

Summary of learning goals

The purpose of this sequence is to sort, classify, represent and interpret data. Students learn to choose simple questions for a survey, gather responses and make simple inferences from their data. Students learn to create simple picture graphs and explore the ways in which the data vary between the different categories. They then use the data to make decisions.

Australian Curriculum: Mathematics (Year 1)

ACMSP262: Choose simple questions and gather responses and make simple inferences.

ACMSP263: Represent data with objects and drawings, where one object or drawing represents one data value. Describe the displays.

Summary of lessons

Who is this sequence for?

- It is anticipated that students will not have had much experience with data collection and representation. It does require them to count with one-to-one correspondence and to compare numbers to at least 20.

Lesson 1: Draw a Playground

Students are asked to brainstorm different playground equipment. They then draw a playground that they think all children would love.

Lesson 2: What is Your Favourite?

The class works together to gather data on the playground facilities they have and enjoy in their school and local community. They organise and represent the data as a people graph and then as a column graph. Students use the graphs to answer questions and make simple inferences.

Lesson 3: Asking Others

Students work in groups to survey another class on what is their favourite playground equipment, then organise the data collected and represent it in a simple column graph. They compare this graph to the graph created in Lesson 2, which displays their own class' favourite playground equipment.

Lesson 4: Design a Playground

Students use the data collected in Lessons 2 and 3 to design the ideal playground, and justify their playground design by making references to the data.

Reflection on this sequence

Rationale

This sequence focuses on developing the fundamental understanding of variation in data through a meaningful context.

By carefully choosing simple questions and gathering responses, students can make simple inferences about what equipment should be included in the ideal playground. Students learn to represent their data with objects and drawings, using one-to-one correspondence. Students compare their column graphs and use the data to justify their playground design.

The focus on variability is what distinguishes statistics from mathematics.



reSolve mathematics is purposeful

- The lesson builds students' understanding of variation in data.
- The context of designing a playground 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 on the class while also extending their individual understanding.

re(Solve) MATHS BY INQUIRY Planning Playgrounds

Draw a Playground

Y1

About this lesson

Students are asked to brainstorm different playground equipment. They then draw a playground that they think all children would love.

Australian Curriculum: Mathematics (Year 1)

ACMSP262: Choose simple questions and gather responses and make simple inferences.

Mathematical purpose

- To gather initial ideas on students' conceptions of a great playground. These ideas will be used again at the end of the sequence for comparison.

Learning intention

- To brainstorm a playground that everyone would love.



Time

A lesson of approximately 1 hour.



Vocabulary

- brainstorm



Resources

- reSolve PDF *1a Playground Equipment* printed and cut into cards (one set per group of two to three students)

Drawing a playground

Ask students to share stories about their favourite playgrounds and/or the best playground that they have visited. It could also be good to look at some pictures of playgrounds in the local area, in Australia or the world.



Resources: Provide groups of two to three students with the prepared cards from reSolve PDF *1a Playground Equipment*. Ask the students to sort the cards based on what they like to do at the playground.

Ask students to use the cards that they have sorted to think about a playground that they think all children would love. Have students draw a picture of the playground and display them in the classroom. These pictures will be used again at the end of the sequence.

What is Your Favourite?

Y1

About this lesson

The class works together to gather data on the playground facilities they have and enjoy in their school and local community. They organise and represent the data as a people graph and then as a column graph. Students use the graphs to answer questions and make simple inferences.

Australian Curriculum: Mathematics (Year 1)

ACMSP262: Choose simple questions and gather responses and make simple inferences.

ACMSP263: Represent data with objects and drawings, where one object or drawing represents one data value. Describe the displays.

Mathematical purpose

- To sort, classify, represent and interpret data.
- Students learn to choose simple questions, gather responses and make simple inferences from their data.
- Students learn to create simple picture graphs and explore the ways in which the data vary between the different categories.

Learning intention

- To find out what is our class' favourite playground equipment.



Time

A lesson of approximately 1 hour.



Vocabulary

- categories
- data
- graph
- survey
- variation



Resources

- Drawings of playgrounds from Lesson 1
- reSolve PDF *1a Playground Equipment* printed and cut into cards (one set per group of two to three students)
- Unifix cubes in a range of colours
- Student Sheet 1 – Playground Graph (one copy per student)

Playground pictures



Resources: Review the pictures students drew of playgrounds in Lesson 1.

Discuss with the students the ways in which these playgrounds have been designed based on what we think others would like. Explain that the class will carry out an investigation to find out what other students actually like and alter their playground designs based on the data.

Pose the question: *How would we find out the class' favourite playground equipment?*

Introduce the term **survey** – this idea might arise naturally, depending on students' prior experiences. The survey will include a list of possible favourites that the students have created.

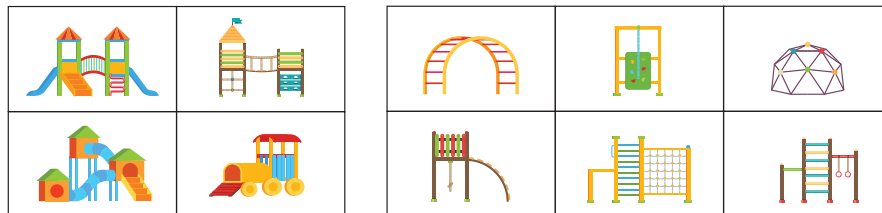
Data collection



Resources: Provide the students with the cards (or a selection of these cards) provided in reSolve PDF *1a Playground Equipment*.

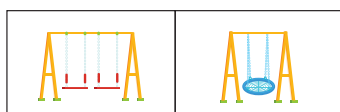
Explain that categorising or grouping the equipment will create a smaller number of choices when conducting the survey, which will make the data easier to work with.

As a class, decide on some categories to use. The equipment might be sorted based on the type of activity that is possible on the equipment. For example:



You play on top of these

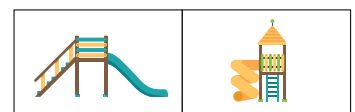
You climb on these



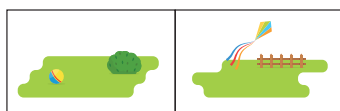
These ones swing



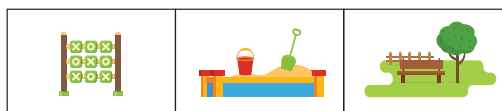
These go up and down



You slide on these



You run with these ones



These are quiet and don't use lots of energy



These ones spin

Sort the pictures into categories or groups. Here are some questions to promote deeper thinking:

- *Do the categories represent all the equipment or spaces? Think about your own favourite thing to do. Where does it fit in the categories?*
- *Does any equipment fit into more than one category?*

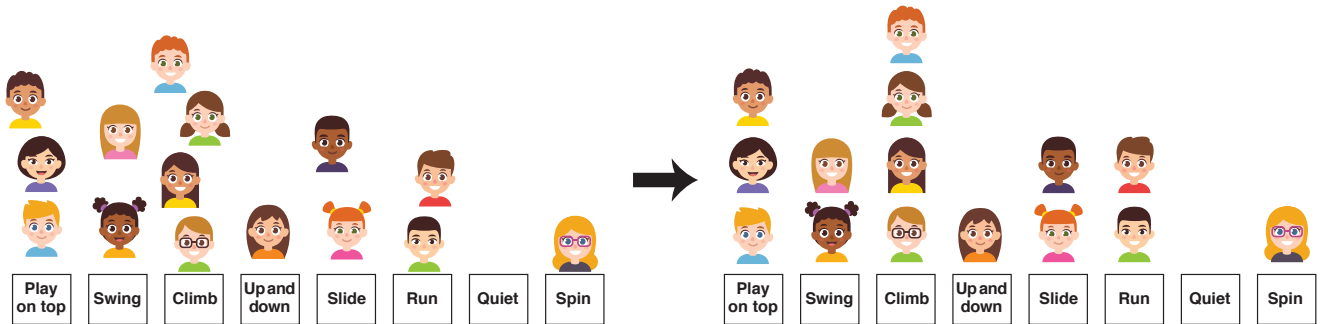
Playground graphs

Create a class people graph

Write the names of the playground equipment categories on paper and place them in a line on the floor or outside. Ask the students to sit behind the piece of equipment that is their favourite.

Ask students to reflect on the way they are sitting: *Are there big gaps in some lines? Is there even spacing between people? Are the lines of people straight? Is there a common baseline?* Discuss how, without common spacing, straight lines and a common baseline, the data can be hard to read accurately.

Ask students to shuffle around so that the data are easy to read.



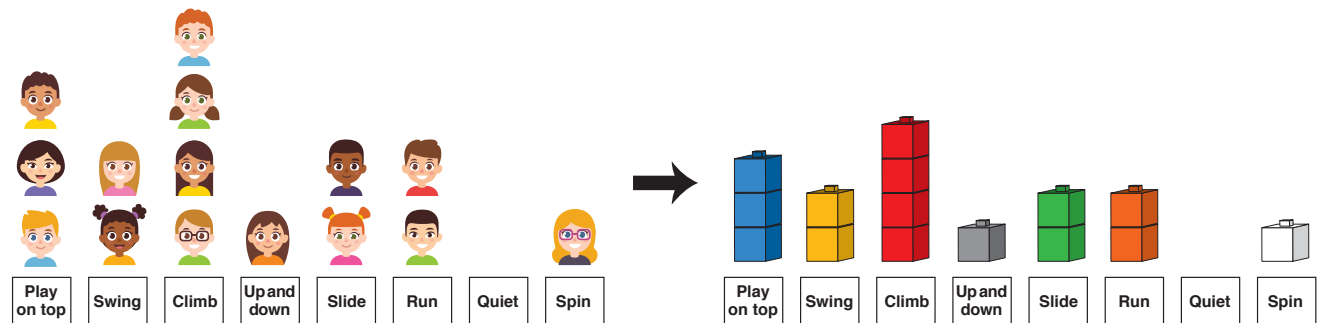
Create a simple column graph

Turn the people graph into a column graph to give greater precision and accuracy.

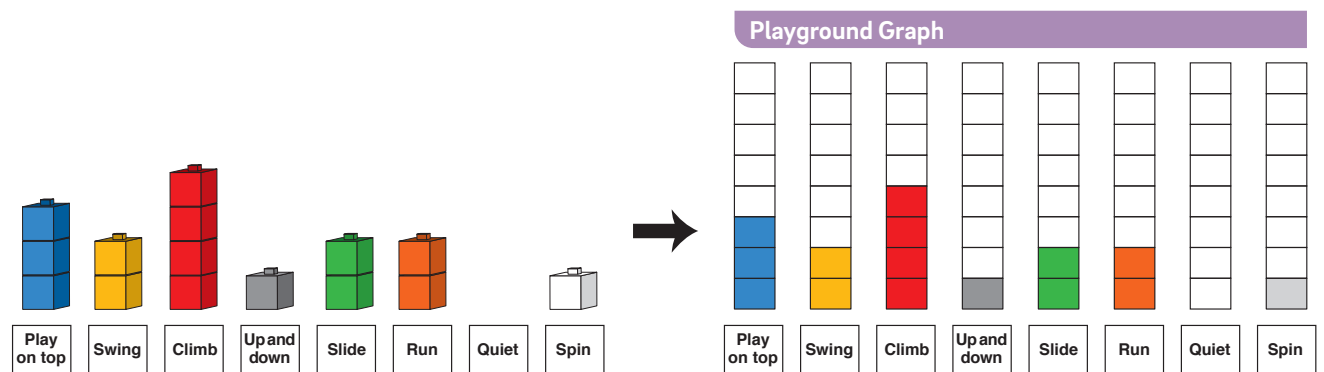


Resources: Allocate a colour Unifix cube to each piece of equipment.

Ask students to take a cube to represent their favourite equipment. Stack the cubes to create a clearer graph.



As a class, convert the Unifix graph to a column graph, using one square to represent one cube.



Resources: Provide students with [Student Sheet 1 – Playground Graph](#) and have them construct their own graph.



Teacher note:

- If the students have an alternative set of categories, you might wish to construct another graph using the different categories.

What does the data tell us?

An important concept to discuss is the variation between the number of students in the different categories in the picture graph.

Looking at the data

Pose the questions: • *Where do you fit in the class data?*

Is your favourite equipment the same as that of other students in your class?

- *Do all categories have the same number of students?*
- *Do some categories have fewer students?*

As a class or ask students to do this individually, record what the data reveal.

Looking beyond the data

Ask some specific questions about the dataset. For example:

- *Why do you think there is variation between the number of students in each category?*
- *Why do you think that more students prefer particular types of equipment?*
- *Why might a particular category have the fewest number of students?*
- *If there are two (or more) graphs that use different categories, compare them. Do the graphs have the same shape? What makes them different?*

Reflection

Ask students to make some simple inferences based on the data. For example:

- *Could you use the data to predict how many students will use the playground equipment each day?*
- *What do you think the most popular type of playground equipment would be in our **whole school**? Do you think it would be the same as the most popular equipment in our **class**?*
- *Do you think the data would be very different if we looked at the favourite equipment of students in Year 6? In what ways might the data 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)?*
- *In what ways would you expect the data to change if we asked students in a different part of Australia? Or a different part of the world?*

Where to next?

In Lesson 3: Asking Others students survey another class and explore the similarities and differences between the data compiled by the two classes.

Playground Graph

[illegible]

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Asking Others

Y1

About this lesson

Students work in groups to survey another class on what is their favourite playground equipment, then organise the data collected and represent it in a simple column graph. They compare this graph to the graph created in the previous lesson on their own class' favourite playground equipment.

Australian Curriculum: Mathematics (Year 1)

ACMSP262: Choose simple questions and gather responses and make simple inferences.

ACMSP263: Represent data with objects and drawings, where one object or drawing represents one data value. Describe the displays.

Mathematical purpose

- To create simple picture graphs and explore the ways in which the datasets vary between the different categories.
- Students choose simple questions, gather responses and make simple inferences from their data.

Learning intention

- To find out what is the favourite playground equipment of a different class.



Time

A lesson of approximately 1 hour.



Vocabulary

- survey
- variation



Resources

- Unifix cubes in a variety of colours
- Student Sheet 1 – Other Class Graph (one copy per student)
- Student Sheet 2 – Comparing Graphs (one copy per student)



Teacher preparation required

- Prior to this lesson, arrange visits to other classes to conduct a survey. It would be good to have groups of students visit a variety of classes of different years.

Data collection

Explain to the class that to design the ideal playground for the school, it isn't enough to just know what equipment the class likes. Ask students to consider: *Do you think that another class would like the same playground equipment as us?*

Have students visit and survey another class in small groups to find out what is the other class' favourite playground equipment.

Collecting results



Resources: Allocate a colour to each category of equipment (as in the previous lesson). Each student in the class being surveyed takes a single Unifix cube matching the colour of their favourite category, then places the cube in a bag or box to be sorted.

Return to the classroom and have the students use the cubes they collected to create a simple Unifix graph.



Resources: Provide each student with Student Sheet 1 – Other Class Graph.

Have students turn their Unifix graph into a column graph by colouring in one square for each cube collected.

What does the data tell us?

Have some students present their graphs to the class. Discuss the data presented in the graphs.

Questioning might include:

- *Do all categories have the same number of students?*
- *Do some categories have fewer students?*
- *Why do you think there is **variation** between the number of students in each category?*
- *Why do you think that more students prefer particular types of equipment?*
- *Why might a particular category have the fewest number of students?*

Have some students present their graphs to the class. Discuss the overall data presented in the graphs of this group of students. Questioning might include:

- *What equipment is the most popular overall?*
- *What equipment is the least popular overall?*
- *Why do you think there is **variation** between the graphs?*

Comparing graphs



Resources: Provide students with Student Sheet 2 – Comparing Graphs.

Ask the students to compare the similarities and differences between the graph they created in this lesson and the original class graph. As a class, discuss the similarities and differences.

Making inferences

Students make inferences by comparing the graph they created and the original class graph. Questioning might include:

- *Why do you think there are differences between the two graphs?*
- *Can you use both sets of data to predict how many students will use the playground equipment each day?*
- *What do you think would be the most popular type of playground equipment chosen by the whole school? Do you think it would be the same as the one chosen by our class?*

Further activities

Activity 1

Collate all the data collected into one graph. This large graph can then be compared to the original class graph.

Activity 2

Contact a school in another part of Australia or in another part of the world. Ask them to complete the survey and email back their results. In what ways are their data the same and in what ways are they different?

Where to next?

In Lesson 4: Design a Playground students use the data collected to design the ideal playground.

The favourite playground equipment of class: _____

[illegible]

Comparing Graphs

Name: _____

In what ways are the graphs **SIMILAR**?

In what ways are the graphs **DIFFERENT**?

re(Solve) MATHS BY INQUIRY Planning Playgrounds

Design a Playground

Y1

Lesson abstract

Students use the data collected in Lessons 2 and 3 to design the ideal playground, and justify their playground design by making references to the data.

Australian Curriculum: Mathematics (Year 1)

ACMSP262: Choose simple questions and gather responses and make simple inferences.

ACMSP263: Represent data with objects and drawings, where one object or drawing represents one data value. Describe the displays.

Mathematical purpose

- Students use collected data to make decisions.

Learning intention

- To use what we've learned in the previous two lessons to design the ideal playground.



Time

A lesson of approximately 1 hour.



Vocabulary

- data
- justify



Resources

- Drawings of playgrounds from Lesson 1
- Completed student sheets from Lessons 2 and 3

Revisiting playground drawings

Discuss the data that the students have collected over the previous two lessons.

- *What is the most popular equipment?*
- *If a piece of equipment is very popular, do you think there should be more than one piece in a playground?*
- *What equipment is not as popular as others?*

Have students look back at their original playground drawings from Lesson 1. Have the students discuss with a partner:

- *Which parts of your original design fit, based on the data?*
- *What might need to change about your design, based on the data?*

Ask students to design a new playground, incorporating what they have learnt from the data.

Reflection

Ask students to share their designs with the class. They should explain why they have chosen the various elements of their playground, with reference to the data collected.