

## Summary of learning goals

- Students sort, classify and represent data. They make observations and simple inferences based on the data.

### Australian Curriculum: Mathematics (Foundation)

**ACMNA005:** Sort and classify familiar objects and explain the basis for these classifications.

Copy, continue and create patterns with objects and drawings.

**ACMSP011:** Answer yes/no questions to collect information and make simple inferences.

## Summary of lessons

### Who is this sequence for?

- This sequence has been written as an introduction to statistics and so students do not need to have prior experience in data collection and reading data. Students should be able to count with one-to-one correspondence to at least 20.

### Lesson 1: Shoes

Students gather and represent data on the shoes that they wear to school. The class works together to sort their shoes into different categories of their choosing, and organises and represents the data using a picture graph. Students then use the data in the graph to answer questions and make simple inferences.

## Reflection on this sequence

### Rationale

This sequence focuses on developing understanding of variation in data through a meaningful context. By observing and discussing how the type of shoes they wear varies on different days or at different times of the year, students appreciate that variation is natural. By representing their data graphically, they can begin to appreciate the extent of the variation and what is expected.

The focus on variability is what distinguishes statistics from mathematics.



#### reSolve mathematics is purposeful

- The lesson introduces the fundamental concept of variation in statistics.
- The context of shoes is personally significant to students and enables students to meaningfully analyse the data and make inferences.



#### reSolve tasks are inclusive and challenging

- The collaborative nature of this task provides access for all students.
- Challenge is provided to students as they are asked to make inferences and draw conclusions of varying complexity based on the data presented.



#### reSolve classrooms have a knowledge-building culture

- The task is completed as a class, allowing students to learn from others' contributions. This allows students to build on the collective knowledge of the class while also extending their individual understanding.

## Shoes

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### About this lesson

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### Mathematical purpose

- Students sort, classify and represent data.
- Students create a simple picture graph and explore how the datasets vary between the different categories.
- Students learn to use data to answer questions and to make inferences.

### Learning intention

- To sort and classify the shoes that we wear.



#### Time

A lesson of approximately 1 hour.



#### Vocabulary

- categories
- common
- data
- sorting
- variation



#### Resources

- This resource uses the students' shoes as the context for statistical investigation. Other possible contexts are listed in the Further activities section.
- For a greater variety of shoes, this task would work well on a day when students are not in their regular uniform. Alternatively, students could bring their favourite pair of shoes to school.

## What shoes do we wear?

**Pose the questions:** *What do you think are the most common types of shoes in our class?*  
*If we could tell the local shoe shop owner what shoes to sell, what should we tell them?*

Take some students' suggestions. Explain that the class will carry out an investigation to answer the question.



**Resources:** Have students sit in a circle, take off one shoe and place it in the middle of the circle.

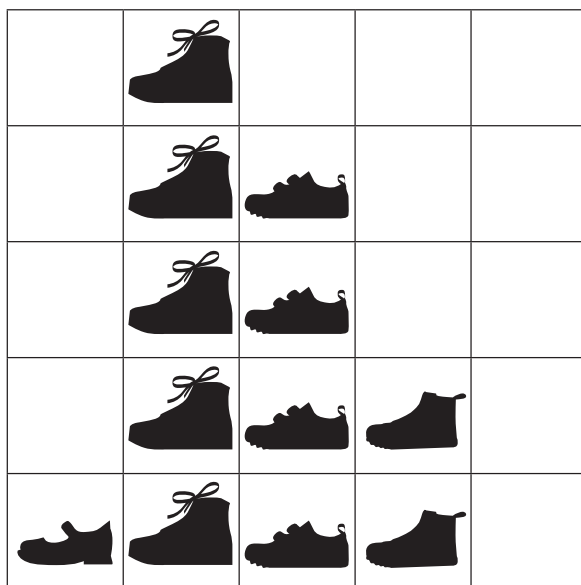
**Pose the question:** *How can we sort these shoes?*

Students ask simple yes/no questions to see which shoes fit in the different categories, such as *Does this shoe have tie-up laces?* Students should be encouraged to think of many different ways to sort the shoes. Prompt them to think carefully and creatively about the categories and sort the shoes a variety of ways. Questioning might include:

- *Can every shoe be placed in a category? In which category does your shoe fit?*
- If sorting by colour, ask: *How white is white?*  
Many white sneakers have other colours on them as well.
- *Do any shoes fit into more than one category?*

## Represent the data

Agree on one method of sorting and use it to create a picture graph. One way that this might be done is to use a large grid on the floor. A grid could be made by sticking masking tape to the floor, drawing with chalk, a large sheet of plastic with a grid marked or separate sheets of paper taped to the floor in a grid arrangement. Each square in the grid should be large enough for a shoe to fit inside.



Identify and name the different categories. For example, the categories used to sort the shoes shown in the picture graph at left are:

- buckles
- tie-up laces
- velcro
- slip-ons.

The actual shoes can be replaced with self-adhesive notes or pictures of shoes so that the graph can be transferred onto the wall.

## What does the data tell us?

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### Teacher notes:

- The following questions are designed to emphasise the **variation** between the number of shoes in each category shown in the picture graph.
- Record answers as a class or have students do this individually.

## Looking at the data

- Pose the questions:**
- *Where does **your** shoe fit in the class data?*
  - *Do all the categories have the **same** number of shoes?*
  - *Do some categories have **fewer** shoes?*

## Looking beyond the data

Ask some specific questions about the dataset. For example:

- *Why do you think there is **variation** between the number of shoes in each category?*
- *Why do you think that **more** students wear velcro or slip-on shoes than shoes with tie-up laces?*
- *Why might shoes with buckles be the category having the smallest number of shoes?*

## Making inferences

These questions ask the students to use the data to make simple inferences; that is, to make predictions.

- *Can you use the data to **predict** how many children will wear shoes with tie-up laces to school tomorrow?*
- *What do you think the most common types of shoes would be in **our school**? Do you think this would be the same as the most common type of shoes in **our class**?*
- *Do you think the data would be very different if we looked at the shoes worn to school by Year 6 students? How might it be different?*
- *Would you expect different results if we collected the data at a different time of year (e.g. in winter instead of summer)?*
- *How would you expect the data to change if we looked at the school shoes worn by students in a different part of Australia? Or a different part of the world?*

## Drawing conclusions

- Revisit the question posed at the start of the investigation: *What do you think are the most common types of shoes in our class? If we could tell the local shoe shop owner what shoes to sell, what should we tell them?* Record answers as a class or ask students to do this individually.

## Further activities

The same process can be followed with different datasets. Some examples are listed here.

### Crunch and sip

Collect data on the fruit and vegetables that students bring to school each day in their lunchbox.

A focus question might be: *What are the most common fruit and vegetable snacks brought to school by our class?*

### School breakfast and/or lunch

Collect data on the food eaten for breakfast and/or lunch in the school breakfast club or from the canteen at lunchtime. A focus question might be: *The breakfast club organisers/canteen supervisors are planning what food to buy. What can we tell them about the most common types of breakfast foods eaten by students in our class?*

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#### Teacher note:

- The term 'most common' has been used in this lesson. It might be interesting to discuss with students whether the most common type of shoe or breakfast food is also the most popular.