# Mathematics – K-2 multi-age – Year A – Unit 7



Contents

[Unit description and duration 4](#_Toc130307558)

[Student prior learning 4](#_Toc130307559)

[Lesson overview and resources 5](#_Toc130307560)

[Lesson 1: Introducing ‘Clear the Board’ 16](#_Toc130307561)

[Daily number sense: Tally marks – 10 minutes 16](#_Toc130307562)

[‘Clear the Board’ – 40 minutes 18](#_Toc130307563)

[Discuss and connect the mathematics – 10 minutes 21](#_Toc130307564)

[Lesson 2: ‘Clear the Board’ 23](#_Toc130307565)

[Daily number sense – 10 minutes 24](#_Toc130307566)

[Reviewing results – 10 minutes 24](#_Toc130307567)

[Exploring combinations – 20 minutes 25](#_Toc130307568)

[Discuss and connect the mathematics – 20 minutes 27](#_Toc130307569)

[Lesson 3: Revisiting ‘Clear the Board’ 30](#_Toc130307570)

[Daily number sense: Would you rather? – 15 minutes 30](#_Toc130307571)

[Describing the combinations – 10 minutes 31](#_Toc130307572)

[‘Clear the Board’ – 25 minutes 33](#_Toc130307573)

[Discuss and connect the mathematics – 10 minutes 35](#_Toc130307574)

[Lesson 4: Biography glyphs – Part 1 36](#_Toc130307575)

[Daily number sense: What number am I? – 10 minutes 36](#_Toc130307576)

[Creating biography glyphs – 30 minutes 38](#_Toc130307577)

[Discuss and connect the mathematics – 20 minutes 41](#_Toc130307578)

[Lesson 5: Biography glyphs – Part 2 43](#_Toc130307579)

[Daily number sense: Number line – 10 minutes 44](#_Toc130307580)

[Sorting and categorising data to answer a question – 30 minutes 45](#_Toc130307581)

[Discuss and connect the mathematics – 20 minutes 52](#_Toc130307582)

[Lesson 6: Biography glyphs – Part 3 53](#_Toc130307583)

[Daily number sense: Number chart puzzle – 10 minutes 54](#_Toc130307584)

[Using sorted information to create picture graphs – 30 minutes 55](#_Toc130307585)

[Relaunch and re-summarise – 20 minutes 56](#_Toc130307586)

[Lesson 7: Daily activities – Part 1 60](#_Toc130307587)

[Daily number sense: Number busting – 20 minutes 61](#_Toc130307588)

[True or false? How do you know? – 10 minutes 61](#_Toc130307589)

[Collecting and sequencing daily activities 1 – 20 minutes 62](#_Toc130307590)

[Discuss and connect the mathematics – 10 minutes 64](#_Toc130307591)

[Lesson 8: Daily activities – Part 2 65](#_Toc130307592)

[Daily number sense: Data talk – 15 minutes 66](#_Toc130307593)

[Collecting and sequencing daily activities 2 – 30 minutes 67](#_Toc130307594)

[Discuss and connect the mathematics – 15 minutes 71](#_Toc130307595)

[Resource 1: Stage 1 gameboard 72](#_Toc130307596)

[Resource 2: Early Stage 1 gameboard 73](#_Toc130307597)

[Resource 3: Stage 1 recording sheet 74](#_Toc130307598)

[Resource 4: Assessing game play 75](#_Toc130307599)

[Resource 5: Would you rather? 76](#_Toc130307600)

[Resource 6: Dice display 77](#_Toc130307601)

[Resource 7: Biography glyph key 78](#_Toc130307602)

[Resource 8: Biography glyph face 79](#_Toc130307603)

[Resource 9: Data table 80](#_Toc130307604)

[Resource 10: Sequencing activities 86](#_Toc130307605)

[Resource 11: Clock number talk 87](#_Toc130307606)

[Resource 12: Our day template 88](#_Toc130307607)

[Syllabus outcomes and content 89](#_Toc130307608)

[References 99](#_Toc130307609)

## Unit description and duration

This two-week unit provides opportunities for students to develop their understanding of communicating data through visual displays. Students are provided with opportunities to:

* collect and organise categorical data
* interpret data to make informed decisions
* identify and describe trends in data to predict the likelihood of outcomes
* use data as a powerful way to describe events in the world around us.

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### Student prior learning

Before engaging in these teaching and learning activities, students would benefit from prior experience with:

* sorting and classifying objects according to their attributes and properties
* sorting, classifying, representing, and interpreting data
* gathering, organising, and displaying data in picture graphs.

## Lesson overview and resources

The table below outlines the sequence and approximate timing of lessons, syllabus focus areas and content groups, and resources.

|  |  |  |
| --- | --- | --- |
| Lesson | Syllabus focus area and content groups | Resources |
| [**Lesson 1: Introducing 'Clear the Board'**](#_Lesson_1:_Introducing)  60 minutes  A quantity can be described by talking about its smaller parts. | **Representing whole numbers**  **Early Stage 1**   * Recognise number patterns * Connect counting and numerals to quantities   **Stage 1 – Part A**   * **Use counting sequences of ones with two-digit numbers and beyond**   **Combining and separating quantities**  **Early Stage 1**   * Model additive relations and compare quantities * Identify part-whole relationships in numbers up to 10   **Stage 1 – Part A**   * Recognise and recall number bonds up to ten * Represent equality   **Data**  **Stage 1 – Part A**   * Ask questions and gather data   **Chance**  **Stage 1 – Part A**   * Identify and describe possible outcomes   **Stage 1 – Part B**   * Identify and describe activities that involve chance | * [Resource 1: Stage 1 gameboard](#_Resource_1:_Stage) * [Resource 2: Early Stage 1 gameboard](#_Resource_2:_Early) * [Resource 3: Stage 1 recording sheet](#_Resource_3:_Stage) * [Resource 4: Assessing game play](#_Resource_4:_Assessing) * 0-5 number cards * 20 double-sided counters (or 10 of one colour and 10 of another colour) per pair * Sticky notes * Ten-frames * Two 6-sided dot dice (per team) * Writing materials |
| [**Lesson 2: 'Clear the Board'**](#_Lesson_2:_Clear)  60 minutes  Data can be used to answer questions and describe the world. | **Combining and separating quantities**  **Early Stage 1**   * Model additive relations and compare quantities * Identify part-whole relationships in numbers up to 10   **Stage 1 – Part A**   * Use advanced count-by-one strategies to solve addition and subtraction problems * Recognise and recall number bonds up to ten * Use flexible strategies to solve addition and subtraction problems * Represent equality   **Data**  **Early Stage 1**   * Respond to questions, collect information and discuss possible outcomes of activities * Organise objects into simple data displays and interpret the displays   **Stage 1 – Part A**   * Ask questions and gather data * Represent data with objects and draw and describe displays   **Stage 1 – Part B**   * Create displays of data and interpret them | * [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear) (from previous lesson) * Collection of objects or counters * Glue * Large poster paper (per group) * Sticky notes * Ten-frames * Two 6-sided dot dice (per group) * Writing materials |
| [**Lesson 3: Revisiting 'Clear the Board'**](#_Lesson_3:_Revisiting)  60 minutes  Data can be used to look for patterns and to help predict the likelihood of events. | **Representing whole numbers**  **Early Stage 1**   * Recognise number patterns   **Stage 1 – Part A**   * Continue and create patterns   **Combining and separating quantities**  **Early Stage 1**   * Model additive relations and compare quantities * Identify part-whole relationships in numbers up to 10   **Stage 1 – Part A**   * Recognise and recall number bonds up to ten * Represent equality   **Data**  **Early Stage 1**   * Respond to questions, collect information and discuss possible outcomes of activities * Organise objects into simple data displays and interpret the displays   **Stage 1 – Part A**   * Represent data with objects and drawings and describe displays   **Stage 1 – Part B**   * Identify a question of interest and gather relevant data * Create displays of data and interpret them   **Chance**  **Stage 1 – Part A**   * Identify and describe possible outcomes   **Stage 1 – Part B**   * Identify and describe activities that involve chance | * [Resource 1: Stage 1 gameboard](#_Resource_1:_+) * [Resource 2: Early Stage 1 gameboard](#_Resource_2:_ES1) * [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear) * [Resource 5: Would you rather?](#_Resource_5:_Would) * [Resource 6: Dice display](#_Resource_6:_Dice_1) * 20 double-sided counters (or 10 of one colour and 10 of another colour) per pair of students * Two 6-sided dot dice (per group) * Writing materials |
| [**Lesson 4: Biography glyphs – Part 1**](#_Lesson_4:_Biography_1)  60 minutes  Data can be collected to answer questions. Data can be visually displayed and read. | **Representing whole numbers**  **Early Stage 1**   * Connect counting and numerals to quantities   **Stage 1 – Part A**   * Represent the structure of groups of ten in whole numbers   **Data**  **Early Stage 1**   * Respond to questions, collect information and discuss possible outcomes of activities * Organise objects into simple data displays and interpret the displays   **Stage 1 – Part A**   * Ask questions and gather data * Represent data with objects and drawings and describes the displays   **Stage 1 – Part B**   * Identify a question of interest and gather relevant data | * [Resource 7: Biography glyph key](#_Resource_7:_Biography_2) * [Resource 8: Biography glyph face](#_Resource_8:_Biography) * Counters * Writing materials |
| [**Lesson 5: Biography glyphs – Part 2**](#_Lesson_5:_Biography_1)  60 minutes  Data can be sorted, categorised and displayed in different ways to communicate and highlight information. | **Representing whole numbers**  **Early Stage 1**   * Use the counting sequence of ones flexibly   **Stage 1 – Part A**   * Represent numbers on a line   **Data**  **Early Stage 1**   * Respond to questions, collect information and discuss possible outcomes of activities * Organise objects into simple data displays and interpret the displays   **Stage 1 – Part A**   * Ask questions and gather data * Represent data with objects and drawings and describes the displays   **Stage 1 – Part B**   * Identify a question of interest and gather relevant data * Create displays of data and interpret them | * [Resource 7: Biography glyph key](#_Resource_7:_Biography_2) * [Resource 9: Data table](#_Resource_5:_Three) * Counters * Pattern blocks * Sticky notes * Writing materials |
| [**Lesson 6: Biography glyphs – Part 3**](#_Lesson_6:_Biography_1)  60 minutes  Data can be communicated through visual representations. | **Representing whole numbers**  **Early Stage 1**   * Use the counting sequence of ones flexibly * Connect counting and numerals to quantities   **Stage 1 – Part A**   * Use counting sequences of ones with two-digit numbers and beyond   **Data**  **Early Stage 1**   * Respond to questions, collect information and discuss possible outcomes of activities * Organise objects into simple data displays and interpret the displays   **Stage 1 – Part A**   * Represent data with objects and drawings and describe the displays   **Stage 1 – Part B**   * Create displays of data and interpret them | * [Resource 9: Data table](#_Resource_5:_Three) * Collection of objects, for example, counters, teddies, shells, pompoms and blocks * Writing materials |
| [**Lesson 7: Daily activities – Part 1**](#_Lesson_7:_Daily)  60 minutes  Events can be sequenced and used to form questions to collect data. | **Representing whole numbers**  **Early Stage 1**   * Connect counting and numerals to quantities   **Stage 1 – Part A**   * Represent the structure of groups of ten in whole numbers   **Non-spatial measure**  **Early Stage 1**   * Time: Compare and order the duration of events using the language of time   **Data**  **Stage 1 – Part B**   * Create displays of data and interpret them | * [Resource 10: Sequencing activities](#_Resource_9:_Sequencing) * Video: [Number busting – number talk (renaming 26) (2:00)](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/mathematics-curriculum-resources-k-12/mathematics-k-6-resources/number-busting-renaming-26) * Craft sticks * Sticky notes * Writing materials |
| [**Lesson 8: Daily activities – Part 2**](#_Hlk102720445)  60 minutes  Data and events can be sequenced in different ways. | **Non-spatial measure**  **Early Stage 1**   * Time: Compare and order the duration of events using the language of time   **Data**  **Stage 1 – Part A**   * Ask questions and gather data * Represent data with objects and drawings and describe displays   **Stage 1 – Part B**   * Identify a question of interest and gather relevant data * Create displays of data and interpret them | * [[Resource 10: Sequencing activities](#_Resource_8:_Our)](#_Resource_9:_Sequencing) * [[Resource 11: Clock number talk](#_Resource_8:_Our)](#_Resource_7:_Number) * [Resource 12: Our day template](#_Resource_8:_Our) * [Writing materials](#_Resource_8:_Our) |

## Lesson 1: Introducing ‘Clear the Board’

**Core concept:** A quantity can be described by talking about its smaller parts.

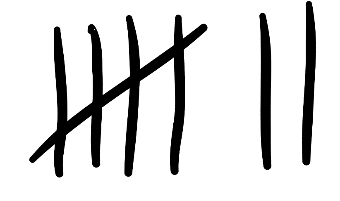
The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that different combinations of numbers can add up or bond to form a given number.  In addition, students working towards Stage 1 outcomes are learning that gathering and organising data helps to answer questions. | Students working towards Early Stage 1 outcomes can combine 2 number representations that add up to 10 or less.  Students working towards Stage 1 outcomes can:   * combine 2 number representations that add up to 12 or less * track the total number of rolls using tally marks * develop questions from data gathered. For example, why 1 and 13 are always left over. |

### Daily number sense: Tally marks – 10 minutes

1. Draw 7 tally marks and ask students what they think the representation might mean (see Figure 1).

Figure 1 – Tally marks



1. Provide an opportunity for students to [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) and then share their thinking.
2. Explain that the representation is of the number 7 and each of the tally marks represents one observation. Ask students why they think the fifth mark has been drawn diagonally through the first 4 marks. Have students share their responses.

**Tally marks:** A single mark in a tally represents one observation. Tally marks are usually drawn in groups of 5. The first 4 marks are often drawn vertically, with the fifth mark drawn diagonally through the first 4. This makes counting in groups more efficient.

1. Using their individual whiteboards, students write the numbers 1-6. Provide Early Stage 1 students with counters and display a [6-sided die](https://www.didax.com/apps/dice/). Tell students that it will be rolled 20 times. Each time it is rolled, Early Stage 1 students need to place a counter next to the number and Stage 1 students need to record a tally mark next to the number. For example, if a 6 is rolled, a counter or mark is recorded next to 6 (see Figure 2).

Figure 2 – Recording with counters and tally marks

Whiteboard 1: 1 with 3 counters, 2 with 1 counter, 3 with 5 counters, 4 with 4 counters, 5 with no counters and 6 with 7 counters. 
Whiteboard 2: 1 with 3 tally marks, 2 with 1 tally mark, 3 with five tally marks, 4 with 4 tally marks, 5 with no tally marks and 6 with 7 tally marks.

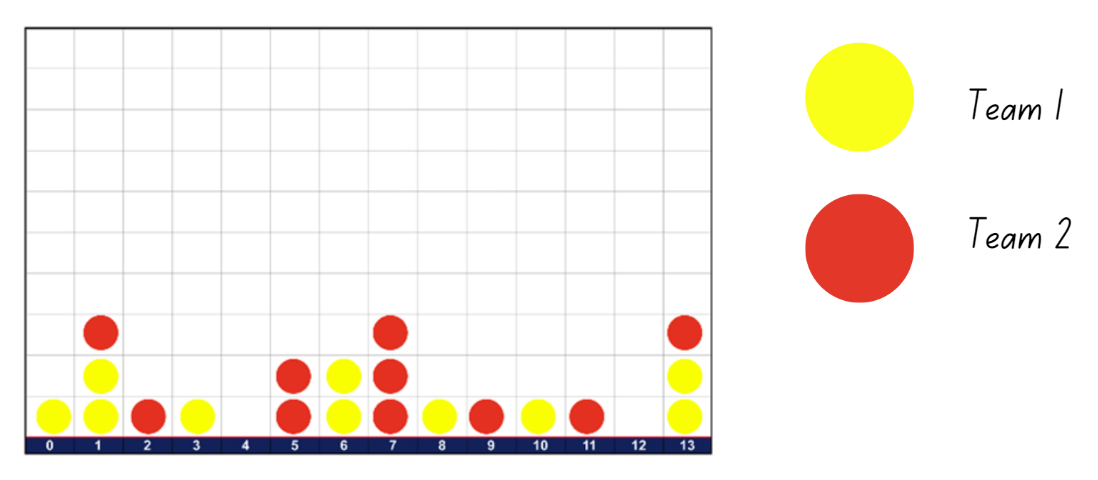
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### ‘Clear the Board’ – 40 minutes

**Note:** Consider printing [Resource 1: Stage 1 gameboard](#_Resource_1:_+) and [Resource 2: Early Stage 1 gameboard](#_Resource_2:_ES1) on A3 paper.

1. Explain that students are going to play a game in small teams. Each team rolls two 6-sided dice and combines the numbers rolled. The team then removes the corresponding counter from the gameboard. Stage 1 students record the number of rolls using tally marks. Model playing the game against the class.
2. Display [Resource 1: Stage 1 gameboard](#_Resource_1:_+) and each team decides which numbers to place their 10 counters on (see Figure 3).

Figure 3 – ‘Clear the Board’ set up



**Note:** Early Stage 1 students can play the game using [Resource 2: Early Stage1 gameboard](#_Resource_2:_ES1).

1. Teams take turns rolling two 6-sided dice and combining the dots together. If the team has a counter on the corresponding number for the total combinations of dots, they remove their counter. For example, if Team 1 rolls a 6 and 4 and have a yellow counter on 10, they can remove the yellow counter. Only one counter can be removed each turn. Stage 1 teams must also record a tally mark for the total next to the number on [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear).

**Note:** Early Stage 1 students can play this game using a 6-sided die and number cards to 4. This will allow them to combine numbers to 10. Support Early Stage 1 students by providing them with counters and ten-frames to keep track when combining numbers.

1. The first team to remove all 10 counters from the gameboard is the winner.
2. When students are confident with the game, split them into groups of 4 with 2 players in each team. Each Early Stage 1 group needs one copy of [Resource 2: Early Stage 1 gameboard](#_Resource_2:_ES1) and each team needs 10 of the same-coloured counters, ten-frames, dice or number cards. Each Stage 1 group needs two 6-sided dice, one copy of [Resource 1: Stage 1 gameboard](#_Resource_1:_+) and each team needs 10 of the same-coloured counters and [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear).
3. Teams play each other twice. During this time, observe the various strategies that students use to combine the dots or counters and record rolls.

**Note**: Stage 1 teams keep [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear) as it will be used in future lessons.

This table details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Are students able to combine 2 number representations that add up to 12 or less? **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-02)** * Are students able to combine 2 number representations that add up to 12 or less? **(MAO-WM-01, MA1-CSQ-01)** * What are students noticing and wondering while they are playing and gathering data about the game? For example, it is hard to roll a 2 or it is impossible to roll zero. **(MAO-WM-01, MA1-DATA-01, MA1-DATA-02, MA1-CHAN-01)** * Are students able to track the total number of rolls in each game using tally marks? **(MAO-WM-01, MA1-RWN-01, MA1-DATA-01)**   What to collect:   * observational data **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-01, MA1-CSQ-01, MA1-DATA-01, MA1-DATA-02, MA1-CHAN-01)** * [Resource 4: Assessing game play](#_Resource_4:_Assessing). **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-01, MA1-CSQ-01, MA1-DATA-01, MA1-DATA-02, MA1-CHAN-01)** | Students are unable to make use of part-whole relations in determining the total number of dots. Provide students with double-sided counters. Ask:   * Can you recreate the dot patterns using these counters? * Now that you can move the dots, which ones would you move to make a friendly number? For example, moving 4 dots from the 5, then combining them with 6 to make 10.   Students have difficulty developing, noticing, and wondering questions from the game. Ask:   * What were some of the first numbers you cleared from the game board? * Are there any numbers that you found difficult to clear from the board? What were they? | Students are confident in using count-by-one strategies to determine total number of dots. Ask:   * Is there another way to find the total of the 2 dice without having to count? * What do you know about the relationship between numbers that might help you find the total? * What do you know about 5 that might be useful when combining it with 6? For example, if 5 is 4 and one, can you combine 6 and 4 and 1. |

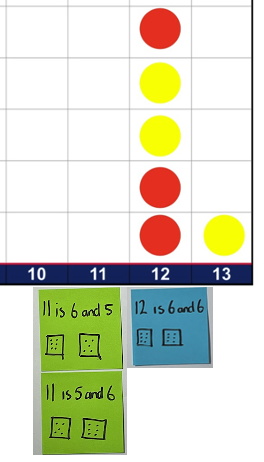
### Discuss and connect the mathematics – 10 minutes

1. Regroup as a class and ask:

* What did you notice when playing the game?
* Did some numbers come up more often than others?
* Were some numbers impossible to roll?
* What strategies did you use to combine the totals?

1. Tell the class that many teams put a lot of their counters on 11 and 12. Have students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) about the different dice combinations that they could make for 11 and 12.
2. Select students to share their thinking and model recording combinations using sticky notes (see Figure 4).

Figure 4 – Recording combinations to 11 and 12



**Note:** Keep sticky notes for [Lesson 2](#_Lesson_2:_Clear).

1. Ask students if this information changes how they might place their counters in future games. Explain that this is something the class is going to continue to think about and explore in future lessons.

## Lesson 2: ‘Clear the Board’

**Core concept:** Data can be used to answer questions and describe the world.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that:   * gathering and organising data helps to answer questions * different combinations of numbers can add up or bond to form a given number. | All students can:   * use data displays to develop and answer questions * recognise and recall different combinations of 2 numbers that add up to a given number.   In addition, students working towards Early Stage 1 outcomes can group objects according to characteristics to form a data display.  In addition, students working towards Stage 1 outcomes can create data displays using a combination of pictures, symbols, and words. |

### Daily number sense – 10 minutes

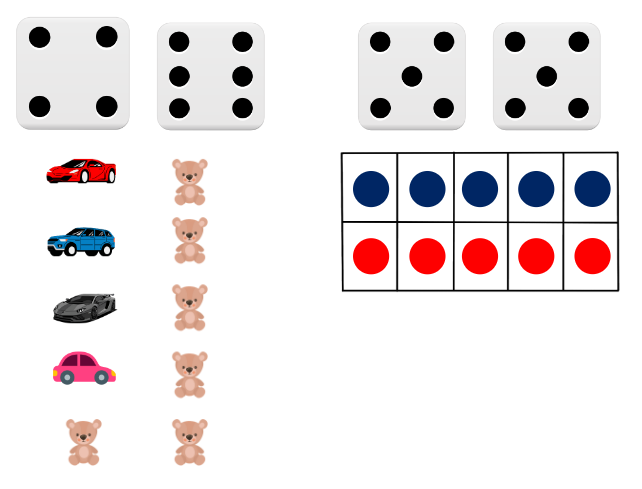
1. As part of the daily number sense session, consider including short, focused, and frequent teaching activities that target a concept or skill (for example, number sense) that you have identified as a class need through formative assessment. Examples of resources for this include:

* [Thinking Mathematically Stage 1](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/mathematics-curriculum-resources-k-12/mathematics-k-6-resources.main-education--category---catalogue---key-learning-area---mathematics---thinking-mathematically.nameAsc.1.grid#catalogue_auto)
* [Universal Resources Hub.](https://resources.education.nsw.gov.au/home)

### Reviewing results – 10 minutes

1. Have Stage 1 students look at the data gathered on [Resource 3: Stage 1 recording sheet](#_Resource_3:_‘Clear) from [Lesson 1](#_Lesson_1:_Let’s) and reflect on the most and least common numbers rolled. Stage 1 students share with the class.
2. Display the sticky notes of the possible combinations for 11 and 12 from [Lesson 1](#_Lesson_1:_Introducing). Ask all students to record all the possible combinations for 10 using two 6-sided dice.
3. Provide students with independent thinking time, dice, and an individual whiteboard to record their combinations. Early Stage 1 students can use a ten-frame or different objects to model the combinations to 10 (see Figure 5).

Figure 5 – Early Stage 1 combinations



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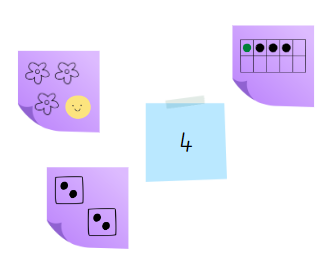
1. Select students to share their responses and model recording their thinking using sticky notes. Add the sticky notes to a class display.

### Exploring combinations – 20 minutes

1. Provide pairs with two 6-sided dice and a collection of sticky notes. Early Stage 1 students work in pairs to find all the combinations for numbers 0-10. Stage 1 students work together to find all combinations for numbers 0-13.

**Note:** Early Stage 1 students can use ten-frames and concrete materials to keep track when combining numbers. Early Stage 1 students can draw dice patterns, ten-frames or collections of objects (see Figure 6).

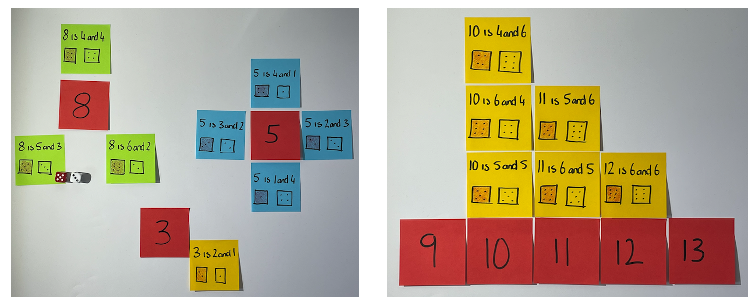
Figure 6 – Early Stage 1 displays of combinations



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1. When pairs are confident that they have identified all the combinations, provide them with a large sheet of paper. Students stick their sticky notes to the paper to display all their combinations (see Figure 7).

Figure 7 – Stage 1 displays of combinations



### Discuss and connect the mathematics – 20 minutes

1. Students display their work and go on a [gallery walk](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/555) to look at the other groups combinations and how they have displayed their data.
2. Regroup as a class and ask:

* What do you notice about the different ways students have organised their data?
* How do you know you have all the combinations?
* Which way makes it easier to keep track of the combinations?
* Which number had the greatest number of combinations?
* Which way of displaying the combinations made it easier to answer these questions without having to count?
* Looking at the combinations of numbers for 10, I notice that there are 2 notes with 6 and 4. Are they the same? Why or why not?

1. Provide additional time for students to revise their thinking, find missing combinations of numbers through being more systematic in their approach, and reorganise their data displays. If needed, students can glue their sticky notes to their display.

This table details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Are students able to group objects according to characteristics to form a data display? **(MAO-WM-01, MAE-DATA-01)** * Are students able to create and organise their data? **(MAO-WM-01, MA1-DATA-02)** * Are students able to use their data display to develop and answer questions? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** * Are students working systematically when exploring combinations? **(MAO-WM-01, MA1-CSQ-01)** * Can students recognise and recall different combinations of 2 numbers that add up to a given number? **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-02, MA1-CSQ-01)**   What to collect:   * observational data **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-02, MAE-DATA-01, MA1-CSQ-01, MA1-DATA-01, MA1-DATA-02)** * student work samples. **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-02, MAE-DATA-01, MA1-CSQ-01, MA1-DATA-01, MA1-DATA-02)** | Students have difficulty working systematically through the range of numbers and combinations.   * Ask students if there is a way to organise the numbers to make sure all combinations have been recorded. * Support students to identify patterns within the combinations, for example, if we decrease 6 (in 6 and 4 is 10) by one to make 5, and we add one more to the 4, it continues to make 10. Does this pattern continue? * Provide students with different visual representations of numbers by using either dice dot patterns, domino patterns or ten-frame representations. Insert these into pocket dice or create cube nets to make the dice. | Students confidently and accurately interpret information by describing the shape and distribution of the data. For example, the numbers in the middle of the range have more combinations. Ask:   * What would the data look like if we played the game with three 6-sided dot dice? How would it change? * Which numbers would have the greatest number of combinations if we played the game with two 9-sided dot dice? |

## 

## Lesson 3: Revisiting ‘Clear the Board’

**Core concept:** Data can be used to look for patterns and to help predict the likelihood of events.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that:   * data displays help mathematicians to share what they have noticed about the world around them * mathematicians use data to help them make predictions.   In addition, students working towards Stage 1 outcomes are learning that the likelihood of possible outcomes can be identified and described. | All students can interpret data to choose the most likely combinations of numbers on the dice to increase chances of winning the game.  In addition, students working towards Early Stage 1 outcomes can predict possible responses to a question.  In addition, students working towards Stage 1 outcomes can describe events as likely, unlikely, more likely, less likely and impossible. |

### Daily number sense: Would you rather? – 15 minutes

1. Display [Resource 5: Would you rather?](#_Resource_5:_Would) and ask students the 2 questions on the number talk.

**Note:** Explain to Early Stage 1 students that the even numbers on the dice are 2, 4 and 6. Display the even numbers for students to reference.

1. Allow individual thinking time and then students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) to discuss the options. Ask:

* What did the options require you to think about?
* How did you reach your decision?
* Did you draw on any strategies when solving the problem?
* Are you confident with your decision? Why?

1. Provide students with two 6-sided dice to roll 10 times. Students record if they roll 2 even numbers or doubles.
2. After playing, ask:

* Are you still confident with your decision? Why or why not?
* Do you think the results will change if you play again?
* What are you still wondering?

### Describing the combinations – 10 minutes

This activity has been adapted from [Dice Sums](https://www.youcubed.org/resource/data-talks/) from [youcubed](http://youcubed.org).

1. Ensure all pairs of students have their data display from [Lesson 2](#_Lesson_2:_‘Clear). Display [Resource 6: Dice display](#_Resource_6:_Dice_1) and allow time for students to compare it to their data display.
2. After looking at their display and [Resource 6: Dice display](#_Resource_6:_Dice_1), have Early Stage 1 students make predictions about which number they think might be rolled the most and least and explain why they think this. Facilitate Stage 1 students to discuss and label the likelihood of rolling certain numbers. Ask Stage 1 students to identify numbers that are likely, unlikely, and impossible and have them label them on their data display (see Figure 8).

Figure 8 – Labelling and comparing the likelihood of rolling different combinations

Example of labelling and comparing the likelihood of rolling different combinations.
First image displays all the outcomes from rolling two dice, from 2 on the left (by rolling 1 twice) through to 12 on the right (by rolling 6 twice). The image has been annotated to identify combinations that are more or less likely to roll.

Adapted from [‘Dice Sums’](https://www.youcubed.org/resource/data-talks/) by [youcubed](https://www.youcubed.org/) and is licensed under [CC-BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/).

1. Looking at the data displays, ask:

* Which combinations of numbers are most likely to be rolled? Why?
* Which combinations of numbers are least likely to be rolled? Why?
* Are some numbers impossible to roll? How do you know?
* Looking at the combinations for 6 and 4, which one is more likely to be rolled during a game?
* Are there any other numbers that are just as likely to occur as 6? What are they?
* If you were to play ‘Clear the Board’ again, which numbers would you pick to give you the best chance of winning? Are there any numbers you would not choose? Why?

1. Explain that mathematicians use data to help them develop a hunch, also called a conjecture. Propose the conjecture that, if students choose numbers that have the greatest number of possible combinations, they have a better chance of winning the game.

### ‘Clear the Board’ – 25 minutes

1. Revise the rules from [Lesson 1](#_Lesson_1:_Let’s), hand out resources and have students play ‘Clear the Board’ against another team.
2. Explain that this is an opportunity to test the conjecture that certain combinations of numbers are more likely than others. Remind students that they are free to choose any numbers they like, but that they should think about which numbers will give their team the best chance of winning.
3. This time, ask Stage 1 students to record both the total number of dice rolls using tally marks, and the number combinations that are rolled during the game. For example, if a 5 is rolled, a tally mark would be placed in the first column next to 5 and the combination rolled; 4 and 1 would be placed in the next column.

**Note:** Take photos of students’ gameboards as they play to support the discussion in the next section.

This table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Can students interpret the data and use knowledge of the possible combinations to inform the choice of numbers (predict the outcomes of events)? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** * Can students predict possible responses to a question? **(MAO-WM-01, MAE-DATA-01)** * Are students able to describe events as likely, unlikely, more likely, less likely and impossible? **(MAO-WM-01, MA1-CHAN-01)** * Can students recognise and recall different combinations of 2 numbers that add up to a given number? **(MAO-WM-01, MAE-CSQ-01, MAE, CSQ-02, MA1-CSQ-01)**   What to collect:   * observational data. **(MAO-WM-01, MAE-CSQ-01, MAE-CSQ-02, MAE-DATA-01, MA1-CSQ-01, MA1-DATA-01, MA1-DATA-02, MA1-CHAN-01)** | Students are not yet able to use data display to help predict outcomes. Ask:   * Looking at the picture from our number talk today, which numbers have the greatest number of combinations? * Which numbers are more likely to be rolled? Which numbers are least likely? | Students can confidently and accurately use the data to predict the outcomes of events to increase their chances of winning the game. Ask:   * What numbers would you choose if we were to use two 9-sided dot dice? * What would the game board and data look like? |

### Discuss and connect the mathematics – 10 minutes

1. Regrouping as a class, Stage 1 pairs compare their current recording sheet with the one from [Lesson 1](#_Lesson_1:_Let’s). All students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) to discuss anything interesting they noticed from playing the game this time.
2. Strategically select and sequence examples of students’ gameboards and recording strategies to help facilitate a discussion about the key mathematical ideas. Ask:

* Did the numbers you predicted give your team the best chance of winning?
* Were there any numbers that surprised you when they came up? Why?
* Is there anything you are still wondering?

## 

## Lesson 4: Biography glyphs – Part 1

**Core concept:** Data can be collected to answer questions. Data can be visually displayed and read.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that:   * groups of 10 can be represented in different structures * asking questions and collecting information helps to learn more about a topic * the same information can be displayed in different ways. | All students can use symbols to create and interpret data displays.  In addition, students working towards Early Stage 1 outcomes can:   * count out a specified number of objects from a large collection * ask and respond to questions about information collected.   In addition, students working towards Stage 1 outcomes can:   * recognise that 10 ones are the same a one 10 * ask and find answers to questions by collecting data. |

### Daily number sense: What number am I? – 10 minutes

1. Build student understanding of 10 ones are one 10 by making statements to guess the number. For example, I am thinking of a number that has:

* 18 ones
* one 10 and 2 ones
* 3 tens and 4 ones
* one 10 and 12 ones
* 45 ones.

1. Provide Early Stage 1 students with a large collection of counters and have them count out the number, ensuring they keep track of the count. Stage 1 students record the numbers on their individual whiteboard.
2. Students create their own questions to ask the class or a partner.

**Note:** Provide Early Stage 1 students with numbers between 0-20.

The table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Can students count out a specified number of objects from a large collection? **(MAO-WM-01, MAE-RWN-01)** * Can students recognise that 10 ones are the same as one 10? **(MAO-WM-01, MA1-RWN-01)**   What to collect:   * observational data. **(MAO-WM-01, MAE-RWN-01, MA1-RWN-01)** | Students are unable to recognise that 10 ones are the same as one 10.   * Provide students with a ten-frame and counters to represent the number when thinking of and guessing partners numbers. * Students use concrete materials, like, interlocking cubes, MAB blocks or craft sticks to represent 10 ones as one 10. | Students can recognise that 10 ones are the same as one 10.   * Challenge students to think of and make statements about three-digit numbers. * Students need to come up with at least 3 different statements for the same number. |

### Creating biography glyphs – 30 minutes

This lesson has been adapted from Marks Krpan C (2013).

1. Revise that, in the last few lessons, the focus was on making a data display. Remind the class that they explored possible dice sum combinations and how the data could help increase the chance of winning. Explain that students can be curious about anything and collect data to find answers. This is one of the reasons mathematicians make data displays; they get curious and want to share what they have learned.
2. Explain that mathematicians can also be curious about each other. Ask students what they wonder about each other. Students may need some prompts, for example, what language do students in the class speak, or what superpower students might want. Students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) and then share their ideas. Record student suggestions of what they wonder about each other.
3. Explain that data can be represented as a symbol, like a glyph. Since the class is representing data about themselves, the data will be displayed by using glyphs to make a face.

**Glyphs**: A ‘glyph’ is a symbol, icon or character that represents information.

1. As a class, choose 6 suggestions of what students wonder about each other and make them into a category heading on [Resource 7: Biography glyph key](#_Resource_7:_Biography_2). Co-construct other suggested responses (see Figure 9). Ensure categories and glyphs are colour-coded for easy interpretation later.

Figure 9 – Biography glyphs key (the categories and symbols can be adapted to suit the student’s interests and needs)

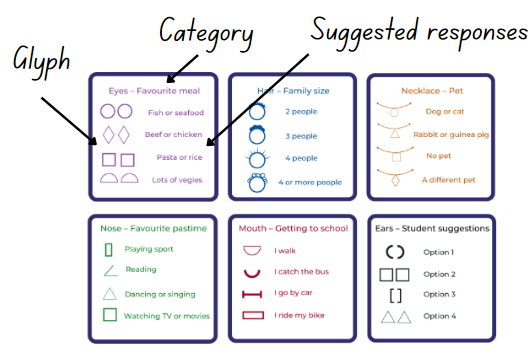


Image adapted from Marks Krpan C (2013).

1. Demonstrate the creation of your teacher biography glyph by selecting the matching glyph and colour from each category to create your biography data face. For example, if pasta is your favourite food, draw 2 purple square eyes.
2. Provide each student with [Resource 8: Biography glyph face](#_Resource_8:_Biography) to create their own biography glyphs. As a class, systematically select a category and read and display each glyph option to support students to draw the matching glyph to their paper face (see Figure 10).

Figure 10 – Students' biography glyphs



**Note**: Figure 10 shows a range of possible student responses. Some responses will be easier to interpret than others. First, focus on the details of the glyphs, then the composition of the ‘face’, and then the image as a whole.

This table details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Can students ask and respond to questions about information collected? **(MAO-WM-01, MAE-DATA-01)** * Are students able to ask and find answers to questions by collecting data? **(MAO-WM-01, MA1-DATA-01)** * Can students use symbols to create a data display? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01)**   What to collect:   * [Resource 8: Biography glyph face](#_Resource_8:_Biography). **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01)** | Students find it difficult to draw glyph shapes with accuracy.   * Have students rehearse drawing the glyph by carefully tracing to ‘feel’ the glyph shape with a finger prior to drawing it on their paper face. * Provide students with objects that are the shapes needed so students can trace around the shapes. | Students complete their biography glyph independently and quickly.   * Have students add more categories of interest for the glyph key and create their own glyphs within these categories to use for their biography glyph. * Have students share their additional categories with a partner. Have the partner draw themselves using the new key. |

### Discuss and connect the mathematics – 20 minutes

1. Have students display their biography glyphs and go on a [gallery walk](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/555). As students are walking around, encourage them to stop and read the data of different student biography glyphs. For example, ‘I can see this student has a dog because there is a circle on their necklace.’ Students many need to refer to the class created [Resource 7: Biography glyph key](#_Resource_7:_Biography_2).
2. Regroup as a class and have students bring their biography glyphs for a discussion. Display some student biography glyphs and choose different students to interpret the data or ask questions about it.
3. Discuss how students were able to communicate information about themselves and their classmates through the chosen symbols used. Ask:

* How did we communicate information about ourselves?
* How did we learn information about each other?
* What are you wondering?

This table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for   * Can students use symbols to interpret a data display? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)**   What to collect:   * observational data. **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** | Students find it difficult to interpret a peer’s biography glyph.   * Support students by providing a colour copy of the glyph key to students. * Show students how to systematically identify each glyph on their peer’s paper face, then find it on the key through colour and shape to get the corresponding information. | Students can easily interpret biography glyphs of their peers using the glyph key.   * Students interpret the biography glyphs and match them to as many class members as possible. * Challenge students to create their own glyph key. |

## Lesson 5: Biography glyphs – Part 2

**Core concept:** Data can be sorted, categorised, and displayed in different ways to communicate and highlight information.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that:   * numbers have a sequence based on their value * data can be represented with objects and drawings * data can be described and interpreted * the same information can be displayed in different ways. | All students can:   * investigate a topic by creating suitable questions * sort data into relevant categories.   In addition, students working towards Early Stage 1 outcomes can:   * sequence given numbers and identify numbers before and after a given number * organise collected data using concrete materials into a data display.   In addition, students working towards Stage 1 outcomes can:   * sequence given numbers and identify missing numbers on a number line * organise collected data using concrete materials, tables or symbols. |

### Daily number sense: Number line – 10 minutes

1. Build student understanding of numeral identification and order by correctly sequencing numbers.
2. Write the numbers 6, 12, 14, 18 and 20 on the board in a random order. Using their individual whiteboards, ask Early Stage 1 students to order these numbers from smallest to largest and Stage 1 students to order these numbers from smallest to largest on a blank number line.
3. Choose students to share where they placed their numbers and justify the position of their placement.

**Note**: It is important to look where Stage 1 students placed the numbers on the number line. Check if students have considered the missing numbers or placed all the numbers together.

1. Ask Early Stage 1 students to identify the number before and after the given numbers.
2. Ask Stage 1 students to identify and add the missing numbers.
3. Repeat the above steps for different collections of numbers.

The table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Can students sequence numbers and identify numbers before and after a given number? **(MAO-WM-01, MAE-RWM-01, MAE-RWN-02)** * Can students sequence given numbers and arrange them on a number line? **(MAO-WM-01, MA1-RWN-01)**   What to collect:   * observational data. **(MAO-WM-01, MAE-RWN-01, MAE-RWN-02, MA1-RWN-01)** | Students are unable to order numbers on a number line.   * Provide students with 0-10 number cards to sequence in ascending and descending order. * Provide students with 0-10 number cards with 2 or 3 cards missing. Students order the cards in ascending and descending order and identify the missing cards. * Provide benchmark numbers to assist students in ordering the placement of numbers on a number line. | Students can order a collection of numbers on a number line.   * Provide students with a blank number line with 47 and 67 at either end. Have students determine the placement of 52. * Challenge students with different three-digit number ranges. |

### Sorting and categorising data to answer a question – 30 minutes

1. Students display their biography glyphs from the previous lesson on their desk. Provide time for students to examine them and reflect on the data collected. Ask:

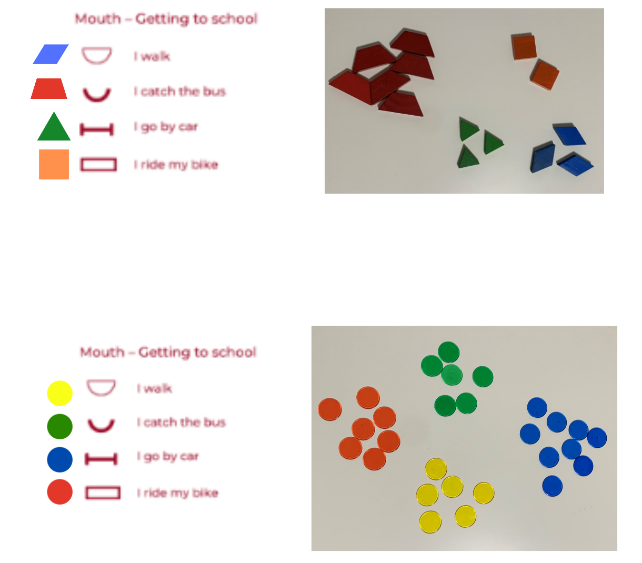
* What do you notice about our class biography glyphs? Students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves).
* What do you wonder about our class? While students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves), monitor for students who wonder something that can be answered by sorting the data within the biography glyphs. For example, how many people have dogs or which superpower is the most popular?

1. Explain that the classes data about different categories has been represented in each individual biography glyph. The glyphs can be used to find out the answers to investigation questions. Display [Resource 7: Biography glyph key](#_Resource_7:_Biography_2) from the previous lesson and ask students to think and share what investigation questions they have about the different categories. Record student suggestions with each category. For example:

* What is the class’ favourite meal?
* What is the class’ least favourite meal?
* How many more people like beef over fish?

1. Ask students to think about how they could use and organise the data to answer these investigation questions. Students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) and then share their ideas with the class.
2. Provide pairs of Early Stage 1 students with a category, for example, getting to school. Assign a shape or coloured counter to the associated glyphs. Explain that students need to collect a square each time they see the glyph which represents riding to school, a trapezium each time they see the glyph which represents catching the bus, and so on. Early Stage 1 students move around the room looking at the data and collecting shapes or counters each time it is represented (see Figure 11).

Figure 11 – Early Stage 1 collecting data



1. Provide pairs of Stage 1 students with a category, their workbook, and access to a range of materials like counters or interlocking cubes. Ask students to use the data presented in the biography glyphs to collect, sort, and categorise the information to answer the investigation questions. Stage 1 students walk around the room, looking at everyone’s biography glyphs to collect relevant information.

**Note:** This task has been left open to allow Stage 1 students to use their own strategies to collect and organise data. When collecting information to investigate a question, students can develop simple ways of recording. Some methods include placing blocks or counters in a line, colouring squares on grid paper or using tally marks.

1. Regroup as a class and strategically select Stage 1 students to present their different strategies for sorting and categorising data on their topic. Ask:

* How did you go about sorting and collating the information from the biography glyphs?
* What information did you pay attention to?
* Which information did you ignore and why?
* How is the way your group sorted your biography glyphs similar or different to another group?

1. If needed, discuss possible ways to sort and categorise data that students have not yet mentioned.
2. Provide time for Early Stage 1 pairs to group their objects into the relevant responses (see Figure 11) and discuss what they notice.
3. Provide time for Stage 1 pairs to reflect on the way they sorted and collated the data in the biography glyphs and if they think they have accurately collected the data to answer some of the investigation questions.
4. Display and introduce [Resource 9: Data table](#_Resource_5:_Three) to Stage 1 students. Ask students to think how this table may assist them when collecting data.
5. Ask Early Stage 1 students to arrange objects according to characteristics to form a data display. Provide sticky notes for students to write or draw the name of the responses for their category (see Figure 12).

Figure 12 – Early Stage 1 arranging responses



1. Provide Stage 1 pairs with the relevant table for their category from [Resource 9: Data table](#_Resource_5:_Three) and together they fill in the relevant sections (see Figure 13).

Figure 13 – Additional information



1. Students then use [Resource 9: Data table](#_Resource_5:_Three) to organise and collect data on their category. Circulate and observe students during this process.
2. While Stage 1 are collecting data, have Early Stage 1 students take a photo of their data display and start to interpret the information by discussing what they notice, for example, most students walk to school, or the same number of students ride and drive to school.

This table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for   * Can students organise collected data using concrete materials into a data display? **(MAO-WM-01, MAE-DATA-01)** * Are students able to organise collected data using concrete materials, tables or symbols? **(MAO-WM-01, MA1-DATA-01)** * Can students investigate a topic by creating suitable questions? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01)** * Are students able to sort data into relevant categories? **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)**   What to collect:   * observational data **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** * student work samples **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** | Students examine the wrong glyphs for the category they are investigating or find it difficult to sort and collate biography glyphs into appropriate subcategories. Ask:   * What are you finding out about our class? * Which glyphs give you that information?   Students might count a glyph more than once or miss it. Ask:   * How do you know you have counted that information just once? * Have you counted all the glyphs? How can you be sure? | Students can easily interpret and collate the biography glyph data for one category.   * Students interpret and collate the biography glyphs for another question/category. * Challenge students to collate the collected data into a data display. |

### Discuss and connect the mathematics – 20 minutes

1. Regroup as a class and have pairs reflect on both data collection methods they used to collect and organise data to answer the investigation questions. Ask:

* What is similar about your collection methods?
* What is different about your collection methods?
* Do they show the same information?
* Is one collection method easier to understand than the other?

**Note:** Early Stage 1 are focusing on how they organised their objects into groups (Figure 11) and arranged them in a data display (Figure 12).

1. Have pairs ask each other the investigation questions and then use the data they have collected to answer the questions.
2. Ask students to share the responses to the investigation questions with the class and record.

**Note:** Keep class biography glyphs and co-constructed strategies for sorting information for next lesson.

## Lesson 6: Biography glyphs – Part 3

**Core concept:** Data can be communicated through visual representations.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

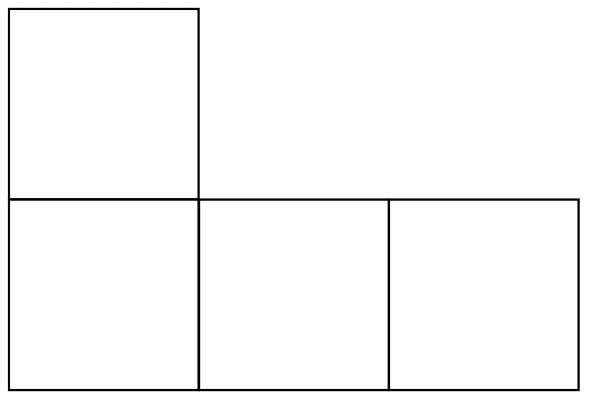
|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| All students are learning that:   * data displays are an efficient way of communicating information * the same information can be displayed in different ways. | Students working towards Early Stage 1 outcomes can:   * group objects according to characteristics * arrange objects to form a data display * interpret information and ask questions about information collected.   Students working towards Stage 1 outcomes can:   * represent data in a picture graph using a baseline, equal spacing and same-sized symbols * interpret information presented in tables and picture graphs. |

### Daily number sense: Number chart puzzle – 10 minutes

This activity has been adapted from *Open-Ended Maths Activities* by Sullivan and Lilburn (2017).

1. Build student understanding of number patterns by connecting a number to its neighbours on a number chart.
2. Draw a number chart puzzle piece (Figure 14), and tell students that the shape covers the number 17 on a number chart. Ask students what other numbers it might be covering.

Figure 14 – Puzzle piece



1. Students use their individual whiteboard to draw different possibilities and share them with the class.
2. Using the same puzzle piece, students complete the activity with a different one or two-digit number.

**Note:** Provide Early Stage 1 students with numbers between 0-20. Initially some students may need to refer to a number chart.

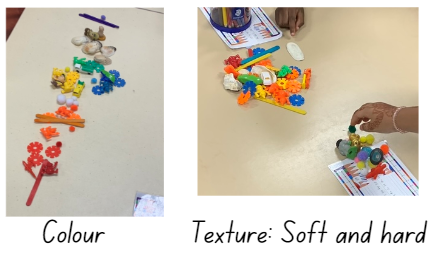
### Using sorted information to create picture graphs – 30 minutes

1. Compare and contrast the examples students used to sort and categorise data in the previous lesson. Ask students to look at all the examples and think of which way helps to know about a category of interest at a glance.
2. Have Stage 1 students think if there is a way to combine the pretty nature of the glyph and the tally table information. Students may suggest a picture graph (or pictograph); if not, make this suggestion.

**Picture graph:** Display of data using images, symbols, or pictures to represent data in categories.

1. Provide Early Stage 1 pairs with a collection of different objects, for example, counters, teddies, shells, pompoms, cars, and blocks. Ask students to look at their objects and have a think how they could group objects according to their characteristics, for example, colour, size, shape, or texture.
2. Explain to Stage 1 students that a picture or symbol can be used to represent data. Discuss how to select an appropriate symbol and tell students that they ideally want a symbol that can be easily reproduced multiple times, so not to use a detailed drawing.
3. Ask Early Stage 1 students to sort their items according to a certain characteristic (see Figure 15).

Figure 15 – Early Stage 1 grouping objects



1. Co-construct a picture graph with Stage 1 students using one of the glyph categories from [Resource 9: Data table](#_Resource_5:_Three) from the previous lesson. Demonstrate just enough to have students get started on a picture graph.
2. Have Stage 1 students remain in the same pairs/groups as the previous lesson. Ask students to create a picture graph for the category they collected the data on, using their data from [Resource 9: Data table](#_Resource_5:_Three).
3. Do not show or tell students how to create a good data display yet. Instead, where appropriate, take photos of student work and pause to allow discussion of key aspects of data displays.

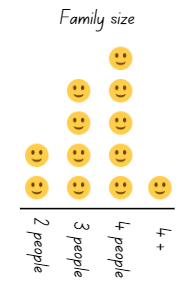
### Relaunch and re-summarise – 20 minutes

1. Regroup with Early Stage 1 and ask students to explain and justify how they sorted their collection of items. Ask students to arrange their objects to form a data display.
2. Have Stage 1 students compare and contrast the picture graphs students made for different categories.
3. Strategically select and display students’ picture graphs to compare, contrast and highlight key features of data displays. Have students identify if they included any of the key features needed to create a clear picture graph. Ask:

* Does one picture represent one data value?
* Are symbols the same size, equally spaced and not overlapping?
* Is there a baseline?

1. Co-construct a picture graph with students (see Figure 16).

Figure 16 – Simple picture graph



Images sourced from [Canva](https://www.canva.com/) and used in accordance with the [Canva Content License Agreement](https://www.canva.com/policies/content-license-agreement/).

1. Relaunch Stage 1 students to complete or revise their picture graph.
2. When Early Stage 1 students have completed their data display, have students move around the room and make statements and ask questions about the different displays. For example, blue is the most popular colour in this collection or there are more hard items than soft items.

**Note:** Students may take photos and use voice recorder to record statements about their display.

1. Gather Stage 1 students together to re-summarise. Discuss how they have revised or modified their data representation to make it clearer to someone else. Ask:

* How have you changed or revised your picture graph? Why?
* How does this make the information clear to someone else?

This table below details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Are students able to group objects according to characteristics? **(MAO-WM-01, MAE-DATA-01)** * Can students arrange objects to form a data display? **(MAO-WM-01, MAE-DATA-01)** * Can students interpret information and ask questions about information collected? **(MAO-WM-01, MAE-DATA-01)** * Are students able to represent data in a picture graph using a baseline, equal spacing and same-sized symbols? **(MAO-WM-01, MA1-DATA-01)** * Can students interpret information presented in tables and picture graphs? **(MAO-WM-01, MA1-DATA-01, MA1-DATA-02)**   What to collect:   * observational data **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** * student work samples. **(MAO-WM-01, MAE-DATA-01, MA1-DATA-01, MA1-DATA-02)** | Students may find it difficult to display data so information conveyed is understood by others.   * Support students to create labels (such as title or categories). * Ask how someone else could know what the picture graph is about.   Students may experience difficulty when representing the data value with the accurate number of picture symbols.   * Ask how students know \_\_ people have \_\_? * Help students to create units or pictures that are uniform in size and are equally spaced with no overlapping. * Help students work from a common baseline. Ask how they can tell how many more/less/most/least, without counting. | Students create a data display enabling efficient communication of class information.   * Challenge students to modify the unit/picture from representing one-to-one value to a unit/picture representing more than the value of one. Students adjust the data display accordingly. * Students create another data display using the same collected data. |

## Lesson 7: Daily activities – Part 1

**Core concept:** Events can be sequenced and used to form questions to collect data.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| Students working towards Early Stage 1 outcomes are learning that events can be compared and ordered using the language of time.  Students working towards Stage 1 outcomes are learning that:   * mathematicians can read data displays to learn about the world (people) around them * data displays can be used to make inferences, make predictions and draw conclusions * mathematicians identify a question of interest and gather relevant data. | Students working towards Early Stage 1 outcomes can:   * use words such as 'night-time', 'morning', 'afternoon' * sequence daily activities.   Students working towards Stage 1 outcomes can:   * use picture graphs to interpret information * ask and answer questions about data represented on a picture graph * draw conclusions from picture graphs to help make meaning from them. |

### Daily number sense: Number busting – 20 minutes

This lesson has been adapted from [Number busting – number talk (renaming 26) (2:00)](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/mathematics-curriculum-resources-k-12/mathematics-k-6-resources/number-busting-renaming-26) from [Thinking mathematically](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/mathematics-curriculum-resources-k-12/mathematics-k-6-resources.main-education--category---catalogue---key-learning-area---mathematics---thinking-mathematically.nameAsc.1.grid#catalogue_auto).

1. Sit in a circle and display one group of 10 and 7 ones using craft sticks or other materials. Tell students you have 17 craft sticks. Students [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) to share ideas on how they can prove there are 17 sticks.

**Note:** Bundles of 10 can be made with craft sticks, interlocking cubes, straws or something similar that can be separated. Watch [Number busting – number talk (renaming 26) (2:00)](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/mathematics-curriculum-resources-k-12/mathematics-k-6-resources/number-busting-renaming-26).

1. Invite students to number bust 17 with you. Model how to use the collection to partition 17 in different ways. Record some of the different ways to rename 17. Invite other students to share their ideas. Demonstrate ideas students may not think of, such as unbundling the collections to show that 17 is 17 ones.
2. Repeat and model the above steps with different two-digit numbers to support students understanding.

### True or false? How do you know? – 10 minutes

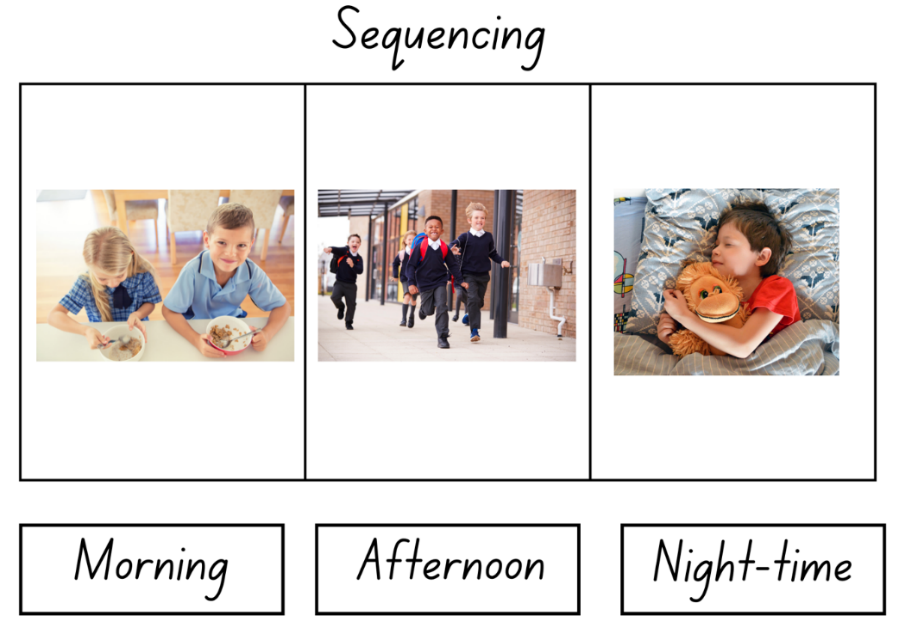
1. Display picture graphs created in the previous lesson and pose some statements that students can indicate are true or false from the graph. For example, most people do not have a pet.
2. Students can answer by indicating true or false via gestures or moving to a particular side of the classroom. Ensure students justify their thinking in reference to the picture graph. For example, ‘I know more people have dogs than cats because…’

### Collecting and sequencing daily activities 1 – 20 minutes

This activity has been adapted from [Dear Data](https://www.youcubed.org/tasks/dear-data/) from [youcubed](https://www.youcubed.org).

1. Ask students to [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) to a partner about the different activities or experiences they engage in during a day. Record students’ ideas of activities, for example, go to school, eat, play sports.
2. As a class, group the activities into categories using the labels ‘morning’, ‘afternoon’, and ‘night-time’.
3. Provide Early Stage 1 students with [Resource 10: Sequencing activities](#_Resource_9:_Sequencing). Students draw a picture of something they do in the morning, afternoon and night-time and label the activities with the language of time (see Figure 17).

Figure 17 – Sequencing example 1



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1. Scaffold Stage 1 students to reflect on the class list of activities and which ones would be useful to represent with data. Example topics for data collection could include:

* Where are we during our day? For example, home, the bus, in the playground, in the classroom.
* What do we eat during our day?
* What activities do we do during the day?

1. Students select one of the data topics and plan how they will collect their data. Students will need to decide:

* What topic they will choose to collect data on.
* How they will they collect their data and what tools they might need.

1. Stage 1 students then reflect on the previous day and record their data in their workbooks.

This table details assessment opportunities and differentiation ideas.

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Are students able to use the terms ‘morning’, ‘afternoon’ and ‘night-time’? **(MAO-WM-01, MAE-NSM-02)** * Do students sequence events in time? **(MAO-WM-01, MAE-NSM-02)** * Can students identify and collect data telling a story about their day, using tools like a table? **(MAO-WM-01, MA1-DATA-01)**   What to collect:   * [Resource 10: Sequencing activities](#_Resource_9:_Sequencing) **(MAO-WM-01, MAE-NSM-02)** * observational data. **(MAO-WM-01, MA1-DATA-01)** | Students are unable to use the terms ‘morning’, ‘afternoon’ and ‘night-time’.   * Use visual prompts for students to associate the language of time with images such as the sun rising, the moon and stars. * Have students identify 2 specific events that happen at different times such as sleeping and school.   Students having difficulty in selecting a topic and collection method. Ask:   * What aspect of your day do you want to represent? For example, ‘Where am I during the day?’ * What data will you need to collect? For example, ‘What are the places you usually visit during the day? What time are you there?’ * How will you keep track of the places you visit and the times you are there? For example, you may scaffold developing a table for students to use when collecting their data. | Students can use the terms ‘morning’, ‘afternoon’ and ‘night-time’.   * Have students identify several activities that they do in the morning. For example, brush teeth, eat breakfast, get ready for school. Have students draw these events and annotate them with words such as ‘before’, ‘after’ and ‘next’. * Students draw activities that happen throughout the day. Students cut the images out and have a partner sequence and label them in order using the language of time. |

### Discuss and connect the mathematics – 10 minutes

1. Have Early Stage 1 students partner with a Stage 1 student. Ask Early Stage 1 students to explain [Resource 10: Sequencing activities](#_Resource_9:_Sequencing) using a storytelling approach of the events in sequential order. Encourage students to verbalise their story using the language of time.
2. Ask Stage 1 students to share their topic for data collection and explain to their partner how they recorded their data and their reasons for recording the data that way.

## Lesson 8: Daily activities – Part 2

**Core concept:** Data and events can be sequenced in different ways.

The table below contains suggested learning intentions and success criteria. These are best co-constructed with students.

|  |  |
| --- | --- |
| Learning intentions | Success criteria |
| Students working towards Early Stage 1 outcomes are learning that events can be compared and ordered using the language of time.  Students working towards Stage 1 outcomes are learning that:   * mathematicians use data to describe their lives and the world around them * the same data can be represented in different ways * different data can be displayed in the same way. | Students working towards Early Stage 1 outcomes can:   * use words such as 'yesterday’, ‘today’ and ‘tomorrow’ * sequence activities that occur over 3 days.   Students working towards Stage 1 outcomes can:   * create a data display telling a story about their day * make simple inferences about their day from their data displays. |

### Daily number sense: Data talk – 15 minutes

This activity has been adapted from [Water Usage](https://www.youcubed.org/resource/data-talks/) from [youcubed](https://www.youcubed.org).

1. Build student understanding of interpreting data in displays by engaging in a data talk.
2. Display [Resource 11: Clock number talk](#_Resource_7:_Number) and ask some questions to generate rich talk.
3. Provide students with independent thinking time, as well as the opportunity to [turn and talk](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/teaching-and-learning-resources/numeracy/talk-moves) to a partner to share their thinking.

The table outlines stimulus prompts to generate conversation about the topic, along with anticipated responses from students.

|  |  |
| --- | --- |
| Prompts | Anticipated student responses |
| * What do you notice? * What do you wonder? * What is going on in this data display? | * I notice that it looks like a clock. There are pictures around the outside of the clock and around the inside. * The pictures all have a different meaning, but I wonder why they are around the clock? * Maybe the pictures on the clock tell us when something is happening. |

1. Strategically select students to share their thinking. Record student thinking for the class to see (see Figure 18).

Figure 18 – Co-constructed noticing and wonderings

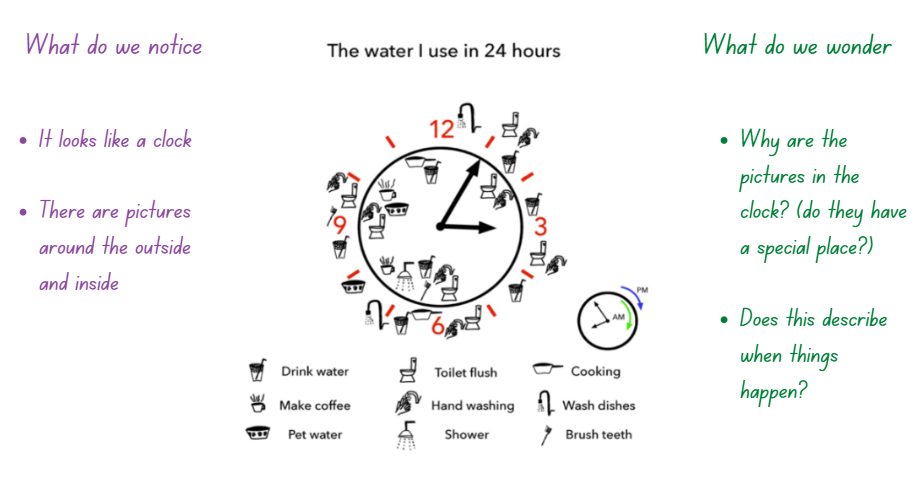


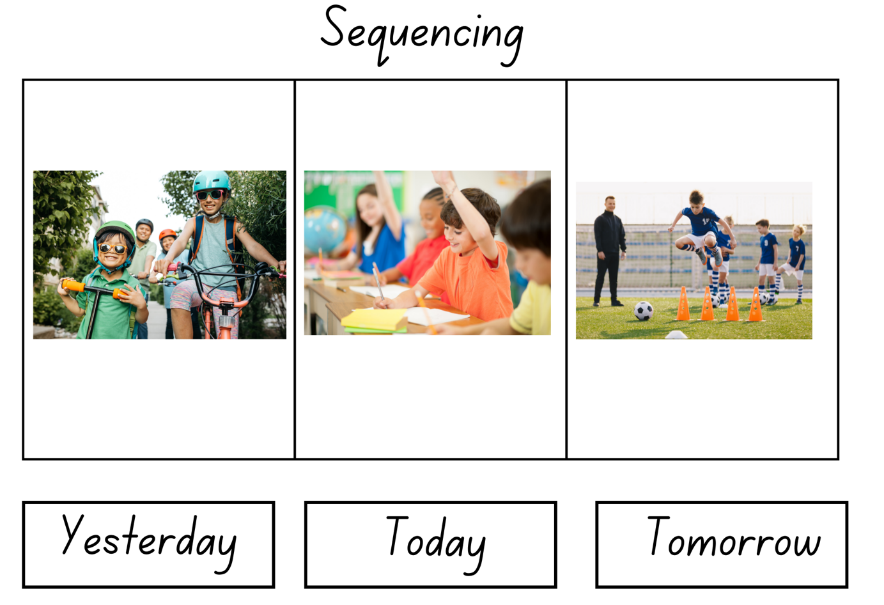
Image adapted from ‘[Water Usage](https://www.youcubed.org/resource/data-talks/)’ by [youcubed](https://www.youcubed.org/) and is licensed under [CC BY 4.0](http://creativecommons.org/licenses/by/4.0).

### Collecting and sequencing daily activities 2 – 30 minutes

This activity has been adapted from [Dear Data](https://www.youcubed.org/tasks/dear-data/) from [youcubed](https://www.youcubed.org).

1. Revise the class list describing events that occur during the day, used in the previous lesson. Discus the terms ‘yesterday’, ‘today’ and ‘tomorrow’ and create a class list of activities that occurred yesterday, today and will occur tomorrow. Ensure the activities are labelled with the category names ‘yesterday’, ‘today’ and ‘tomorrow’. Have a class discussion that some activities may occur on all days and others may only occur on one day. For example, eating breakfast happens every day and soccer practice usually only occurs on one day in the week.
2. Provide Early Stage 1 students with the graphic organiser in [Resource 10: Sequencing activities](#_Resource_9:_Sequencing). Students draw a picture of something they did yesterday, today and will do tomorrow and label the activities with the language of time (see Figure 19).

Figure 19 – Sequencing example 2



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1. For Stage 1 students, revise the data they collected from the previous lesson. Prompt students to consider how they will represent their data.
2. Provide students with [Resource 12: Our day template](#_Resource_8:_Our) and time to create their data display (see Figure 20).

Figure 20 – Student data display

An image of a timeline showing the events in a student's day. The top image has a row of boxes for each hour with images from the key below. Images in the key include a bed, bus, playground, classroom and lunch area. 
The second figure shows pictures of a bedroom, bus, playground, classroom and lunchtime all in a row.
The last figure shows a bedroom, breakfast and bus all in a row.

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This table details assessment opportunities and differentiation ideas

|  |  |  |
| --- | --- | --- |
| Assessment opportunities | Too hard? | Too easy? |
| What to look for:   * Are students able to use the terms ‘yesterday’, ‘today’ and ‘tomorrow’? **(MAO-WM-01, MAE-NSM-02)** * Do students sequence events in time? **(MAO-WM-01, MAE-NSM-02)** * Can students record data telling a story about their day, using tools like a table and data display? **(MAO-WM-01, MA1-DATA-01)**   What to collect:   * [Resource 10: Sequencing activities](#_Resource_9:_Sequencing) **(MAO-WM-01, MAE-NSM-02)** * [Resource 12: Our day template](#_Resource_8:_Our) **(MAO-WM-01, MA1-DATA-01)** * observational data. **(MAO-WM-01, MAE-NSM-02, MA1-DATA-01)** | Students are unable to sequence events in time.   * Use visual prompts for students to associate the language of time with images such as the sun rising, the moon and stars. * Have students identify 2 specific events that happen at different times such as sleeping and school.   Students are unable to record data in a display.   * Scaffold the display into 3 sections morning, afternoon and night-time and have students record one activity for each category. * Have student recount verbally their activities and draw pictures to represent each activity they state. * Provide a selection of generic pictures of everyday activities and have students use the visuals to sequence. | Students can create a data display.   * Have students create a data display for a longer period of time such as a year. Ask students what this may look like and how would they have to change the data recorded. * Ask students to compare their display to a partner’s. Have students identify similarities and differences. |

### Discuss and connect the mathematics – 15 minutes

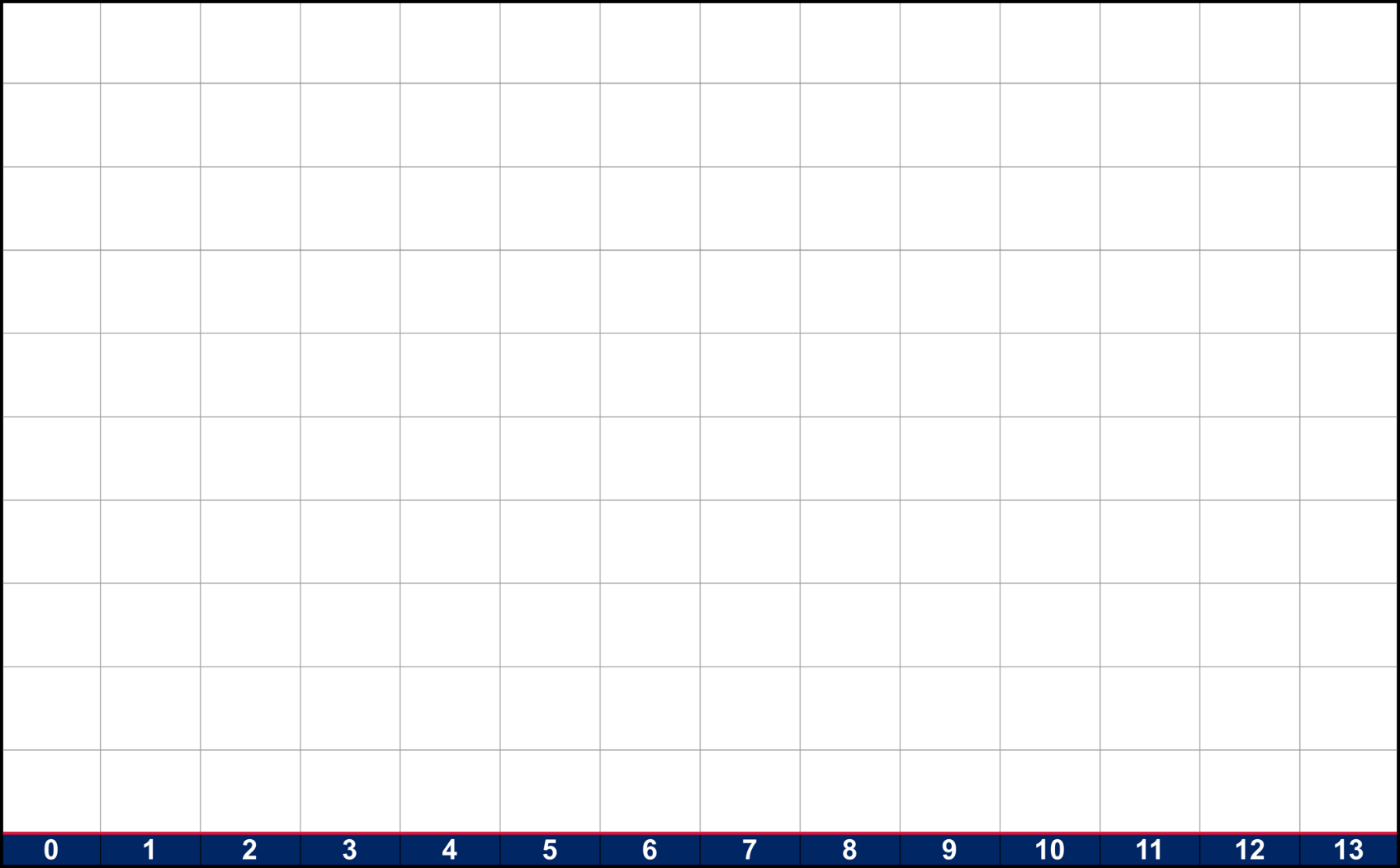
1. Students post their data displays and graphic organisers around the classroom and go on a [gallery walk](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/555#.ZAfIgvM8fK4.link). As students walk around and observe their peers’ work, ask:

* What is the story of this person's day or 3 days?
* What is interesting about the way this person displayed their data?
* What are you wondering and what questions would you ask this person about their day?

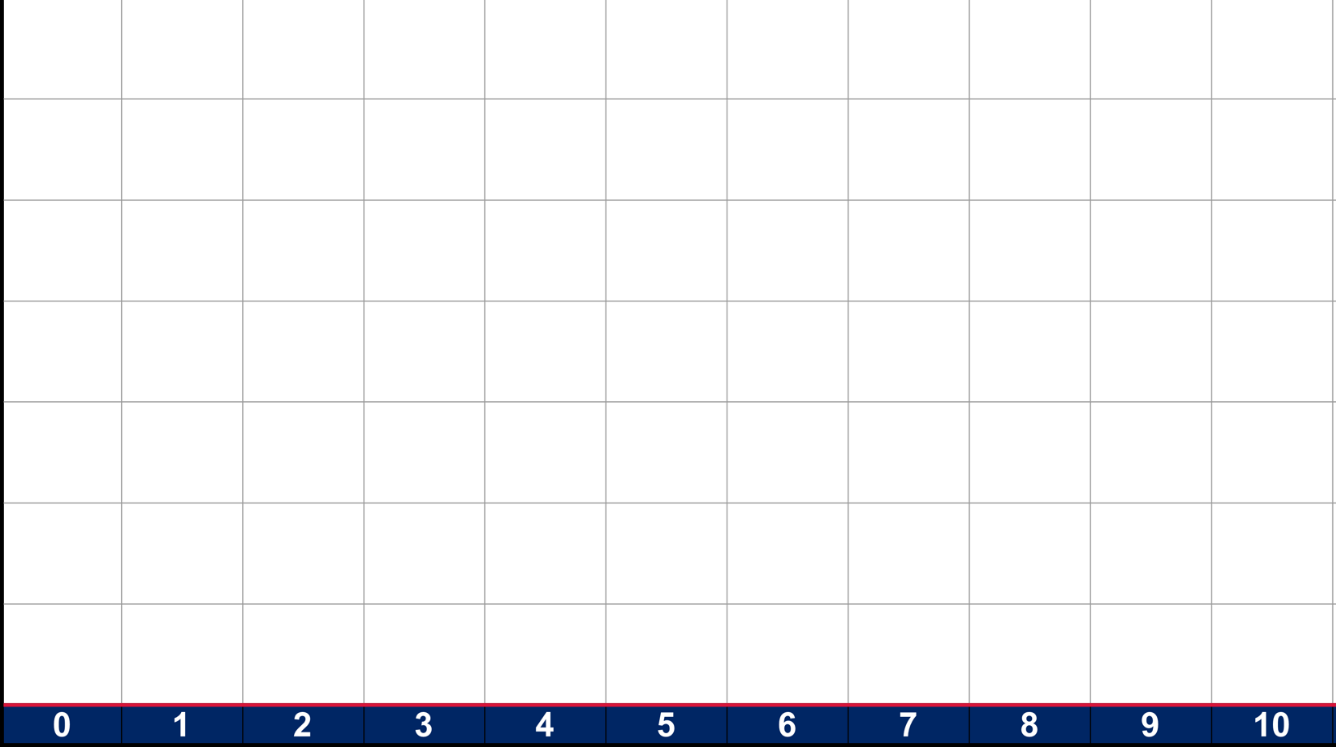
1. After the gallery walk, facilitate a whole class discussion. Ask questions such as:

* What did you learn about yourself that was interesting or surprised you?
* What did you learn about others?
* What ways of displaying the data did you find most interesting? Why?
* What other questions could you ask about yourself that you could answer by collecting data?

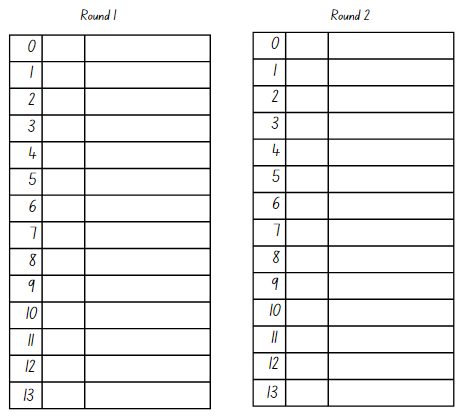
## Resource 1: Stage 1 gameboard



## Resource 2: Early Stage 1 gameboard



## Resource 3: Stage 1 recording sheet



## Resource 4: Assessing game play

|  |  |  |
| --- | --- | --- |
| Focus | Listen, watch, and think | Ask |
| Accuracy | Are they getting correct answers? | What answer did you get? |
| Efficiency and strategy selection | Silently count as students play to assess time taken to answer. | How did you solve it?  Was it an efficient strategy? |
| Flexibility and strategy selection | Are they applying the strategy in a reasonable timeframe? | Why did you pick that strategy?  Is there another strategy that you could use for that problem?  When do you like to use \_\_ strategy instead of \_\_ strategy? |

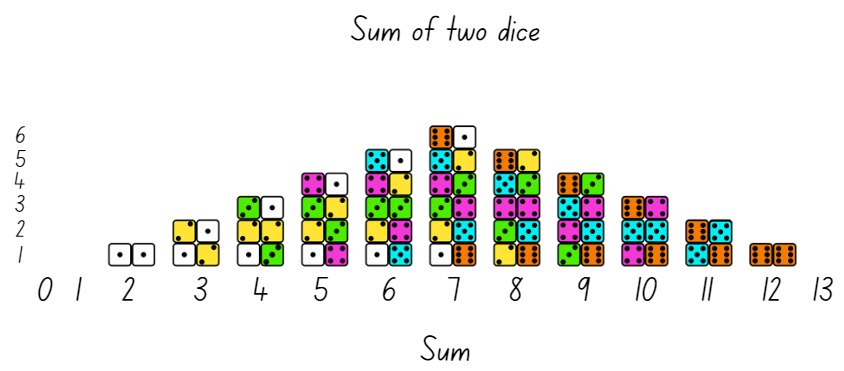
Adapted from Bay-Williams J and Kling G (2019).

## Resource 5: Would you rather?

Would you rather? 
Option 1 - $1 for every time doubles are rolled. 
2 six-sided dice will be rolled 10 times. 
Option 2 - $1 for every time 2 even numbers are rolled. 

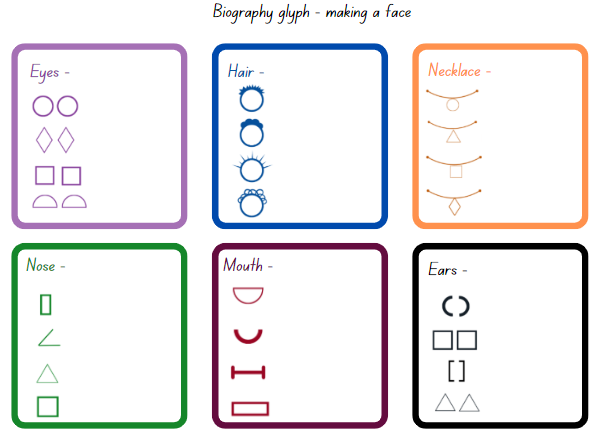
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## Resource 6: Dice display

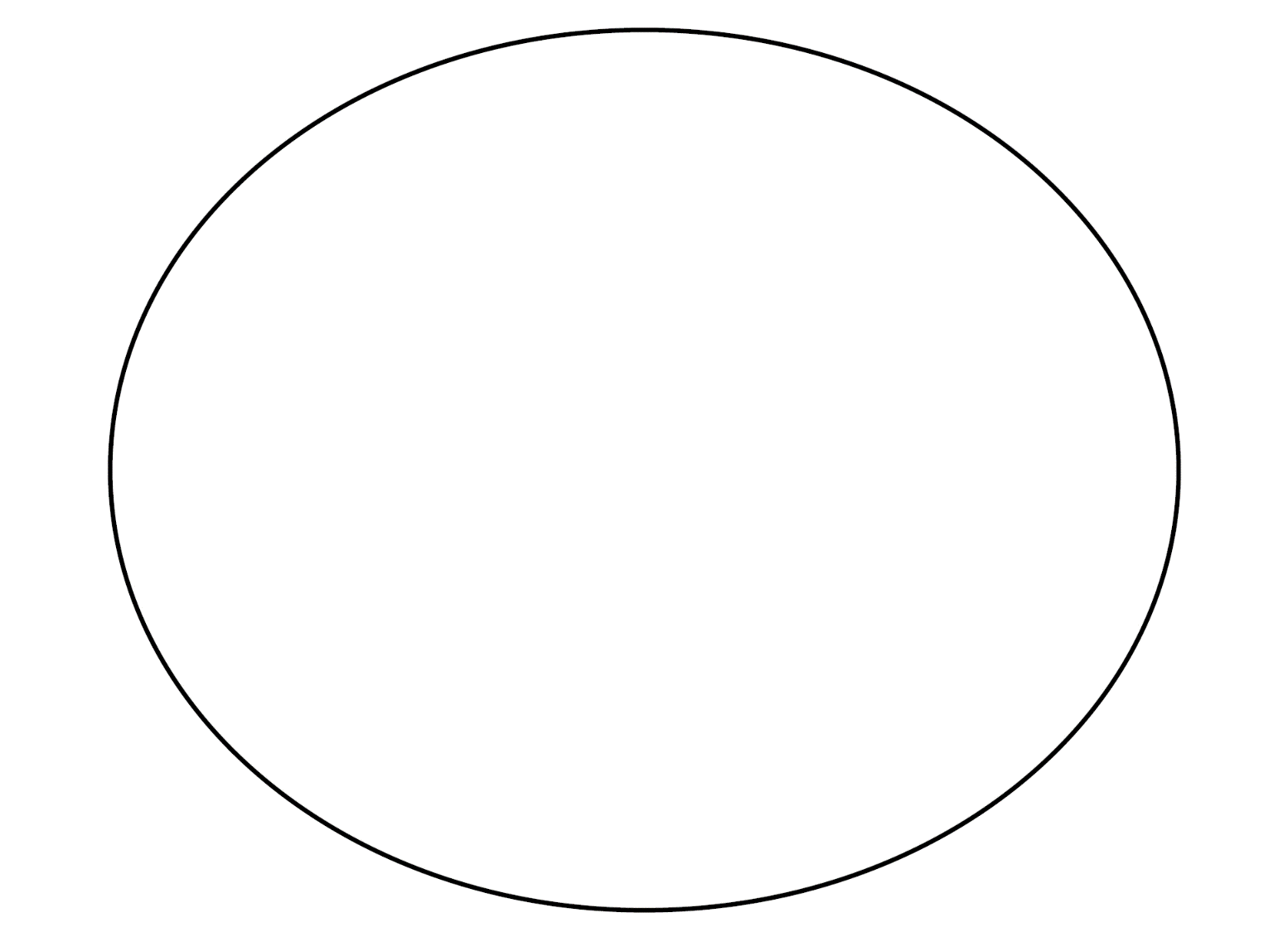


Adapted from ["Dice Sums"](https://www.youcubed.org/resource/data-talks/) by [youcubed](https://www.youcubed.org/) is licensed under [CC BY 4.0](http://creativecommons.org/licenses/by/4.0).

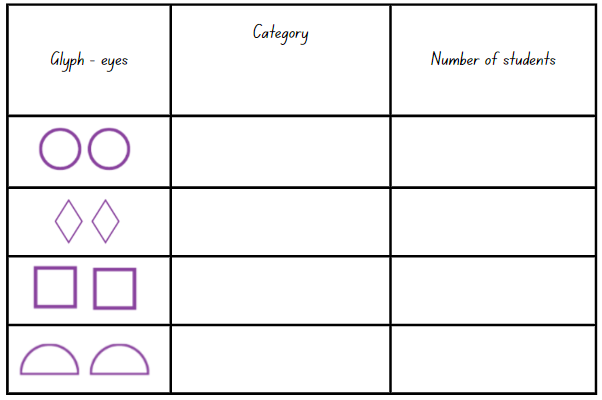
## Resource 7: Biography glyph key

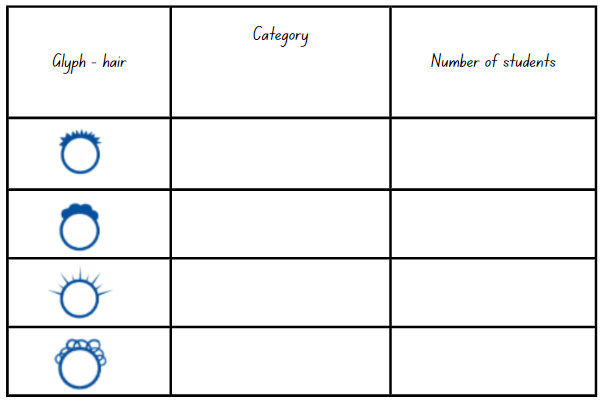


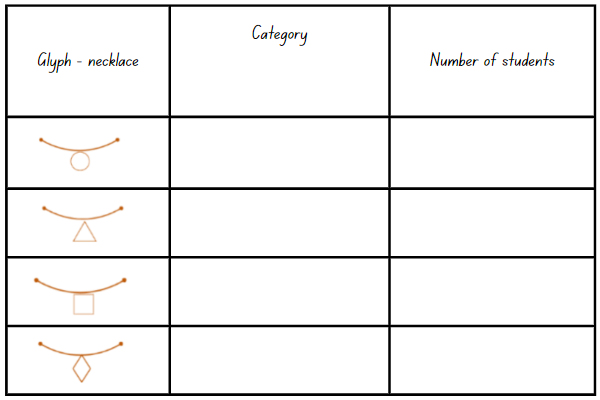
## Resource 8: Biography glyph face

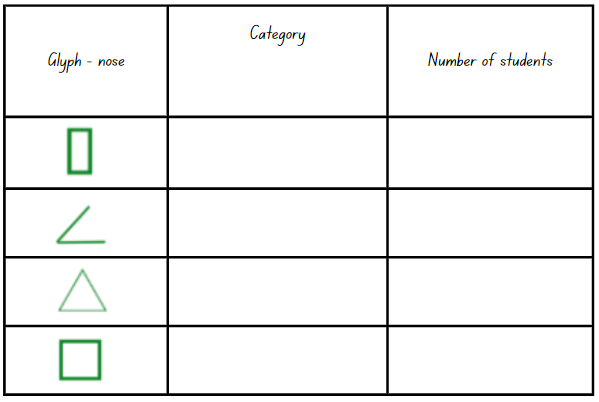


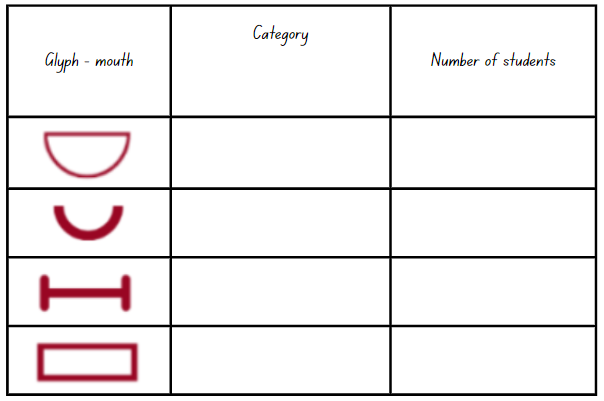
## Resource 9: Data table

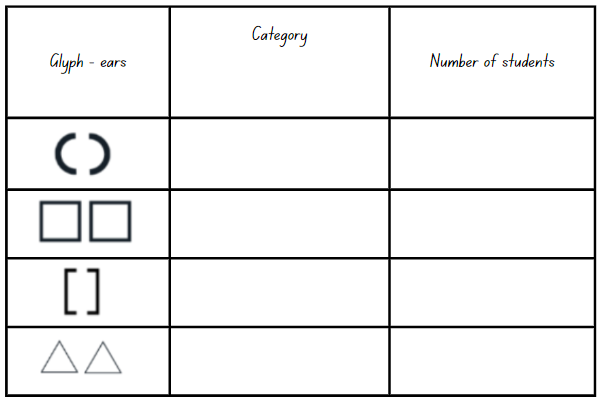




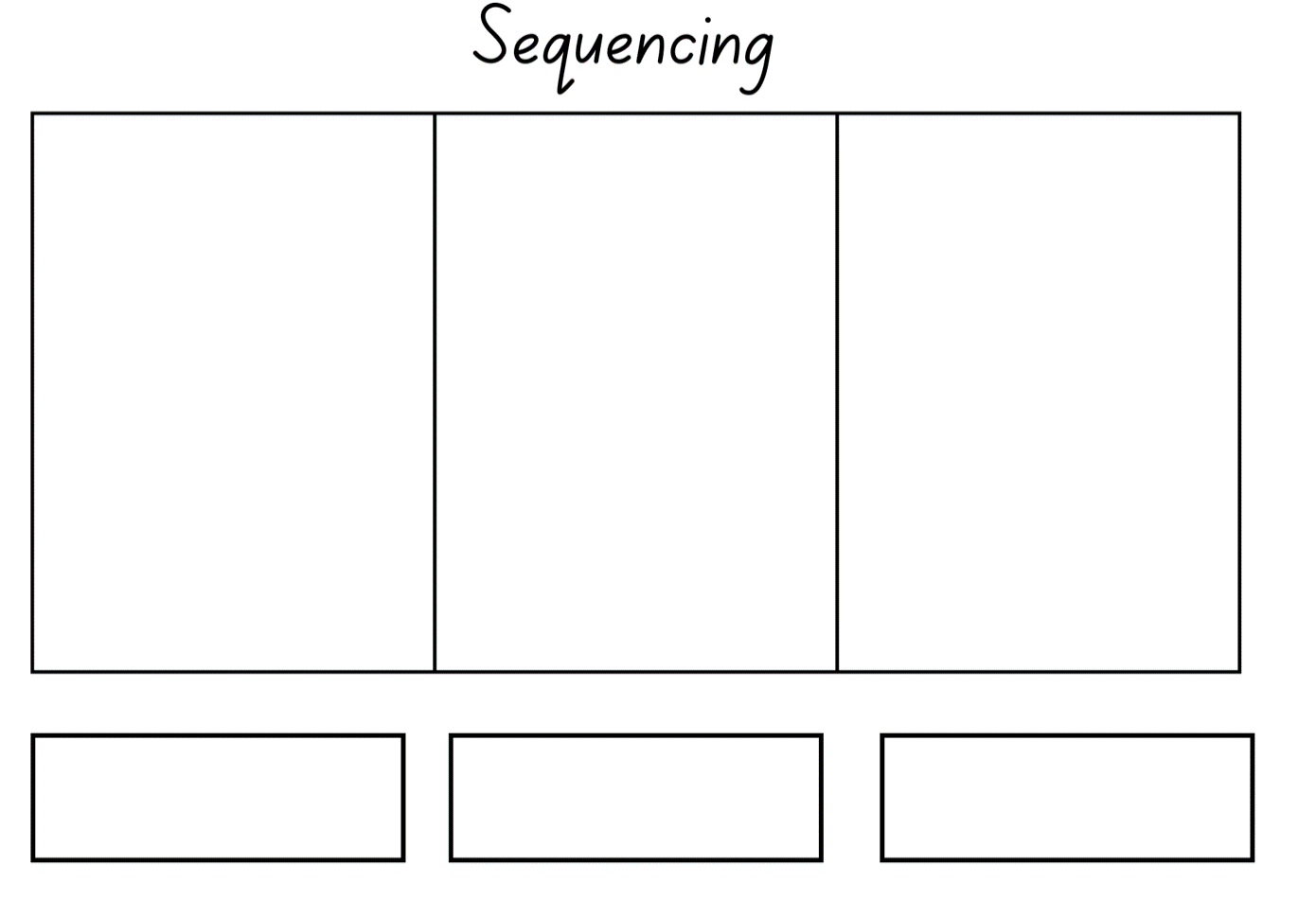




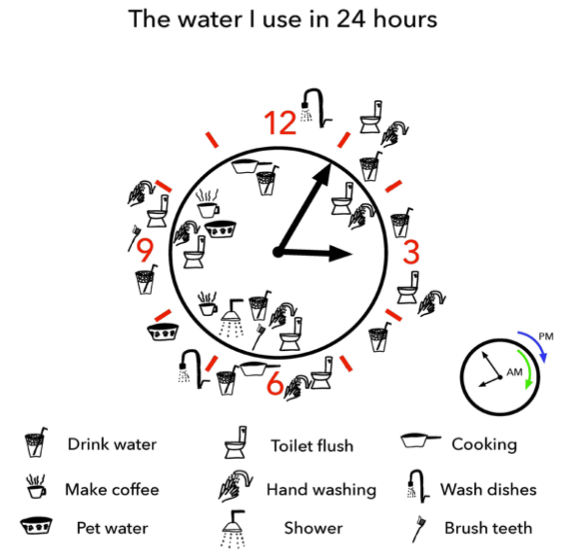




## Resource 10: Sequencing activities

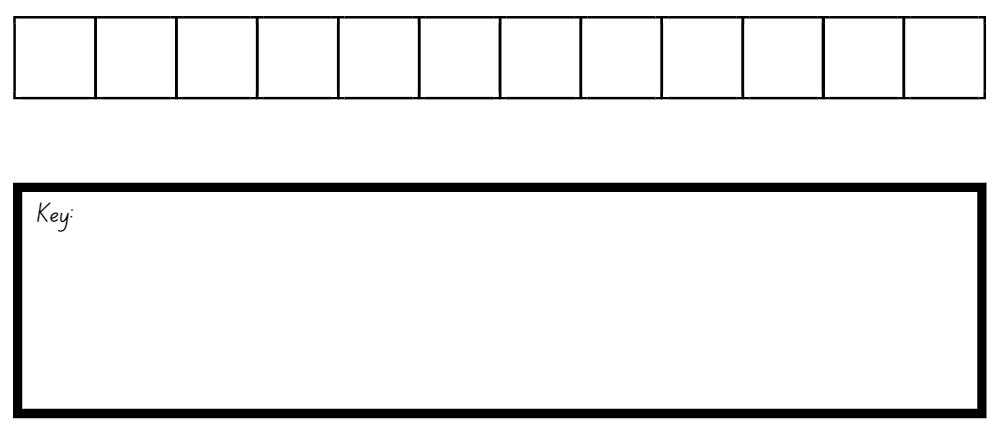


## Resource 11: Clock number talk



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## Resource 12: Our day template



## **Syllabus outcomes and content**

The table below outlines the [syllabus outcomes](https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10) and range of relevant syllabus content covered in this unit. Content is linked to [National Numeracy Learning Progression](https://www.australiancurriculum.edu.au/resources/national-literacy-and-numeracy-learning-progressions/version-3-of-national-literacy-and-numeracy-learning-progressions/) versions (3).

|  |  |  |
| --- | --- | --- |
| Focus area and outcomes | Content groups and content points | Lessons |
| **Representing whole numbers**  **MAO-WM-01**  **MAE-RWN-01, MA1-RWN-01**  **MAE-RWN-02, MA1-RWN-02** | **Early Stage 1**  **Use the counting sequence of ones flexibly**   * identify the number before as ‘one less’ and the number after as ‘one more’ than a given number | **5–6** |
| **Representing whole numbers (cont)** | **Early Stage 1**  **Recognise number patterns**   * recognise dice and domino dot patterns (NPA1, NPV2, CPr2) | **1, 3** |
| **Representing whole numbers (cont)** | **Early Stage 1**  **Connect counting and numerals to quantities**   * count with one-to-one correspondence, recognising that the last number name represents the total number in the collection (CPr3, CPr5) * count out a specified number of objects (from 5 to 20) from a larger collection, keeping track of the count (CPr4-CPr5) * represents numbers as quantities to at least 20 using objects (such as fingers), number words and numerals (NPV2-NPV4, CPr3) * compare and order numbers to 20 (NPV2-NPV3) | **1, 4, 6–7** |
| **Representing whole numbers A** | **Stage 1**  **Use the counting sequences of ones with two-digit numbers and beyond**   * Identify the number before and after a given two-digit number (CPr5) * **count forwards and backwards by ones from a given number to at least 120 (CPr6)** | **1, 6** |
| **Representing whole numbers A (cont)** | **Stage 1**  **Continue and create number patterns**   * **model and describe ‘odd’ and ‘even’ numbers using items paired in two rows** | **3** |
| **Representing whole numbers A (cont)** | **Stage 1**  **Represent numbers on a line**   * **sequence numbers and arrange them on a line by considering the order and size of those numbers (CPr5)** | **5** |
| **Representing whole numbers A (cont)** | **Stage 1**  **Represent the structure of groups of ten in whole numbers**   * **recognise that ten ones is the same a one ten (NPV2, NPV4)** * **partition two-digit numbers to show quantities values (NPV4)** | **4, 7** |
| **Combining and separating quantities**  **MAO-WM-01**  **MAE-CSQ-01, MA1-CSQ-01**  **MAE-CSQ-02** | **Early Stage 1**  **Model additive relations and compare quantities**   * identify situations in which addition and subtraction may be applied (AdS1- AdS2) * combine two or more groups of objects to model addition, identifying the relationship between the parts and the whole (AdS1- AdS2) * use concrete materials or fingers to model and solve addition and subtraction questions, counting forwards or backwards by ones as necessary (AdS1- AdS2, NPV3) | **1–3** |
| **Combining and separating quantities (cont)** | **Early Stage 1**  **Identify part-whole relationships in numbers up to 10**   * create, model and recognise combinations for numbers up to ten (Reasons about relations) (AdS2) * count by ones to find the total or difference (AdS2-AdS3) * use drawings, words and numerals to record addition and subtraction, and explain their thinking (Reasons about relations) (AdS2) | **1–3** |
| **Combining and separating quantities A** | **Stage 1**  **Use advanced count-by-one strategies to solve addition and subtraction problems**   * record number sentences in a variety of ways using drawings, words, numerals and symbols (AdS6) | **2** |
| **Combining and separating quantities A (cont)** | **Stage 1**  **Recognise and recall number bonds up to ten**   * recognise, recall and record combinations of two numbers that add up or bond to form 10 (AdS2, AdS6) * model and record patterns for individual numbers up to ten by making all possible whole-number combinations (Reasons about patterns) | **1–3** |
| **Combining and separating quantities A (cont)** | **Stage 1**  **Use flexible strategies to solve addition and subtraction problems**   * use non-count-by-one strategies such as using doubles for near doubles and combining numbers that add to ten (AdS6) | **2** |
| **Combining and separating quantities A (cont)** | **Stage 1**  **Represent equality**   * use the equals sign to record equivalent number sentences involving addition, and to mean 'is the same as', rather than as an indication to perform an operation (Reasons about relations) (NPA3) * model the commutative property for addition and apply it to aid the recall of addition facts (Reasons about relations) (AdS7) | **1-3** |
| **Non-spatial measure**  **MAO-WM-01, MAE-NSW-02** | **Early Stage 1**  **Compare and order the duration of events using the language of time**   * use terms such as daytime, night-time, morning, afternoon, today, tomorrow, yesterday, before, after and next (MeT1) * sequence events in time (MeT1) | **7–8** |
| **Data**  **MAO-WM-01**  **MAE-DATA-01, MA1-DATA-01**  **MA1-DATA-02** | **Early Stage 1**  **Respond to questions, collect information and discuss possible outcomes of activities**   * predict possible responses to a question * collect information from their peers and about their environment (IRD1) * pose and respond to questions about the information collected (IRD1) | **2–6** |
| **Data (cont)** | **Early Stage 1**  **Organise objects into simple data displays and interpret the displays**   * group objects according to characteristics (IRD1) * arrange objects according to a characteristic to form a data display (IRD1) * interpret information presented in a data display to answer questions (Reasons about quantity) (IRD2) | **2–6** |
| **Data A** | **Stage 1**  **Ask questions and gather data**   * investigate a topic of interest by choosing suitable questions to obtain appropriate data (IRD2) * gather data and track what has been counted by using concrete materials, tally marks, lists or symbols (IRD3) | **1–2, 4–5, 8** |
| **Data A (cont)** | **Stage 1**  **Represent data with objects and drawings and describe the displays**   * use concrete materials or pictures of objects as symbols to create data displays where one object or picture represents one data value (IRD2) * describe information presented in one-to-one data displays (Reasons about relations) (IRD2) * use comparative language to describe information presented in a display, such as ‘more than’ and ‘less than’ * interpret a data display and identify the biggest or smallest values (IRD2) | **2–6, 8** |
| **Data B** | **Stage 1**  **Identify a question of interest and gather relevant data**   * pose suitable questions where the answers form categories, and predict the likely responses (IRD2) * collect data on familiar topics (IRD2) * sort data into relevant categories (IRD2) | **3–5, 8** |
| **Data B (cont)** | **Stage 1**  **Create displays of data and interpret them**   * organise collected data into lists and tables to display information (IRD2) * represent data in a picture graph using a baseline, equal spacing and same-sized symbols (IRD2) * interpret information presented in tables and picture graphs (IRD2) | **2–3, 5–8** |
| **Chance A**  **MAO-WM-01**  **MA1-CHAN-01** | **Stage 1**  **Identify and describe possible outcomes**   * identify possible outcomes of familiar activities and events * describe the chance of possible outcomes for familiar activities and events (UnC1) | **1, 3** |
| **Chance B** | **Stage 1**  **Identify and describe activities that involve chance**   * describe possible outcomes in everyday activities and events as being likely or unlikely to happen (UnC2) * compare familiar activities and events and describe them as being more or less likely to happen (Reasoning about relations) (UnC2) * describe familiar events as being possible (UnC2) | **1, 3** |

## References

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Bay-Williams J and Kling G (2019) [‘Interview Prompts for Assessing During Game Play’](http://kcm.nku.edu/mathfactfluency/tool18.php), Chapter 7. *Assessing Derived Fact Strategies and All Facts, Math Fact Fluency Companion*, accessed 6 December 2022.

Marks Krpan C (2013) *Math Expressions: Developing Student Thinking and Problem Solving Through Communication*, 1st edn, Pearson, Toronto, Canada.

Stanford University (n.d.) *‘*[Dice Sums’](https://www.youcubed.org/resource/data-talks/), *Data Talks*, youcubed, accessed 6 December 2022.

Stanford University (n.d.) ‘[Water Usage’](https://www.youcubed.org/resource/data-talks/), *Data Talks*, youcubed, accessed 6 December 2022.

Stanford University (n.d.) [‘Dear Data’](https://www.youcubed.org/tasks/dear-data/), *Tasks*, youcubed, accessed 6 December 2022.

Sullivan P and Lilburn P (2017) *Open-Ended Maths Activities: Using ‘Good’ Questions to Enhance Learning in Mathematics*, Revised edn, Oxford University Press ANZ, Great Britain.