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Lesson 1 • How many are we?

**Lesson 1**

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# Lesson overview

Students collect data to answer the question: “How many students are in our class today?”.

## Learning goals

We collect data to answer questions.

## Resources

**Each student**

Sheet of A4 paper

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| Lesson phase | Estimated time | Lesson type |
| **Activity 1 | Our class story** | 5 minutes | Whole class |
| **Activity 2 | Planning to collect our data** | 25 minutes | Group |
| **Activity 3 | Collecting our data** | 20 minutes | Whole class |

# Teach this lesson

**Activity 1 | Our class story**

Convene a whole class discussion. **Ask:** *What questions can we ask about our class?*

Allow students to share suggestions. Some suggestions you might discuss include:

* how students got to school today.
* what students like to do at lunchtime.
* what activities students do after school.

**Pose the question:** *One question I want to ask is: How many are in our class today? How could we find out how many we are?*

## Activity 2 | Planning to collect our data

Invite students to talk with a partner about how the class could find out how many there are in the class today. Provide students with some paperand ask them to draw a picture of how we could work out how many there are in the class today.

### Noticing students’ thinking

* **Do students recognise the need to count to determine ‘how many’?** 
  + Students may not immediately realise that counting is the best way to determine how many. For example, they may suggest strategies such as having students line up or calling out names on the roll as ways to work out how many. You might have a go at some of these strategies and note anything useful that comes from the strategies. For example, lining students up is a helpful organisational tool, but it doesn’t tell us how many.
* **Can students suggest systematic ways of counting?**
  + Do students consider ways of organising the count (i.e. the students) so that the data can be reliably collected? For example, students may suggest counting everyone in the class, but if everyone is the class is wandering around then it is hard to know if each person has been counted. Challenge students to consider how they will organise the data (students) so they can count all.

## Activity 3 | Collecting our data

Invite students to share their plan with the class. Discuss the different plans suggested by students.

**Discuss**: *How are the plans similar and how are they different?*

* The plans may suggest counting as a way to find out ‘how many’. The differences between the plans may also be the counting methods used.

**Explain:** *It seems that counting could be a good way to work out ‘how many’.*

Select one or two methods shared and use them to determine how many there are today. Choose methods that do not keep track of who has been counted, as we want to establish with the students that we need to be organised to ensure we have counted everyone.

**Discuss:**

* *Did we count everyone just once? How do we know?* 
  + Establish with the students the need to keep track of the count.
* *We need to make sure that we keep track and count all the data. How could we make sure we have counted everyone who is here?* 
  + Ask students if they can think of other suggestions for keeping track of the count. These can be added to the chart. Some helpful strategies might include:
    - students stand up or sit down as they are counted.
    - students each have a block/counter, and these are collected and counted to find the total.
    - students each record a mark on the board and then the class counts the marks.

**Ask**: *I wonder if we would get the same number of students if we followed a different plan for collecting our data?*

Invite student responses and encourage students to provide reasons for their answers.

Select one of the other data collection methods, conduct the count and record the results. Repeat the count again with a different method.

**Explain:** *We have collected our data using some different methods. Each time we got the same result.*

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Lesson 2 • How many today?

**Lesson 2**

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# Lesson overview

Students use their own methods to informally represent their data on the number of students in the class.

## Learning goals

We can represent the data that we collect in different ways.

## Resources

**Each group**

* Materials for creating data representations:
  + Selection of concrete materials, such as counters, cubes, or blocks
  + Selection of art materials, such as coloured pencils, sticky dots, or stamps

**Each student**

* Sheet of A4 paper

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| Lesson phase | Estimated time | Lesson type |
| **Activity 1 | Predicting** | 15 minutes | Whole class |
| **Activity 2 | Recording data** | 25 minutes | Individual |
| **Activity 3 | Analysing data** | 10 minutes | Individual |

# Teach this lesson

## Activity 1 | Predicting

**Revise:** *In the last lesson we asked the question: How many are in our class? What was the answer to our question? How did we work out the answer?*

Allow students to share what they remember and their reflections on the previous lesson.

**Ask**: *How many do you think might be in our class today?*

Discuss with the students that they can predict how many might be in class today, based on what was learnt in the previous lesson.

**Ask:** *How many are in our class today? How might we find out?*

Invite students to offer suggestions for working out ‘how many’. Choose a few data collection methods as a class, carry out the counts and record the number of students present on the board or the class chart.

**Ask**: *What do you notice about the number of students in our class today?*

Ask students to suggest reasons for the number being the same or different.

**Pose the question***: How could you show how many are in our class today, so it is easy for someone from another class to see without having to ask?*

## Activity 2 | Recording data

Provide each student with a variety of concrete materials and art materials and a sheet of A4 paper.

Ask the students to use the concrete and/or art materials to represent the number of students in the class in a way that makes sense to them.

### Enabling prompt

The number in the class may be higher than some students are able to count. You can count aloud for students as it is helpful for them to hear the number sequence and practice counting. If students find it difficult to represent the larger number, you can ask them to represent a smaller number such as the number of students in their table group.

If students create a physical model, take a photo and/or ask them to draw a picture of their physical representation on their sheet of paper. Ask students to give their representation a title. This title should relate to the story of the data.

## Activity 3 | Analysing data

Invite some students who have used different representational forms to share their work with the class.

**Discuss**:

* *What did you notice that is different about the representations?*
  + Students’ representations will look different, and students may have used different materials.
* *What did you notice that is similar about the representations?* 
  + Each representation is presenting the same data, that is, the number of students in our class. Each data point is used to represent one student in the class.
* *Which representations were you able to see how many easily? Why?*
  + Allow students to share which ones they found easy to see ‘how many’ and why. Share some that you found easy to see ‘how many’. Highlight features such as accurate recording, organisation and clear connection between the count and the representation.

Discuss how the representations may look different, but they share the same information. Using this data, we can answer the question *How many are in our class?* for this particular day. We can look back on our representations in the future and know how many were in a class on this particular day.

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Lesson 3 • Our class tomorrow

**Lesson 3**

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# Lesson overview

Students use their data representations to make predictions about how many students there might be tomorrow.

## Learning goals

Data provides evidence to inform our predictions.

## Resources

**Whole class**

* Students’ representations from the previous lesson

**Each student**

* Sheet of A4 paper

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| Lesson phase | Estimated time | Lesson type |
| **Activity 1 | Analyse** | 15 minutes | Whole class |
| **Activity 2 | Our class tomorrow** | 25 minutes | Whole class/individual |
| **Activity 3 | Looking at our predictions** | 10 minutes | Whole class |

# Teach this lesson

**Activity 1 | Analyse**

**Revise:** *In the last lesson, we created representations to help us answer the question: How many are in our class? Our representations may have looked different, but they shared the same information.*

Discuss some of the different representations that were used and how they made it easy to answer the question *How many are in our class?.*

**Ask:** *We know how many were in our class the last two days. I wonder if the story of our data will be the same today.*

Allow students to make predictions about how many there are in the class today. Encourage them to use the evidence from their data representations to support their predictions.

Use counting methods from previous lessons to answer the question *How many are in our class today?.*

**Ask**: *What do you notice about the number of students in our class today?*

The number of students may be the same/different. Invite students to infer reasons for this and to explain why they are certain that there are that number in class today.

## Activity 2 | Our class tomorrow

**Ask**: *How many do you think might be in our class tomorrow?*

Provide students a sheet of A4 paper and ask them to create a representation of how many they think will be in the class tomorrow.

## Activity 3 | Looking at our predictions

Invite some students to share their drawing on their predictions for how many might be in the class tomorrow.

**Discuss**:

* *What did you notice that is similar about the predictions? What is different?*
  + The data collected on the previous two days provides evidence to inform our predictions about tomorrow. While the exact numbers may differ, the predictions should be similar to the data collected from the previous two days.
* *Which representations were you able to see how many easily? Why?*
  + Allow students to share which ones they found easy to see ‘how many’ and why. Highlight features such as accurate recording, organisation and clear connection between the prediction and the representation.

Ask the students to share their predictions for the following, using evidence from the data to justify their predictions:

* *Could there be 100 students in our class tomorrow?*
* *Could there be no students in our class tomorrow?*
* *What about if we asked this question on Friday?*

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Optional investigations • We can ask more questions about our class

**Lesson 4**

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# Lesson overview

Students investigate different questions about their class.

## Learning goals

We can ask more questions about our class. The questions that we ask shape the data that is collected.

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| Lesson phase | Estimated time | Lesson type |
| **Optional activity 1 | Ongoing statistical investigation** | 10 minutes daily | Whole class/Small group |
| **Optional activity 2 | The story of our data changes** | 50 minutes | Whole class/Small group |

# Teach this lesson

**Optional activity 1 | Ongoing statistical investigation**

In this sequence, we used the following process:

1. Collecting data
2. Recording and analysing data
3. Making predictions

Follow this process to continue this statistical investigation with the students. Each day, ask *How many are in our class today?*.

Look at how the data changes from day to day. Discuss why the data may be different from one day to the next.

Look back at the data collected over a week, two weeks, or a month. Discuss with the students how the data changed over time.

## Optional activity 2 | The story of our data changes

The same process can be used for other statistical investigations:

1. Collecting data
2. Recording and analysing data
3. Making predictions

Some other ideas for further investigations include:

* **Who are we?**
  + How big are our feet?
  + What colour are our eyes?
* **How did we get to school?**
* **What’s in our lunchbox?**
* **What is our favourite…?**
  + What is our favourite book?
  + What is our favourite free play activity?

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