number Line	106	<b>2</b> Equal Parts 2	184
<b>Comparing and Ordering</b>	<b>34</b>	<b>7</b> Doubles	108	<b>3</b> Comparing Fractions 1	186
<b>1</b> Comparing Sets Concretely	38	<b>8</b> Part-Part-Whole	110	<b>4</b> Comparing Fractions 2	188
<b>2</b> Comparing Sets Pictorially	40	<b>9</b> Solving Story Problems	112	<b>5</b> Regrouping Fractional Parts	190
<b>3</b> Comparing Numbers to 50	42	<b>10</b> Write Your Own Story Problems	114	<b>6</b> Which Fraction is Bigger?	192
<b>4</b> Comparing and Ordering Strategies	44	<b>11</b> Using Doubles	116	<b>Number Relationships 2</b>	<b>194</b>
<b>Skip-Counting</b>	<b>46</b>	<b>12</b> Fluency with 20	118	<b>1</b> Benchmarks on a Number Line	198
<b>1</b> Skip-Counting Forward	50	<b>13</b> Addition and Subtraction Strategies	120	<b>2</b> Decomposing 50	200
<b>2</b> Skip-Counting with Leftovers	52	<b>14</b> Multi-Digit Fluency	122	<b>3</b> Jumping on the Number Line	202
<b>3</b> Skip-Counting Backward	54	<b>Financial Literacy</b>	<b>124</b>	<b>4</b> Who Am I?	204
<b>4</b> Using Skip-Counting	56	<b>1</b> Class Shop	130	<b>Conceptualizing Addition and Subtraction</b>	<b>206</b>
<b>5</b> Skip-Counting Flexibly	58	<b>2</b> Values of Coins	132	<b>1</b> Exploring Properties	210
<b>6</b> Skipping Backward	60	<b>3</b> Counting Coin Collections	134	<b>2</b> Solving Problems 1	212
		<b>4</b> Estimating Money	136	<b>3</b> Solving Problems 2	214
		<b>5</b> Spending Money	138		
		<b>6</b> Saving Regularly	140		

4 Solving Problems 3	216
5 Solving Problems 4	218
6 Sharing Strategies	220

## Early Multiplicative Thinking 222

1 Grouping in 2s, 5s and 10s	226
2 Making Equal Shares	228
3 Making Equal Groups	230
4 Exploring Repeated Addition	232
5 Repeated Addition and Multiplication	234
6 Repeated Subtraction and Division	236

## Patterns and Algebra 238

### Repeating Patterns 240

1 Extending Repeating Patterns	246
2 Repeating the Core	248
3 Representing Patterns	250
4 Predicting Elements	252
5 Finding Patterns	254
6 Exploring Patterns	256
7 Extending and Predicting	258
8 Combining Attributes	260
9 Reviewing Repeating Patterns	262
10 Errors and Missing Elements	264

### Creating Patterns 266

1 Extending Patterns	270
2 Translating Patterns	272
3 Errors and Missing Parts	274
4 Creating Repeating Patterns	276

### Increasing/Decreasing Patterns 278

1 Increasing Patterns 1	282
2 Increasing Patterns 2	284
3 Decreasing Patterns	286
4 Reproducing Patterns	288
5 Extending Patterns	290
6 Creating Patterns	292
7 Errors and Missing Terms	294
8 Reviewing Patterns	296

### Equality and Inequality 298

1 Exploring Sets	304
2 Making Equal Sets	306
3 Using Symbols	308
4 Expressing Equality	310
5 Equal and Unequal Sets	312
6 Equal or Not Equal?	314
7 Exploring Number Sentences	316
8 Exploring Properties	318
9 Missing Numbers	320
10 Expressing Equality and Inequality	322



# Introduction

We use maths every day, but our relationship with the subject tends to be complicated. Most of us have a story from our school days that sets the tone for how we feel about maths. Whether your story is positive or negative, it tends to stick.

As a teacher, the pressure of getting maths “right” in the early years, combined with your own maths stories, can make teaching maths today quite daunting.

Many teachers feel they do not have the expertise or the pedagogical practices necessary to confidently teach maths, especially with students of so many different skill levels in one class.

Long working hours and multiple curriculum demands only add to the problem.

## Welcome to Pearson Mathology F–2

**Pearson Mathology** is a comprehensive maths resource with real-world applications that help educators engage and teach students across all skill levels.

- Co-created with teachers, **Pearson Mathology** offers differentiated learning resources based on classroom reality, as well as effective teacher support.
- Every **Pearson Mathology** activity has been classroom tested and optimized.
- **Pearson Mathology** provides teacher assistance every step of the way, offering customizable solutions and practical supports for planning and teaching.
- **Pearson Mathology** is flexible and gives teachers the opportunity to incorporate their own lesson assets at any time.
- Based on the solid foundation of a research-based learning progression, **Pearson Mathology** combines insights from teacher interviews, focus groups and classroom observations with the best of academic research and pedagogical approaches.

**Pearson Mathology**'s goal is to empower students and teachers to grow in their mathematical capabilities, gain confidence and cultivate an affinity for maths.

## Pearson Mathology F–2 Components

### Mathology Little Books and Teacher's Guides

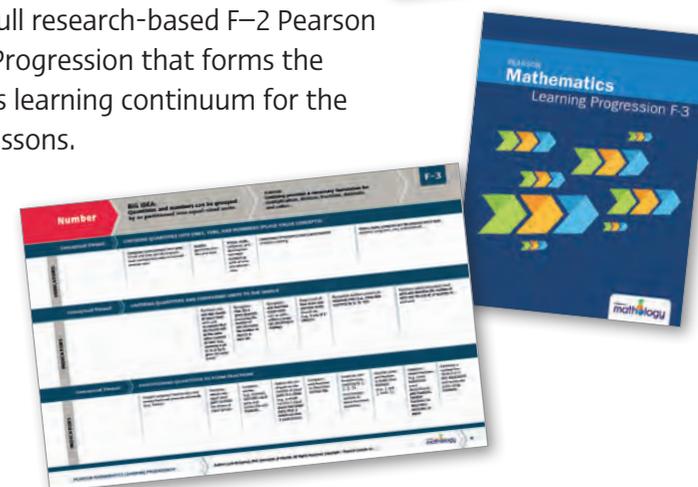
The series of **Mathology Little Books** and corresponding **Teacher's Guides** for F–2 allows teachers to match books to a child's or group's level of maths understanding, providing rich opportunities for teaching and learning.

The series:

- contains 54 fiction and non-fiction books
- is organized around the key big ideas within each maths strand: Number Sense, Patterning and Algebra, Measurement, Geometry, Data Management and Probability
- allows students to consolidate a building block of understanding within a big idea, priming them for the next building block
- contains fun, engaging stories to put maths in real-life contexts
- comes with digital versions of the **Mathology Little Books**, including audio and an interactive activity.

### Learning Progression Booklet

A printed guide to the full research-based F–2 Pearson Mathematics Learning Progression that forms the underlying mathematics learning continuum for the **Pearson Mathology** lessons.

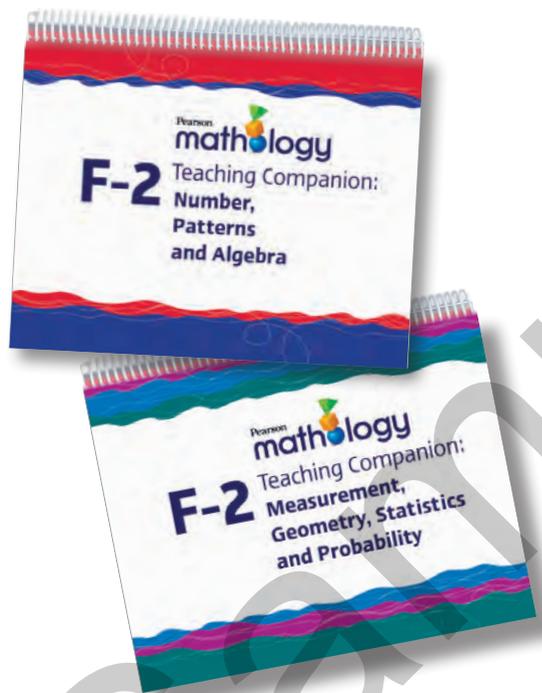


## Teaching Companions

Two printed *Pearson Mathology F–2 Teaching Companion* books: one for the Number, Patterning and Algebra strands and the other for the Measurement, Geometry, Data and Probability strands are designed to be used alongside the *Mathology TEACH* digital tool.

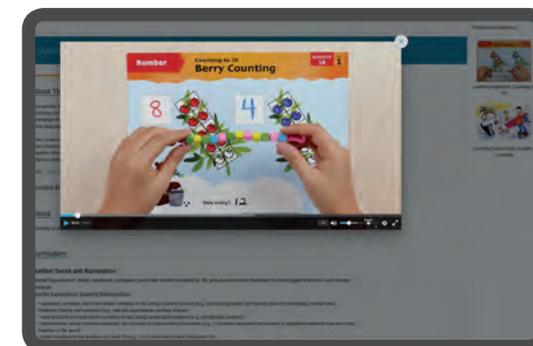
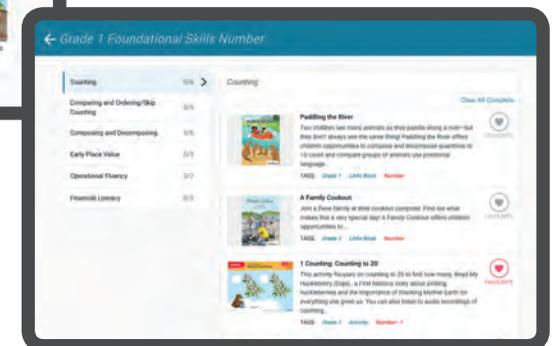
These Teaching Companions provide printed Australian Curricula guidance, pedagogical and implementation advice, and formative assessment rubrics for each **Pearson Mathology** lesson. These lessons comprise easy-to-implement, engaging and hands-on activities and games to help teachers save time, create meaningful learning experiences, and promote understanding of the big ideas in maths.

The Teaching Companions present these lessons by maths strand and topic, and provide additional class Warm-up and Exit Ticket ideas for each topic.



## Pearson Mathology TEACH

*Mathology TEACH* F-2 is an online teacher resource that helps you search for curriculum-focused activities, quickly and easily find what you need to differentiate lessons, plan teaching sequences and conduct effective formative assessment in your F-2 Maths classrooms with confidence. It contains the rich **Pearson Mathology** lesson activities, pedagogical supports, professional learning and Little Books all with simple and effective classroom planning and formative assessment functionality. It allows you to upload and use your own lesson assets whenever you want and provides constant curriculum references to help you address your state and territory expectations.



## Using this Teaching Companion

This Teaching Companion is designed to be used alongside the *Mathology TEACH* digital tool and provides the teaching and formative assessment guidance for each **Pearson Mathology** lesson.

### Finding the Content You Need

**Pearson Mathology** is a flexible resource and each topic and lesson can be used in any sequence and alongside any other content a teacher may wish to use.

This Teaching Companion presents the F–2 lesson activities and teacher guidance by maths strand and topic with the order informed by the underlying Learning Progression and Australian curricula. The lessons are numbered progressively within each topic to reflect a logical learning progression, but the activities can be taught in any order to suit your individual class.

Similarly, **Pearson Mathology** does not prescribe the use of any lessons with a particular year level. Instead it presents the F–2 resources together and provides suggested year levels in the Table of Contents as a guide for teachers should they need it.

The comprehensive Table of Contents on pages iii and iv makes it easy to find an activity suited to the topic you want to teach.

### Curriculum Correlation

Curriculum correlations for each Australian state or territory are provided on pages xii to xxxiii. These show the broad alignment of the **Pearson Mathology** content to the Australian Curricula.

Each topic opening section then provides a more detailed look at the specific Australian Curricula alignment for each **Pearson Mathology** lesson.

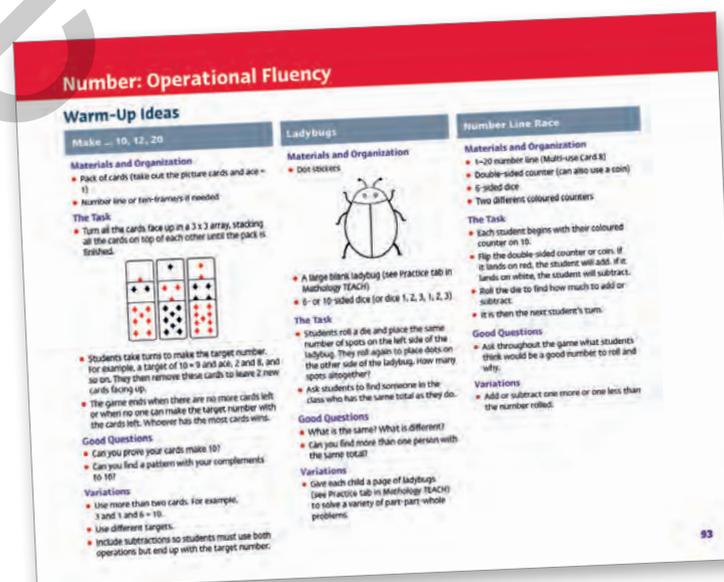
## Lesson Activities and Teaching Guidance

A series of engaging activities are provided for each topic-based cluster of lessons within each strand. These activities range from quick class warm-ups, full maths lessons and innovative Exit Ticket tasks. Full teaching guidance is provided for each activity.

### Warm-Ups

A choice of quick whole-class warm-up activity ideas are provided at the start of each topic. These are quick activities designed to introduce or reinforce maths ideas in the classroom at the beginning of a class or when the class is starting on a new topic.

The warm-ups make use of common classroom items and focus on promoting active participation for all students regardless of age or learning level.



## Lessons

Each **Pearson Mathology F–2** lesson comes with at-a-glance teacher support, specific lesson and activity notes, and all the information you need to plan for the lesson and facilitate learning.

Number

### Counting: Counting to 20



Berry Counting

ACTIVITY 1

**FOCUS:** Counting to 20 to determine how many

**ACTIVITY TIME:** 45–50 min

**GROUP SIZE:** Pairs

**PROFICIENCIES:** Understanding, Reasoning, Fluency, Communicating

**MATERIALS**

- Student Card 1
- Pipe cleaners for branches (1 per pair)
- Beads for berries (20 per pair)
- Master 1; Assessment

Also available:  
A Worm, Cozy Nest, Animals Hide, Dan's Doggy Daycare, Acorns for Willy, On Safari, Paddling the River

**BIG IDEA**  
Numbers tell us how many and how much.

**INSTRUCTIONS**

**Before**

**Note:** Have students print numbers to 10 in words whenever possible. Discuss the different types of berries students know and what sorts of animals might eat them. Have the students eaten blueberries? As a class, practise the counting sequence to 20. Do any students know how to count in another language? Ask them to demonstrate.

**What to Do (15–20 min):** Use Student Card 1

**Note:** Give each pair one pipe cleaner and 20 beads.

- Student A: Take a handful (not all) of berries (beads) and count them. Colour that many berries on the card, then write the number in the box. Place your berries (beads) on the branch (pipe cleaner).
- Student B: Take another handful of berries (beads) and count them. Colour that many berries on the other branch of the card, then write the number in the box. Add your berries (beads) to the same branch (pipe cleaner).
- Count the berries (beads) on the branch (pipe cleaner) to see how many berries you picked altogether. Count the berries you coloured on the card. Did you get the same answer?

**How to Differentiate**

**Enabler:** Give 10 beads to each pair.

**Extension:** Use card 1B. Give each pair 50 beads. Students take two handfuls of beads each, then find how many they have altogether.

**Combined Grades Extension:** Have students write addition sentences.

**CONSOLIDATION**

- Invite pairs of students to share the strategies they used to find the total number of berries (e.g., using fingers, counting from 1, counting on). Display a set of beads. As a class, count the beads. Ask, "What does the last number tell us?" Count the beads again, this time starting with a different bead. Ask: "Does the number of beads change? Why or why not?"

**Highlight for Students**

- The last number we say tells us how many objects are in the set.
- When we count a set of objects, we say one number for each object we touch.

**WHAT TO LOOK FOR**

- Are students able to say the counting numbers in the correct order, especially through the fives?
- Do students say one number for each bead counted (one-to-one correspondence/tagging)?
- When asked "How many?" do students know that the last counting word tells how many (cardinality)?
- What strategies do students use to find the total number of beads (e.g., counting from 1, counting on)?

**PROBING QUESTIONS**

- How many berries did you pick altogether? How do you know?
- How did you keep track of your count?
- How do you know you counted all the berries?
- How can the ten-frame help you find the total?

Activities, stories and maths talks that engage students and activate thinking.

Instructions written in student-friendly language.

Suggestions for differentiation to help pace the learning within the same class activity, depending on your observation of student and class needs.

Sample questions to probe student understanding that can be added to your own repertoire of effective questioning.

Number

### Counting: Helping Students to Progress What You Might See/Hear and Next Steps

ACTIVITY 1

**Counting to 20 Behaviours/Strategies**

<p>Student has difficulty saying the counting sequence.</p> <p>"1, 2, 3, 5, 4, 7, 8..."</p> <p><b>Next Step</b> Provide a number line to 20. Student places each bead under the corresponding number on the line and says the number. Student should start to attach the counting number to an increase in quantity. Provide many opportunities to practise the counting sequence, such as counting students in line, use songs, poems, and videos to reinforce the counting sequence.</p>	<p>Student says number word in between "touches" or does not say one number word for each bead counted.</p> <p><b>Next Step</b> When counting a set, model sliding each bead to a separate pile as the number word is said.</p>	<p>Student loses track of the count, misses beads in the count, or counts more than once.</p> <p>"3, 4"</p> <p><b>Next Step</b> Provide a ten-frame for student to slide beads into as they are counted.</p>
<p>Student recounts when asked "How many?"</p> <p>"I've count again."</p> <p><b>Next Step</b> Provide student with many opportunities to count. Have him or her collect groups or sets of objects in the classroom (e.g., 5 markers). Encourage student to emphasize the last number and gesture to the whole set.</p>	<p>Student gets a different number when the beads are counted in a different order.</p> <p>Starting Point "How many?" "2"</p> <p><b>Next Step</b> Have student count multiple times, using different starting points. Ask, "How many that time?" and "Will it always be that many?"</p>	<p>Student correctly counts the number of beads and realizes that the last number said tells how many (cardinality).</p> <p><b>Next Step</b> Provide student with a greater number of beads to practise counting. Student may start to develop more efficient strategies for counting (e.g., counting on, skip-counting).</p>

A list of **Mathology Little Books** that further support maths instruction and differentiation.

Highlights of intended learning, connections to prior learning, and misconceptions to help students reflect on their own learning and the strategies they use.

Practical, in-the-moment assessment prompts that help you gather evidence of understanding and uncover partial concepts/misconceptions.

A quick glimpse into potential student behaviours and strategies linked to the big ideas in the lesson; supports formative assessment and helps you move students forward to the next logical step along a mathematics learning progression.

## Exit Tickets

Exit tickets are "... a means for teachers to gauge progress toward the established success criteria." They "... allow students to summarise or synthesise their thinking about some aspect of their learning" and in so doing, make the task "more visible to students and their teachers."

John Hattie, *Visible Learning for Maths K-12*, p. 64.

A choice of quick, simple Exit Ticket activity ideas are provided at the start of each topic in this Teaching Companion. These give students a voice to indicate understanding or misunderstanding to their teachers, and provide opportunities to make connections with other maths strands or Key Learning Areas.

**Number: Grouping and Place Value**

**Exit Ticket Ideas**

**One Group, Ten Groups**  
Ask the students to draw one group and ten groups of the same object. For example, cars or oranges.

**Count the Dots 2**  
Give each student the Exit Ticket (in the "Practice" tab of Mathology TEACH) which asks them to find two ways to count the dots.

**I used to ... but now I ...**  
Ask students to complete this sentence: I used to ... but now I ...

**Exit Ticket Chart:**

1	2	3	4
5	6	7	8
10	11	12	13
15	16	17	18
20	21	22	23
26	27	28	29

Sometimes an Exit Ticket activity may suggest the use of an Exit Ticket Chart. The Exit Ticket Chart is a great way to collect and organise a range of Exit Ticket ideas. Students are allocated a number and can stick their Exit Ticket activity response on their number on this laminated chart using a sticky note or other means. Using numbers rather than names provides a level of anonymity among the peer group, which will increase the chances of receiving authentic responses. This chart can be set out, laminated or displayed in any way that suits your classroom.

Templates for teacher-made resources/tickets suggested within Exit Ticket activities will be available to print directly from the "Practice" tab on *Mathology TEACH*.

## Formative Assessment

**Pearson Mathology** does not rely on summative assessment, instead it takes advantage of the maths learning progression structure to provide a unique mechanism for facilitating effective formative assessment aimed at helping students to progress.

*Mathology TEACH* provides an automated tool for recording teacher observations, effectively mapping students' learning progress through important maths concepts, and providing in-the-moment next step ideas to consolidate learning and address misconceptions.

The formative assessment rubrics and next step activities are also provided in this Teaching Companion for each **Pearson Mathology** lesson.

## Rubrics

Rubrics identify the student behaviours teachers might witness when working on a **Pearson Mathology** activity. These behaviours illustrate a progression of some of the most common misconceptions, partial concepts, and strategies students may display while learning. Teachers can use these rubrics for each lesson to identify where on the learning progression their students are working for a particular concept at any point of time.

## Next steps

For each progression point, an in-the-moment next step idea is provided for teacher reference. These are designed to help students progress through the progression point stages, with the final stage indicating a deep understanding of and/or fluency with that concept.

**Patterning and Algebra**

**Equality and Inequality: Helping Students to Progress What You Might See/Hear and Next Steps**

**ACTIVITY 10**

**Expressing Equality and Inequality Behaviours/Strategies**

**Next Step:** Ask students to draw one group and ten groups of the same object. For example, cars or oranges.

**Next Step:** Give each student the Exit Ticket (in the "Practice" tab of Mathology TEACH) which asks them to find two ways to count the dots.

**Next Step:** Ask students to complete this sentence: I used to ... but now I ...

# Using Mathology TEACH

*Mathology TEACH* is a simple, time-saving online planning tool for teachers, containing rich maths activities and pedagogical supports.

It helps teachers:

- search for high-quality **Pearson Mathology** lessons by curriculum or topic and/or add their own favourite lessons
- create their own lesson plans or use pre-set plans
- teach using **Pearson Mathology** lessons, **Mathology Little Books**, projectable/printable assets and digital tools
- assess and track students with a simple-to-use, practical and powerful formative assessment tool
- access short, in-the-moment professional learning videos anytime, anywhere.

## Getting started with Mathology TEACH

To arrange an annual subscription to *Mathology TEACH*, please contact your sales representative or contact Customer Care: schools.pearson.com.au. To self-register for a 16-day trial, please visit <https://mathology.pearsonplaces.com.au/>

Once you log in, you are taken immediately to the Home page where you can access pre-set, adaptable teaching plans or search for **Pearson Mathology** activities or **Mathology Little Books** by curriculum code, learning progression or by typing in key maths terms or concepts.

A list of assets will appear. Click on an asset to view all the teacher guidance and content, add it to a plan or your favourites and/or click the thumb tack symbol to pin it to the **Pearson Mathology** Home page so that you can access it immediately during your class.

## Planning

Once you have selected your assets, you can adapt the preset lessons plans or create your own plans to suit your school's planning schedule: separate ability groups, weekly class plans, full year plans or any structure that suits you best. Easily populate these plans by dragging selected **Pearson Mathology** activities into them, add your own notes and upload any links to your own favourite classroom activities.

- Selecting this symbol in any plan allows you to see the curriculum outcomes your plan is covering, view the list of materials required, share the plan with other teaching colleagues and download the plan to be stored in your school system.

## Setting up a class

Teachers can set up as many classes or groups as they like on *Mathology TEACH* by clicking on their name on the top right-hand corner, selecting "Student Management", creating and naming a class or group and then inputting student names or identifiers.

These student identifiers are only required when using the assessment and analytics functions.

## Accessing lesson guidance

When you select a lesson in *Mathology TEACH*, you can choose to access four levels of lesson guidance.

- 1 About:** overview details about the lesson's maths and background focus, the curriculum outcomes it relates to, and where it sits on the maths learning progression.
- 2 Details:** digital version of the specific teacher guidance for the lesson with direct links to any appropriate line master resources and interactive tools. Projectable or printable versions of the lesson card, rubrics and any associated student assets are provided here. Teachers can choose to project or print and laminate these assets to suit their class.
- 3 Differentiated Support:** a choice of projectable or printable mini-lessons to consolidate, enable or extend understandings. Any common misconceptions for the maths topic/concept are identified with tips on what to do to address them, and After the Lesson activities for in class and at home are also provided in printable formats.
- 4 Practice:** projectable and printable assets for use with warm-up and exit ticket activities.

## Helping students to progress

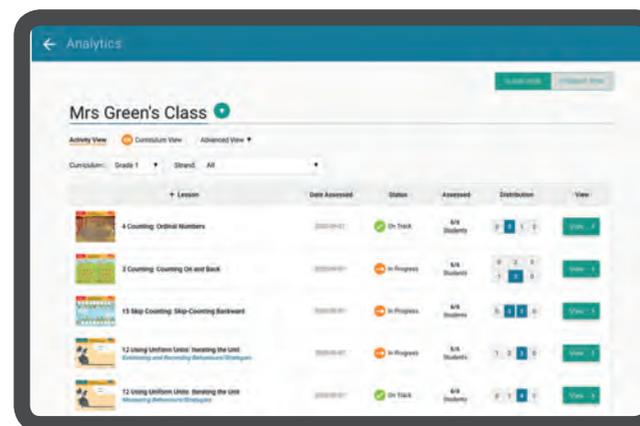
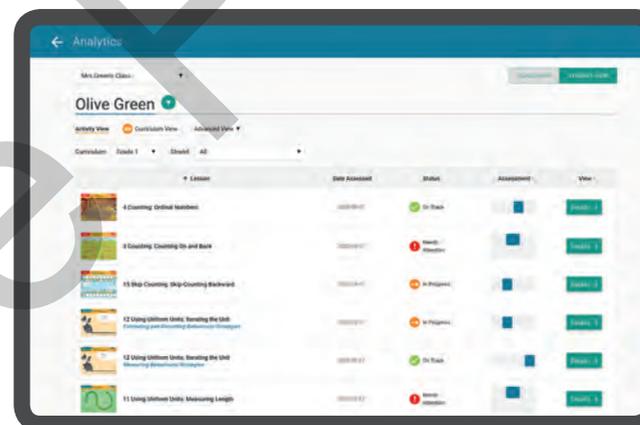
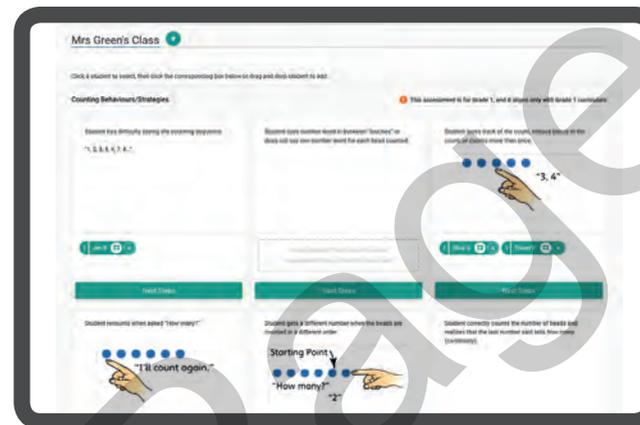
Within each lesson on *Mathology TEACH* you can select an Assessment tab. This gives you an interactive version of the formative assessment rubric for that lesson. Using any device, select the class or group you want to assess and drag your student names to the appropriate rubric cell based on your observations of how they are working. Note that you can change your assessment at any time by dragging the student name to later progression points as you observe their “light bulb” moments.

Teachers can also access in-the-moment teaching ideas designed to address any misunderstandings or misconceptions and help students progress along the learning progression.

Clicking on the “Analytics” tab at the top of the page provides class or individual student reports of progress that can be used for reporting and downloaded as required.

## Professional learning videos

For each **Pearson Mathology** lesson there is a professional learning panel at the right-hand side of the screen. Learning Connections videos for relevant big maths ideas can be found here and viewed at any time (each is about 5 minutes long). In addition, bite-sized Learning Highlights videos offer glimpses of the specific learning you may expect to encounter in the lesson.



# Curriculum Correlation

## Pearson Mathology F-2: Number, Patterns and Algebra

	Australian and West Australian Curriculum				Pearson Mathology	
	Year	Sub-strand	Code	Description	Mathology Activities	Mathology Little Books
<b>NUMBER</b>	Foundation/ Pre-Primary	Number and place value	ACMNA001	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point	<b>Counting:</b> 1 Counting to 20 2 Counting On and Back 3 Ordinal Numbers 1 <b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Comparing and Ordering:</b> 1 Comparing Sets Concretely 2 Comparing Sets Pictorially <b>Composing and Decomposing:</b> 4 Composing and Decomposing to 20 <b>Number Relationships 1:</b> 1 Ordinal Numbers 2	<i>A Warm Cozy Nest</i> <i>Dan's Doggy Daycare</i> <i>Lots of Dots!!</i> <i>Acorns for Wilaiya</i> <i>Time for Games</i> <i>Let's Play Waltes!</i> <i>On Safari!</i> <i>Paddling the River</i>
	Foundation/ Pre-Primary	Number and place value	ACMNA002	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond	<b>Counting:</b> 1 Counting to 20 2 Counting On and Back <b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Composing and Decomposing:</b> 1 Decomposing 10	<i>A Warm Cozy Nest</i> <i>Dan's Doggy Daycare</i> <i>Lots of Dots!</i> <i>Acorns for Wilaiya</i> <i>Animals Hide</i> <i>Time for Games</i> <i>Let's Play Waltes!</i> <i>On Safari!</i> <i>Paddling the River</i> <i>At the Corn Farm</i>
	Foundation/ Pre-Primary	Number and place value	ACMNA003	Subitise small collections of objects	<b>Spatial Reasoning:</b> 1 Subitizing to 5 3 Subitizing to 10	<i>Lots of Dots!</i> <i>Acorns for Wilaiya</i> <i>Spot Check!</i>
	Foundation/ Pre-Primary	Number and place value	ACMNA289	Compare, order and make correspondences between collections, initially to 20, and explain reasoning	<b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Comparing and Ordering:</b> 1 Comparing Sets Concretely 2 Comparing Sets Pictorially <b>Composing and Decomposing:</b> 2 Numbers to 10 4 Composing and Decomposing to 20 <b>Number Relationships 1:</b> 2 Comparing Quantities	<i>Dan's Doggy Daycare</i> <i>Spot Check!</i> <i>Time for Games</i> <i>Let's Play Waltes!</i> <i>Paddling the River</i>

Victorian Curriculum				Pearson Mathology	
Year	Sub-strand	Code	Description	Mathology Activities	Mathology Little Books
Foundation	Number and Place Value	VCMNA069	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point	<p><b>Counting:</b></p> <ol style="list-style-type: none"> <li>Counting to 20</li> <li>Counting On and Back</li> <li>Ordinal Numbers 1</li> </ol> <p><b>Spatial Reasoning:</b></p> <ol style="list-style-type: none"> <li>Estimating Small Sets</li> <li>Estimating Quantities</li> </ol> <p><b>Comparing and Ordering:</b></p> <ol style="list-style-type: none"> <li>Comparing Sets Concretely</li> <li>Comparing Sets Pictorially</li> </ol> <p><b>Composing and Decomposing:</b></p> <ol style="list-style-type: none"> <li>Composing and Decomposing to 20</li> </ol> <p><b>Number Relationships 1:</b></p> <ol style="list-style-type: none"> <li>Ordinal Numbers 2</li> </ol>	<p><i>A Warm Cozy Nest</i>  <i>Dan's Doggy Daycare</i>  <i>Lots of Dots!</i>  <i>Acorns for Wilaiya</i>  <i>Time for Games</i>  <i>Let's Play Waltes!</i>  <i>On Safari!</i>  <i>Paddling the River</i></p>
Foundation	Number and Place Value	VCMNA070	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond	<p><b>Counting:</b></p> <ol style="list-style-type: none"> <li>Counting to 20</li> <li>Counting On and Back</li> </ol> <p><b>Spatial Reasoning:</b></p> <ol style="list-style-type: none"> <li>Estimating Small Sets</li> <li>Estimating Quantities</li> </ol> <p><b>Composing and Decomposing:</b></p> <ol style="list-style-type: none"> <li>Decomposing 10</li> </ol>	<p><i>A Warm Cozy Nest</i>  <i>Dan's Doggy Daycare</i>  <i>Lots of Dots!</i>  <i>Acorns for Wilaiya</i>  <i>Animals Hide</i>  <i>Time for Games</i>  <i>Let's Play Waltes!</i>  <i>On Safari!</i>  <i>Paddling the River</i>  <i>At the Corn Farm</i></p>
Foundation	Number and Place Value	VCMNA071	Subitise small collections of objects	<p><b>Spatial Reasoning:</b></p> <ol style="list-style-type: none"> <li>Subitizing to 5</li> <li>Subitizing to 10</li> </ol>	<p><i>Lots of Dots!</i>  <i>Acorns for Wilaiya</i>  <i>Spot Check!</i></p>
Foundation	Number and Place Value	VCMNA072	Compare, order and make correspondences between collections, initially to 20, and explain reasoning	<p><b>Spatial Reasoning:</b></p> <ol style="list-style-type: none"> <li>Estimating Small Sets</li> <li>Estimating Quantities</li> </ol> <p><b>Comparing and Ordering:</b></p> <ol style="list-style-type: none"> <li>Comparing Sets Concretely</li> <li>Comparing Sets Pictorially</li> </ol> <p><b>Composing and Decomposing:</b></p> <ol style="list-style-type: none"> <li>Numbers to 10</li> <li>Composing and Decomposing to 20</li> </ol> <p><b>Number Relationships 1:</b></p> <ol style="list-style-type: none"> <li>Comparing Quantities</li> </ol>	<p><i>Dan's Doggy Daycare</i>  <i>Spot Check!</i>  <i>Time for Games</i>  <i>Let's Play Waltes!</i>  <i>Paddling the River</i></p>

NSW Curriculum					Pearson Mathology	
Year	Sub-strand	Code	Outcome	Description	Activities	Mathology Little Books
Early Stage 1	Whole Numbers	MAe-4NA	Counts to 30, and orders, reads and represents numbers in the range 0 to 20.	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (ACMNA001)	<b>Counting:</b> 1 Counting to 20 2 Counting On and Back 3 Ordinal Numbers 1 <b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Comparing and Ordering:</b> 1 Comparing Sets Concretely 2 Comparing Sets Pictorially <b>Composing and Decomposing:</b> 4 Composing and Decomposing to 20 <b>Number Relationships 1:</b> 1 Ordinal Numbers 2	<i>A Warm Cozy Nest</i> <i>Dan's Doggy Daycare</i> <i>Lots of Dots!</i> <i>Lets Play Waltes!</i> <i>On Safari!</i>
Early Stage 1	Whole Numbers	MAe-4NA	Counts to 30, and orders, reads and represents numbers in the range 0 to 20.	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (ACMNA002)	<b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Counting:</b> 1 Counting to 20 2 Counting On and Back <b>Composing and Decomposing:</b> 1 Decomposing 10	<i>A Warm Cozy Nest</i> <i>On Safari!</i>
Early Stage 1	Whole Numbers	MAe-4NA	Counts to 30, and orders, reads and represents numbers in the range 0 to 20.	Subitise small collections of objects (ACMNA003)	<b>Spatial Reasoning:</b> 1 Subitizing to 5 3 Subitizing to 10	<i>Lots of Dots!</i> <i>Acorns for Wilaiya</i> <i>Spot Check!</i>
Early Stage 1	Whole Numbers	MAe-4NA	Counts to 30, and orders, reads and represents numbers in the range 0 to 20.	Compare, order and make correspondences between collections, initially to 20, and explain reasoning (ACMNA289)	<b>Spatial Reasoning:</b> 2 Estimating Small Sets 4 Estimating Quantities <b>Comparing and Ordering:</b> 1 Comparing Sets Concretely 2 Comparing Sets Pictorially <b>Composing and Decomposing:</b> 2 Numbers to 10 4 Composing and Decomposing to 20 <b>Number Relationships 1:</b> 2 Comparing Quantities	<i>Dan's Doggy Daycare</i> <i>Lots of Dots!</i> <i>Acorns for Wilaiya</i> <i>Animals Hide</i> <i>Spot Check!</i> <i>Time for Games</i> <i>Lets Play Waltes!</i> <i>Paddling the River</i>
Early Stage 1	Whole Numbers	MAe-4NA	Counts to 30, and orders, reads and represents numbers in the range 0 to 20.	Use the language of money	<b>Financial Literacy:</b> 1 Class Shop	

# Number

**Pearson Mathology** delivers Number content through the following big ideas:

- Numbers tell us how many and how much.
- Numbers are related in many ways.
- Quantities and numbers can be grouped by, or partitioned into, equal-sized units.
- Quantities and numbers can be added and subtracted to determine how many or how much.
- Quantities and numbers can be grouped by, and partitioned into, units to determine how many or how much.

**Also available:**



## Topic Clusters

<b>Counting</b>	4
<b>Spatial Reasoning</b>	22
<b>Comparing and Ordering</b>	34
<b>Skip-Counting</b>	46
<b>Composing and Decomposing</b>	62
<b>Early Place Value</b>	78
<b>Operational Fluency</b>	90
<b>Financial Literacy</b>	124
<b>Number Relationships 1</b>	148
<b>Grouping and Place Value</b>	166
<b>Early Fractional Thinking</b>	178
<b>Number Relationships 2</b>	194
<b>Conceptualizing Addition and Subtraction</b>	206
<b>Early Multiplicative Thinking</b>	222

# Number: Counting

## Big Ideas

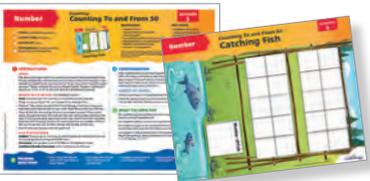
- Numbers tell us how many and how much.
- Numbers are related in many ways.

In this topic, students explore numbers and number relationships to 50, and make connections between the numbers in the count and quantity. They develop fluency in counting on and back, and skip-counting forward and backward.

**Cross-Strand Connections: Patterning and Algebra**

	Maths Focus	Curriculum			
<b>1 Counting to 20</b> p. 8 	Counting to 20 to determine "How many?"	F/P	AC, WA, VIC	ACMNA001, VCMNA069	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point
				ACMNA002, VCMNA070	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond
<b>2 Counting On and Back</b> p. 10 	Counting on and back from a given number	F/P	AC, WA, VIC	ACMNA001, VCMNA069	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point
				ACMNA002, VCMNA070	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond
<b>3 Ordinal Numbers 1</b> p. 12 	Using ordinal numbers to tenth	F/P	AC, WA, VIC	ACMNA001, VCMNA069	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point
				ACMNA002, VCMNA070	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond
<b>4 Counting To 50</b> p. 14 	Counting to determine "How Many?"	1	AC, WA, VIC	ACMNA012, VCMNA086	Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero
				ACMNA013, VCMNA087	Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line
		S 1	NSW	MA1-4NA	Applies place value, informally, to count, order, read and represent two- and three-digit numbers.

# Number: Counting

	Maths Focus	Curriculum			
<b>5 Counting To and From 50</b> p. 16 	Consolidating counting to and from 50	<b>1</b>	<b>AC, WA, VIC</b>	<b>ACMNA012, VCMNA086</b>	Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero
				<b>ACMNA013, VCMNA087</b>	Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line
<b>6 Bridging Tens</b> p. 18 	Counting on and counting back by 1s from a given number	<b>1</b>	<b>AC, WA, VIC</b>	<b>ACMNA012, VCMNA086</b>	Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero
				<b>ACMNA013, VCMNA087</b>	Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line
<b>7 Consolidating Counting</b> p. 20 	Consolidating counting to and from 50	<b>2</b>	<b>AC, WA, VIC</b>	<b>ACMNA026, VCMNA103</b>	Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and tens from any starting point, then moving to other sequences
				<b>ACMNA035, VCMNA112</b>	Describe patterns with numbers and identify missing elements
		<b>S 1</b>	<b>NSW</b>	<b>MA1-4NA</b>	Applies place value, informally, to count, order, read and represent two- and three-digit numbers.

# Number: Counting

## Warm-Up Ideas

### I am Thinking of a Number...

#### Materials and Organization

- Seat the class together in a shared space.

#### The Task

- Tell the class that you are thinking of a number between 1 and 25.
- Use a random name-picker to find a student to guess.
- For each guess, tell the class whether their number is higher or lower than the number guessed.
- Keep guessing until the students find the number that you are thinking of.

#### Good Questions

- What was the thinking you used when you guessed that number?

#### Variations

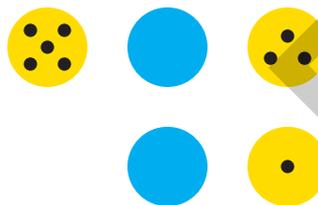
- Keep a tally of the number of guesses to see whether students are getting better at finding the number over time.
- Progress to larger numbers.
- Use fractions.

### Race to 20 Game

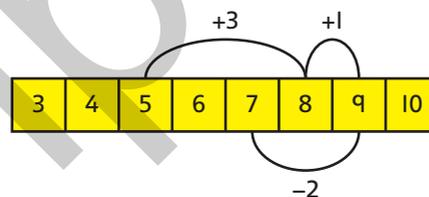
#### Materials and Organization

- Five double-sided counters per pair. Ask the students to mark the yellow side with the numbers 1 to 5 using dots (see pictured).
- 0–20 number path to keep track of numbers.

#### The Task



- The younger player goes first and rolls all five counters. Count the total number of dots on the yellow-facing counters.
- For each blue-sided counter, count back one space. Encourage students to use a number line and count on from the largest number.



- Record your total.
- Take it in turns until one player reaches 20.

#### Good Questions

- Who can show us an efficient strategy for counting on? Who has a different way?

#### Variations

- Race to 50.
- Change the values of the yellow and blue sides.

### Scrunch, Catch and Count

#### Materials and Organization

- Get each pair of students to stand 1 m apart with a piece of scrap paper scrunched into a ball.

#### The Task

- Throw and catch the ball with your partner. Count on one for each successful catch and see what number students can count to.
- When the ball drops, start counting backwards from the last number.
- After a couple of minutes, challenge the students to count in 2s.

#### Good Questions

- Could anyone hear a pattern when they counted? Can you describe it?

#### Variations

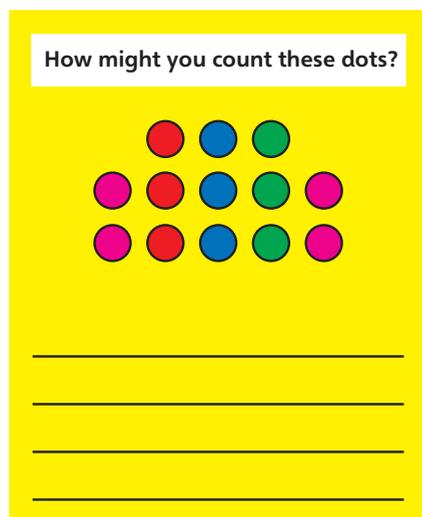
- Count in larger numbers or fractions.
- Try the task in a group of four.
- Try one-handed catch or trick throws.

# Number: Counting

## Exit Ticket Ideas

### Count the Dots

Give each student the Exit Ticket (see "Practice" tab on *Mathology TEACH*). Encourage them to write and explain one good way to count the dots.



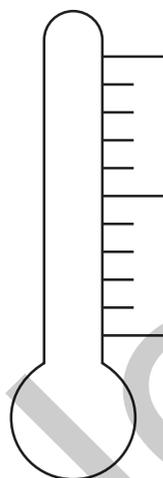
**Purpose:** Provides insight into whether students understand one-to-one correspondence and bridging through 10.

#### Variations

- Students explain it to a partner or to the teacher.
- Provide counters.

### Blank Thermometer

Ask students to put numbers on the blank thermometer (see Practice tab on *Mathology TEACH*) and colour it in to show the degree of effort that they put into the lesson.



**Purpose:** Shows whether students can evenly space numbers in ascending order.

#### Variations

- Put some benchmark numbers on the scale, such as 0 and 50.
- Encourage students to start from tricky numbers.

### Around the World

Students stand up and spread out around the room. They take turns throwing a crumpled-up paper ball to each other. When each student gets the ball, get them to share their "Aha!" moment from the lesson. Once they have shared, they can sit down. Continue throwing the ball to each of the standing students until everyone has had a chance to share.

**Purpose:** The teacher can learn about the key parts of the lesson when students were learning the most.

#### Variations

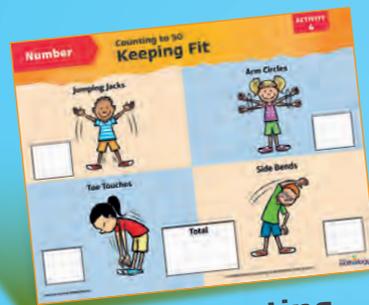
- Allow students to leave once they have shared.

# Number

## Counting: Counting to 20

### ACTIVITY 1

-  **FOCUS:** Counting to 20 to determine how many
-  **ACTIVITY TIME:** 45–50 min
-  **GROUP SIZE:** Pairs
-  **PROFICIENCIES:** Understanding, Reasoning, Fluency, Communicating



Berry Counting

### MATERIALS

- Student Card 1
- Pipe cleaners for branches (1 per pair)
- Beads for berries (20 per pair)
- Master 1: Assessment

Also available:  
*A Warm, Cozy Nest, Animals Hide, Dan's Doggy Daycare, Acorns for Wilaiya, On Safari!, Paddling the River*

### BIG IDEA

Numbers tell us how many and how much.

### INSTRUCTIONS

#### Before

**Note:** Have students print numbers to 10 in words whenever possible. Discuss the different types of berries students know and what sorts of animals might eat them. Have the students eaten blueberries? As a class, practise the counting sequence to 20. Do any students know how to count in another language? Ask them to demonstrate.

#### What to Do (15–20 min): Use Student Card 1

**Note:** Give each pair one pipe cleaner and 20 beads.

- Student A: Take a handful (not all) of berries (beads) and count them. Colour that many berries on the card, then write the number in the box. Place your berries (beads) on the branch (pipe cleaner).
- Student B: Take another handful of berries (beads) and count them. Colour that many berries on the other branch of the card, then write the number in the box. Add your berries (beads) to the same branch (pipe cleaner).
- Count the berries (beads) on the branch (pipe cleaner) to see how many berries you picked altogether. Count the berries you coloured on the card. Did you get the same answer?

#### How to Differentiate

**Enabler:** Give 10 beads to each pair.

**Extension:** Use card 1B. Give each pair 50 beads. Students take two handfuls of beads each, then find how many they have altogether.

**Combined Grades Extension:** Have students write addition sentences.

### CONSOLIDATION

- Invite pairs of students to share the strategies they used to find the total number of berries (e.g., using fingers, counting from 1, counting on). Display a set of beads. As a class, count the beads. Ask, “What does the last number tell us?” Count the beads again, this time starting with a different bead. Ask: “Does the number of beads change? Why or why not?”

#### Highlight for Students

- The last number we say tells us how many objects are in the set.
- When we count a set of objects, we say one number for each object we touch.

### WHAT TO LOOK FOR

- Are students able to say the counting numbers in the correct order, especially through the teens?
- Do students say one number for each bead counted (one-to-one correspondence/tagging)?
- When asked “How many?” do students know that the last counting word tells how many (cardinality)?
- What strategies do students use to find the total number of beads (e.g., counting from 1, counting on)?

### PROBING QUESTIONS

- How many berries did you pick altogether? How do you know?
- How did you keep track of your count?
- How do you know you counted all the berries?
- How can the ten-frame help you find the total number of berries?

### Counting to 20 Behaviours/Strategies

Student has difficulty saying the counting sequence.

"1, 2, 3, 5, 4, 7, 8..."

#### Next Step

Provide a number line to 20. Student places each bead under the corresponding number on the line and says the number. Student should start to attach the counting number to an increase in quantity. Provide many opportunities to practise the counting sequence, such as counting students in line. Use songs, poems, and videos to reinforce the counting sequence.

Student says number word in between "touches" or does not say one number word for each bead counted.

#### Next Step

When counting a set, model sliding each bead to a separate pile as the number word is said.

Student loses track of the count, misses beads in the count, or counts more than once.



#### Next Step

Provide a ten-frame for student to slide beads into as they are counted.

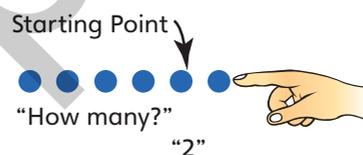
Student recounts when asked "How many?"



#### Next Step

Provide student with many opportunities to count. Have him or her collect groups or sets of objects in the classroom (e.g., 5 markers). Encourage student to emphasize the last number and gesture to the whole set.

Student gets a different number when the beads are counted in a different order.



#### Next Step

Have student count multiple times, using different starting points. Ask: "How many that time?" and "Will it always be that many?"

Student correctly counts the number of beads and realizes that the last number said tells how many (cardinality).

#### Next Step

Provide student with a greater number of beads to practise counting. Student may start to develop more efficient strategies for counting (e.g., counting on, skip-counting).