RICH MATHEMATICAL TASK BOOKLET

STATISTICS

YEAR 1

Teacher Booklet

Task 1

Marco organized his animals by size, the way they moved, and colour. What ways can you think of to organize these animals?

How many different ways can you think of to organise the animals?

Represent the results.

Teacher Notes

Before you launch the task, during literacy time, either read "The animals would not sleep" by Sarah Levine or show the students the story being read: https://www.youtube.com/watch?v=P2PMueGMCa4 . While you read the book, stop and discuss with the students the different ways that Marco had organised the animals.

To launch the task, ask the students to share the different ways that Marco could have categorized the animals that he didn't think of.

Have mixed sets of objects representing Hannah's collections available for the students to sort into sets (e.g., buttons, ice-block sticks, shells, feathers, leaves, soft toys or puppets) and multi-link cubes for the connect.

Notice the initial attributes that students use to sort and group the animals. Expect them to have more than two sets or collections when sorting the animals.

Expect students to use the language of classification in their descriptions of the sets.

For the independent activity, provide students with sets of shape blocks.

Shareback

Select students to share who have been able to identify different attributes to sort the toy animals (e.g., material, number of legs, colour, what they eat) and can identify the attribute that they used to sort the animals.

Ask students to share how they grouped and counted the number in each set.

Support students to notice how the responses can be grouped and how the number in each category can be found.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Data: *collect categorical data for one variable*

Analysis: *create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category*

Connect

Ask them to consider the following questions: how did you work out whether an animal fit in a group? what you would do with animals that fit into more than one category?

What happened when you re-sorted the animals into new categories?

Did they change groups or stay together in the same ones?

Ask the students to sort their sets into sub-categories using a new attribute (e.g., sort the four-legged animals into small animals and large animals) and count how much is in the new set.

Ask the students to represent the sets.

Suggested Learning Outcomes

Sort objects into different sets by an attribute.

Describe similar and different attributes.

Display category data using different representations.

Independent Tasks

Sort the shapes into sets that are similar.
What sets have you made?
What is the same?
What is different?
How many is in each set?

Re-sort the shapes into different sets.
What sets have you made?
What is the same?
What is different?
How many is in each set?

Mathematical Language

Similar, dissimilar, alike, same, different, belong together, group, attribute, organise, sort, classify, represent.

Anticipations

Solutions. Misconceptions

Task 2

As well as the animals, Marco also likes making collections and sorting these out. Unfortunately, his boxes of collections got all mixed up.

Help Marco to sort out the different collections for the objects.

What different ways could Marco sort the collections?

Represent the results.

Teacher Notes

To launch the task, ask the students to share the different collections that they have at home, then show the students the objects and ask them to brain-storm the different ways that the objects could be put into collections.

Have mixed sets of objects representing Marco's collections available for the students to sort into sets (e.g., buttons, ice-block sticks, shells, feathers, leaves, soft toys, cars, play-food, puppets) and multi-link cubes for the connect.

Notice the initial attributes that students use to sort and group the objects. Expect them to have more than two sets or collections when sorting the objects.

Expect students to use the language of classification in their descriptions of the sets.

Shareback

Select students to share who have been able to identify an attribute to sort objects (e.g., use, type, material, shape) and can identify the attribute that they used to sort the objects.

During the large group sharing back, support students to notice how the responses can be grouped and how the number in each category can be found.

Ask students to share how they grouped and counted the number in each set.

Ask students to consider what you would do with objects that fit into more than one collection.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Data: collect categorical data for one variable

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Connect

Ask the students to represent how many objects were in each set for the collections that they made using multi-link cubes on a baseline (replicating a graph).

Suggested Learning Outcomes

Sort objects into different sets by an attribute.

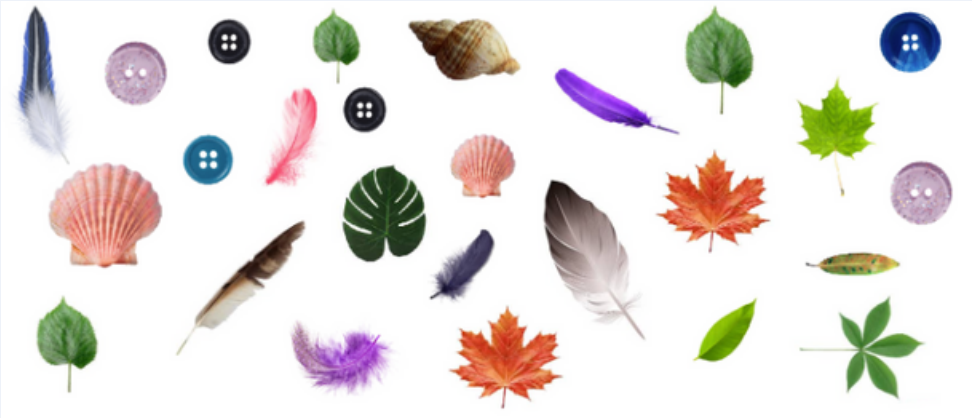
Describe similar and different attributes.

Display category data using different representations.

Independent Tasks

Oh dear, Marco bought some of his collections to school and now they have got all mixed up!

Help Marco to sort out the different collections for the objects.



Mathematical Language

Similar, dissimilar, alike, same, different, belong together, group, attribute, organise, sort, classify, represent.

Anticipations

Solutions. Misconceptions

Task 3

How do we all get to school in the morning?

How can you collect data to answer this question?

Record your results to present to the class.

Can you represent this in different ways?

Teacher Notes

Choose a topic of interest to your students and class (this could be linked to your inquiry topic). For example, this could be breakfast food, sports, toys.

Begin with your whole class by asking the students a question about the topic (e.g., How do you get to school?) that will generate category data and find out the 3 – 4 most common categories by taking a count. This question can be changed to a topic of interest or linked to inquiry. Each student then shows which category relates to them by drawing a picture on a large sheet of paper or the whiteboard.

Launch the task by re-wording the question (e.g., What is the most common way students come to school in our class?). Ask the students to draw or write something that would show everyone what they found out in response to the question.

Notice student solution strategies that may include differing levels of organisation from drawing all the responses, grouping and ordering these, using numbers to represent.

For the independent task, collect food wrappers or ask children to draw a picture of their morning tea.

Shareback

For the first aspect of the task, select students to share who use different ways of representing each way of getting to school, drawings/icons, symbols or words. Support students to notice how the responses can be grouped and how the number in each category can be found.

Big Ideas

Ideas and questions about a specific topic can be investigated through collecting data and using it to answer the questions.

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Plan: plan to collect data by making observations or questioning others, and discuss how the data-gathering process might affect people

Data: collect categorical data for one variable

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Shareback *(continued)*

For the second aspect of the task, select students to share who have used a variety of ways of representing indicating different levels of sophistication including grouping, drawing representations in a line, using numbers and drawing, or words and numbers. If students do not use words or numbers, then model this for the class.

Draw a table and ask students to suggest what headings could be used and what to put in each column to make it clear. Record the data in a tabular form.

Connect

How can the total number of students be found from the recordings?

Ask students to find the total number of students from their own recording and from the table and check these are the same.

Suggested Learning Outcomes

Collect data to answer a question.

Record, sort, count, and display the data collected.

Communicate the results of the investigation.

Using grouping strategies to count and sort.

Independent Tasks

What did the tamariki in this class have for morning tea yesterday?

How can you use the data to answer this question?

Record your results to present to the class.

Can you represent this in different ways?

Mathematical Language

Statistics, data, organise, display, sort, classify, represent.

Anticipations

Solutions. Misconceptions

Task 4

These are the pets that tamariki from Tui class have at home.

Complete the table.

Dogs	
Cats	

Draw a representation to show this data.

Teacher Notes

Notice students who might draw each animal separately and differently or those who realise that the same icon/symbol can be used to represent each cat and the same icon/symbol can be used to represent each dog.

Facilitate students to recognise that it is easier to use small, simple symbols and have them organised in a line for each different category, so it is easier to compare them.

Shareback

Select students to share who have used the same symbol or icon to represent all the cats and a different one for all the dogs and a student whose picture shows that there are more cats than dogs without having to count or read the number.

If no students have developed a representation that shows this, model how it could be recorded.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Patterns can be noticed, described, and analysed in sets of data and by using data visualisations.

Curriculum Links

Data: collect categorical data for one variable

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Connect

How many pets do the tamariki in Tui class have altogether?
How are your representations the same?
How are your representations different?

Suggested Learning Outcomes

Record, sort, count, and display the data collected.

Communicate the results of the investigation.

Using grouping strategies to count and sort.

Independent Tasks

Hamuera wanted to see how many bugs and birds were in his garden.
This is what he saw:

Complete the table.

bugs	
birds	

Draw a representation to show this data.

Mathematical Language

Statistics, data, organise, display, sort, classify, represent, table, most, least.

Anticipations

Solutions. Misconceptions

Task 5

What food do you have for lunch?

Record the results in a table and make a representation to show the data.

Teacher Notes

Choose a topic of interest to your students and class (this could be linked to your inquiry topic). For example, this could be food in their lunchbox, pets at home, or sports they play. It should be a topic where students will give multiple answers.

During the launch, ask the students what food they have in their lunchbox and make a list on the board of all the different food types. Ask students for suggestions of how to record this quickly and model the use of tally marks.

Record on a table with the type of food, tally marks and number [support students to count in fives]

Type of food	Tally	Number

Notice students who use a quick simple symbol and also notice how they align the symbols to make it easier to read.

For the independent task, provide students with a set of three or four objects (types of toys, different coloured blocks, shapes).

Shareback

Select students to share who have used different representations and presentations but focus on students who have used a symbol or drawing that is quick to make and the clearest to read.

If no students have developed a representation that shows this, model how it could be recorded.

Big Ideas

Ideas and questions about a specific topic can be investigated through collecting data and using it to answer the questions.

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Problem: pose a summary investigative question about a group for which the data will have categorical variables (e.g., colour, brand), and anticipate what the data might show

Plan: plan to collect data by making observations or questioning others, and discuss how the data-gathering process might affect people

Data: collect categorical data for one variable

Connect

Support students to notice that they need to use a simple symbol, draw the correct number, and have them in rows and lined up vertically.

How many items of food do we have altogether?

How are your representations the same?

How are your representations different?

Suggested Learning Outcomes

Collect data to answer a question.

Record, sort, count, and display the data collected.

Use tally-marks and picture graphs to represent data.

Use groupings of five to add numbers.

Using grouping strategies to count and sort.

Independent Tasks

Record the different sets on the table using tally marks and numbers.

Type of toy	Tally	Number
Cars		
Blocks		
Teddies		

Make a representation to show the data as clearly as possible.

Mathematical Language

Statistics, data, organise, display, sort, classify, represent, table, most, least.

Anticipations

Solutions. Misconceptions

Task 6

Draw a picture graph that shows the data of the food in lunchboxes.

Draw another picture graph that only uses one symbol.

What statements make you make about that data?

Teacher Notes

During the launch, re-visit the previous task with the students and let them look at the picture graphs that were developed.

Ask them to discuss what helps to make the picture graph clear and easy to see.

Challenge them to develop a picture graph that is better than what they developed yesterday.

Have grid paper available for the connect.

Facilitate the students to notice that using a uniform simple symbol and using similar spacing and alignment makes the graph easier to read.

Shareback

Select students to share who develop representations that show the data clearly.

This should include a simple symbol that is uniform and has similar spacing and alignment.

Connect

Use the grid paper to make a representation of the data.

Big Ideas

Ideas and questions about a specific topic can be investigated through collecting data and using it to answer the questions.

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Suggested Learning Outcomes

Collect data to answer a question.

Record, sort, count, and display the data collected.

Use tally-marks and picture graphs to represent data.

Use groupings of five to add numbers.

Using grouping strategies to count and sort.

Mathematical Language

Statistics, data, organise, display, sort, classify, represent, table, most, least.

Independent Tasks

The chart below shows how students in Room One get to school.

Transport	Tally
	𝍸 ||
	||
	𝍸 𝍸 ||||
	𝍸 𝍸 𝍸

How many students are in Room One?

Draw a picture graph that shows how students in Room One get to school.

What statements can you make about how students in Room One get to school?

Anticipations

Solutions. Misconceptions

Task 7

What sports do you play?

Record the results in a table.

Make two representations to show the data.

Teacher Notes

Choose a topic of interest to your students and class (this could be linked to your inquiry topic). For example, this could be sports they play, pets at home, favourite games. It should be a topic where students will give multiple answers.

During the launch, ask the students what sports they play (or change to your chosen topic) and make a list on the board of all the different ideas generated.

Record results on a table with the following headings: type of sport, tally and number:

Type of sport	Tally	Number

Notice students who use a uniform simple symbol with similar spacing and alignment.

Expect students to develop at least two representations.

Shareback

Select students to share who develop representations that show the data clearly. This should include a simple symbol that is uniform and has similar spacing and alignment.

Connect

Use the grid paper to make a vertical representation of the data.

Big Ideas

Ideas and questions about a specific topic can be investigated through collecting data and using it to answer the questions.

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Data: collect categorical data for one variable

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Suggested Learning Outcomes

Collect data to answer a question.

Record, sort, count, and display the data collected.

Use tally-marks to represent data.

Use groupings of five to add numbers.

Use picture graphs to represent data.

Use grid paper to represent data.

Make statements about data that has been collected to answer a question.

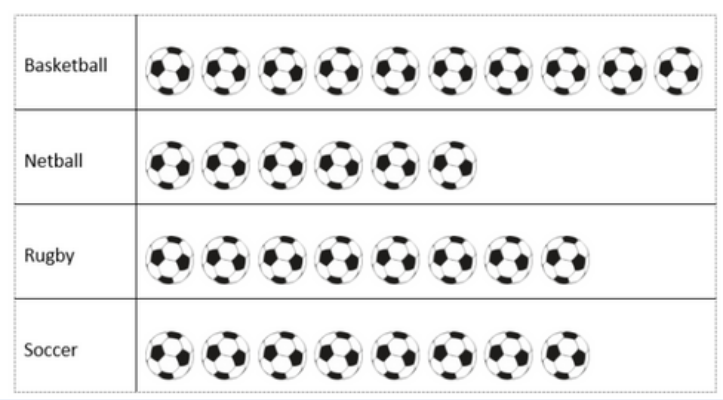
Count in groups.

Mathematical Language

Statistics, data, organise, display, sort, classify, represent, table, most, least, same, picture graphs.

Independent Tasks

The chart below shows the different sports that children in a school play:



Record the data on a table:

Type of sport	Tally	Number
Basketball		
Netball		
Rugby		
Soccer		

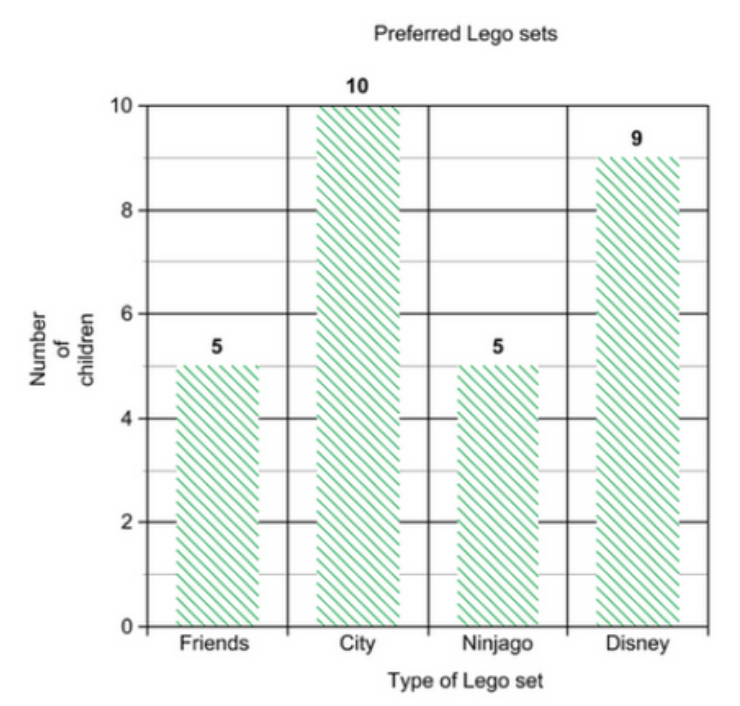
Make a graph of the data.
What statements can you make about the sports that children play?

Anticipations

Solutions. Misconceptions

Task 8

The Warehouse is stocking up for Christmas with Lego sets.
They have surveyed a class to find out the students' favourite sets.
The graph below shows what they found out.



Make statements using 'I notice' about the data showing favourite Lego set types.

Make statements using 'I wonder' about the data showing favourite Lego set types.

Teacher Notes

Ask students to make statements about the graph. If needed, model a statement for the students or use questioning.

Record student statements on pieces of paper and when you have 3-4 statements, ask students to choose a statement and say whether they agree or disagree with a reason.

Notice students who provide reasons for their statements.

Shareback

Select students to share who are able to provide justification and evidence for the statements that they make.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Patterns can be noticed, described, and analysed in sets of data and by using data visualisations.

Curriculum Links

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Statistical Literacy: agree or disagree with others' statements about simple data visualisations (e.g., pictures, graphs, dot plots).

Connect

Here are some statements about the data. Do you agree or disagree with the statement? Make sure you explain why.

1) Lego City sets are the most popular and the Warehouse should have plenty of these.

2) More children like Lego friends that Ninjago sets.

3) Disney Lego sets have nearly the same number of children who like them as Lego City sets.

Which sets would you tell the Warehouse to buy the most of?

Suggested Learning Outcomes

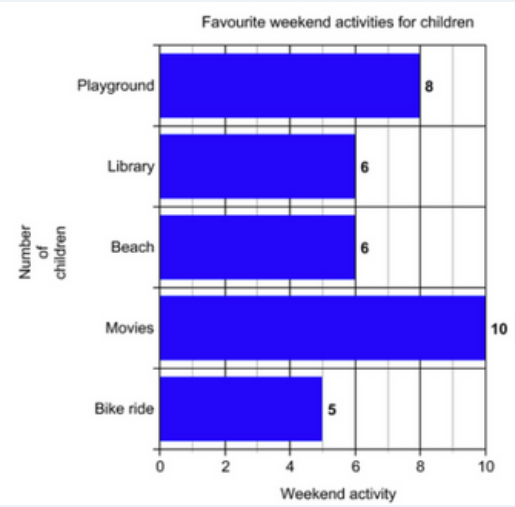
Make a statement about data displayed on a graph.

Agree or disagree with statements about data displayed on a graph.

Compare sets and the size of numbers to make statements.

Independent Tasks

These are the favourite weekend activities of one group of children:



Make "I notice" and "I wonder" statements about the data about weekend activities.

Check the statements that a classmate has made and see whether you agree or disagree and give a reason why.

Mathematical Language

Statistics, data, most, least, same, more, less.

Anticipations

Solutions. Misconceptions

Task 9

Sophie Pascoe is an inspirational athlete. She has won a lot of medals for swimming at the Paralympics.

2008	2012	2018	2020
			

Record the different medals that Sophie Pascal has won on the table using tally marks and numbers.

Medal	Tally	Number
Gold		
Silver		
Bronze		

Make a representation to show the data as clearly as possible.

What statements can you make about the data?

Teacher Notes

Notice students who use a uniform simple symbol with similar spacing and alignment.

Expect students to develop at least two representations.

Have grid paper available.

For the independent task, use the picture or grid paper graphs created for previous tasks.

Shareback

Select students to share who develop representations that show the data clearly. This should include a simple symbol that is uniform and has similar spacing and alignment.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Curriculum Links

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Conclusion: choose from given options the statements that best answer the investigative question

Connect

Here are some statements about the data. Do you agree or disagree with the statement? Make sure you explain why.

1. Boys like hot wheel cars more than girls.
2. Lego is the most popular.
3. Two more girls like puzzles than boys.
4. Marbles are the least popular toy.

Suggested Learning Outcomes

Make a statement about data displayed on a graph.

Agree or disagree with statements about data displayed on a graph.

Independent Tasks

Make “I notice” statements about the data on the graphs.

Check the statements that a classmate has made and see whether you agree or disagree and give a reason why.

Mathematical Language

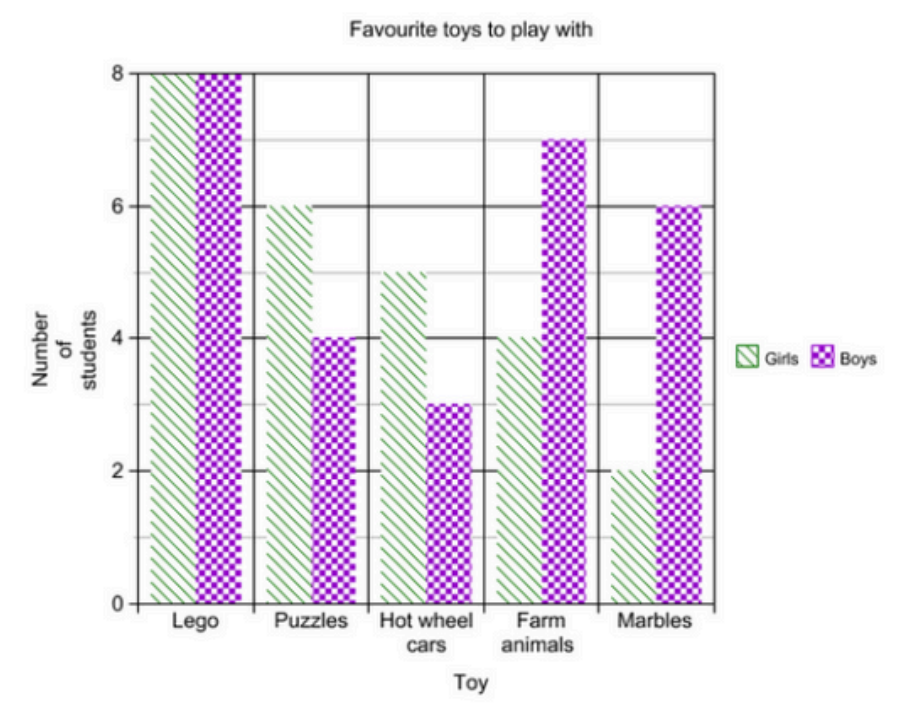
Statistics, data, organise, display, sort, classify, represent, table, most, least. picture graphs

Anticipations

Solutions. Misconceptions

Task 10

Here is a graph about the favourite toys of boys and girls in Kakano hub.



Make statements using 'I notice' about the data showing favourite toys.

Make statements using 'I wonder' about the data showing favourite toys.

Teacher Notes

Ask students to make statements about the graph. If needed, model a statement for the students or use questioning.

Record student statements on pieces of paper and when you have 3-4 statements, ask students to choose a statement and say whether they agree or disagree with a reason.

Notice students who provide reasons for their statements.

Shareback

Select students to share who are able to provide justification and evidence for the statements that they make.

Big Ideas

Data can vary in different ways (e.g., an object can be different sizes and colours) and it can be organised in different ways and by different characteristics (categorical, numerical).

Data can be represented and communicated in multiple ways including data visualisations.

Patterns can be noticed, described, and analysed in sets of data and by using data visualisations.

Curriculum Links

Analysis: create and make statements about data visualisations (e.g., pictures, graphs, dot plots) for the categorical data, giving the frequency for each category

Statistical Literacy: agree or disagree with others' statements about simple data visualisations (e.g., pictures, graphs, dot plots).

Connect

Here are some statements about the data. Do you agree or disagree with the statement? Make sure you explain why.

1. Boys like hot wheel cars more than girls.
2. Lego is the most popular.
3. Two more girls like puzzles than boys.
4. Marbles are the least popular toy.

Suggested Learning Outcomes

Make a statement about data displayed on a graph.

Agree or disagree with statements about data displayed on a graph.

Independent Tasks

Select the following assessment tasks (attached at the end of the document) as the independent activity:

Task 1: Graph of books read.

Task 2: Graph of Pets at Home

Task 3: Desserts sold from a food truck.

Task 4: Fruit

Mathematical Language

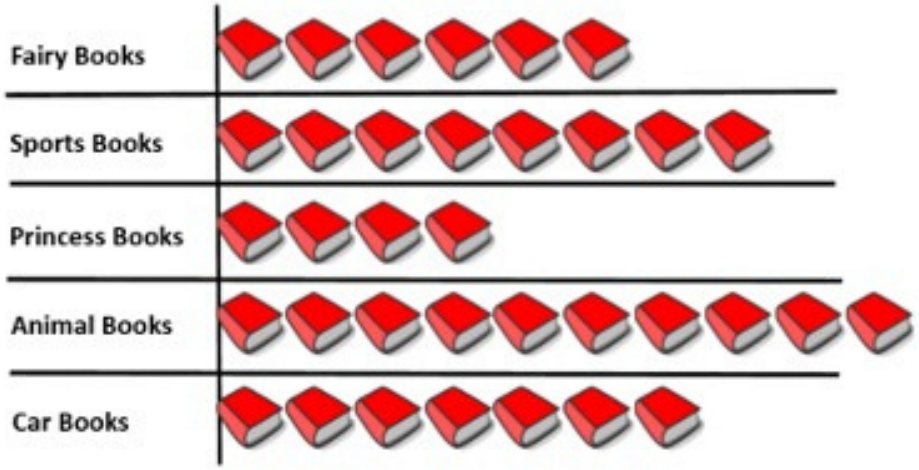
Statistics, data, organise, display, sort, classify, represent, table, most, least.

Anticipations

Solutions. Misconceptions

Assessment Task 1 - Statistics - Year 1

This graph shows how many books some children have read.



What questions can you ask about the graph?

Can you represent the data differently?

Make statements about what you notice about the books they have read based on the data in the graph.

Assessment Task 2 - Statistics - Year 1

Pets Children Have At Home

What statements can you make about this graph? What do you notice?

What questions can you ask about the graph?

How can you represent this data in a different type of graph?

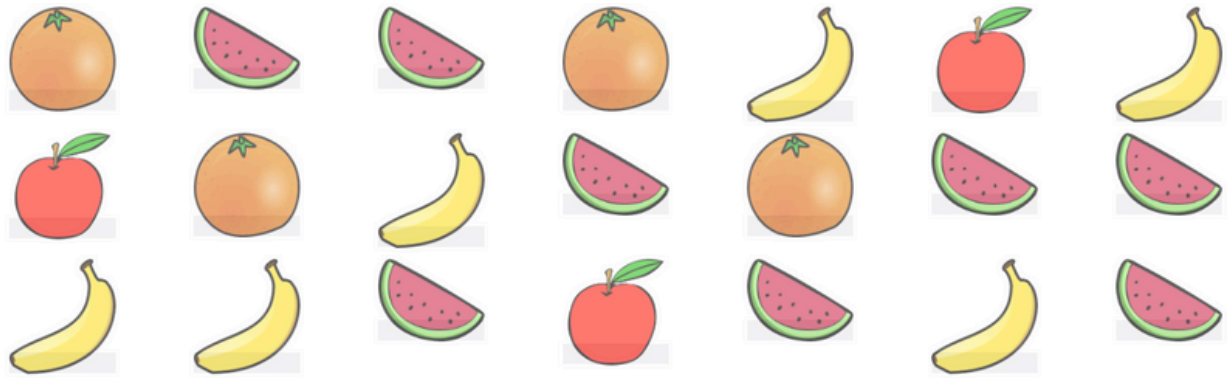
Assessment Task 3 - Statistics - Year 1

These are the desserts (ice-cream cone, shaved ice, sundae, fruit salad) that were sold from a food truck. What questions could you ask about this?

Can you display what desserts they sold?

What statements can you make about the desserts that were sold?

Assessment Task 4 - Statistics - Year 1



Here are the fruits the tamariki chose from the kai basket for morning tea.

What questions could you ask about this?

Make a display to show how many of each fruit were chosen.

What statements can you make about the data?