

# Collect Data, One-To-Many Correspondence, Evaluate.

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## Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

## Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

## Intervene

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention. Select the Intervention button on this screen.

# COLLECT DATA, ONE-TO-MANY CORRESPONDENCE, EVALUATE.

## EXPLICIT TEACHING PLAN OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESCRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PENCIL, RULER, 1 CENTIMETRE GRID PAPER, COMPUTER SPREADSHEET PROGRAM

### WHAT COULD WE DO?

Children:

- create a survey to collect data
- decide on colours to include
- ask children their survey question to collect data
- record the responses using tally marks
- record their data in a table with numbers
  
- record their data in a graph with one-to-many correspondence.
  
- evaluating the effectiveness of different displays of the same data

### WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children

- ask one another questions about methods for collecting data, and representing the data in graphs with one-to-many correspondence, for example:
  - ▶ How could we collect data?
  - ▶ Could we ask questions?
  - ▶ When we ask questions, could we conduct a survey?
  - ▶ Could we supply a list of 5 colours and ask people to select their favourite?
  - ▶ What colours could we include?
  - ▶ Could we include colours that have a lot of shades, like red, blue, green, yellow, purple?
  - ▶ Who will we ask the survey question?
  - ▶ Could we ask everyone in the class?
  - ▶ Is a survey a good way to collect data?
  - ▶ How else could we collect data?
  - ▶ How could we record our data in a column graph?
  - ▶ How could we make our column graph take up less space?
  - ▶ Because 12 is quite a high number, could we record 2 responses as 1 square on our column graph?
  - ▶ Because 2 responses are 1 square, this graph has one-to-many correspondence.

# COLLECT DATA, ONE-TO-MANY CORRESPONDENCE, EVALUATE.

## EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
<p>Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.</p> <p>Record, for example, chance</p> <p>Record, for example, data</p>	<ul style="list-style-type: none"><li>▶ Today brings an investigation about chance and data.</li><li>▶ What do you know about chance and data?</li><li>▶ Talk about chance and data with a friend.</li><li>▶ Is anyone ready to share what they are thinking about chance and data?</li> <li>▶ We've investigated chance.</li><li>▶ And we found that chance tells us how likely it is that an event will happen.</li><li>▶ We've investigated data.</li><li>▶ And we found that data is information.</li><li>▶ We found that when we have some data, we can use it to work out the chance of an event occurring.</li> <li>▶ <b>Today we're going to investigate the ways that we can collect data.</b></li><li>▶ How could we collect data?</li><li>▶ Could we ask questions?</li><li>▶ When we ask questions, could we conduct a survey?</li><li>▶ Could we construct a survey to ask people questions?</li><li>▶ The first thing we need to decide is, what question would we like answered?</li></ul>

Record, for example, Which is your favourite colour out of red, blue, green, yellow, purple?

Add 'other' to the list, for example, red, blue, green, yellow, purple, orange, other

Record 'Favourite Colour' as the title for the table.

- ▶ We've investigated refining the question so that we get response that we can easily record in a graph.
- ▶ And we found that if we gave people a selection of responses, we could control the number of responses.
- ▶ If we would like to know the most popular colour, how could we refine the questions so we get data that we can easily record in a graph?
- ▶ Could we supply a list of 5 colours and ask people to select their favourite?
- ▶ What colours could we include?
- ▶ Could we include colours that have a lot of shades, like red, blue, green, yellow, purple?
  
- ▶ Will everyone be able to select their exact favourite?
- ▶ What if a person's favourite colour is not on the list?
- ▶ Could we add 'other' to the list?
  
- ▶ Who will we ask the survey question?
- ▶ Could we ask everyone in the class?
- ▶ If we ask everyone in the class, how could we record the results?
- ▶ Could we construct a table?
  
- ▶ Let's construct a table.
- ▶ What could be our title for our table?
- ▶ Could we call our table Favourite Colour?

Record a table, with 2 rows and 7 columns, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children						

Allow children in pairs to ask everyone in the class the survey question, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children		### ##				###

Children record the data in a table with numbers for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	8

Display a child's table of data, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	8

- ▶ How many rows will we need?
- ▶ Will we have one row to record the colours and one row for the number of children who like the colour?
- ▶ How many columns will we need?
- ▶ Will we need one column for the row titles?
- ▶ How many colours are we listing?
- ▶ Are we listing 5 colours?
- ▶ And are we listing 'other' in case a person's favourite colour is not listed?
- ▶ So will we need 7 columns?
- ▶ How could we record the responses?
- ▶ Could we record the responses using tally marks?
- ▶ We are ready to conduct the survey!
- ▶ Let's record our data in a table with numbers so we can better see how many people said each colour.
- ▶ How could we interpret the data we collected using this survey?
- ▶ How many children had 'other' colours as their favourite?
- ▶ Do you think we have really found the most popular colour?
- ▶ Why not?
- ▶ Did everyone have the opportunity to name their favourite colour or did everyone

- have to choose from the listed colours?
- ▶ What might be a better way to collect this data?
  - ▶ If we just asked everyone for their favourite colour, how many colours might we end up with?
  - ▶ If we just asked everyone for their favourite colour, what colours might people name?
  - ▶ What if someone said they liked pale pink, bright pink, light pink, crimson, hot pink, baby pink, magenta, rose ...
  - ▶ Would we list their favourite colour as pink?
  - ▶ What if someone said they liked pale blue, royal blue, aqua, turquoise, jade, cyan, indigo, navy, ...
  - ▶ Would we list their favourite colour as blue?
  - ▶ Would that give us exact data?
- ▶ Is a survey a good way to collect data?
- ▶ If we collect data by survey, do we just have to accept what people say?
  - ▶ Could people change their mind later?
  - ▶ Is a survey true for a particular point in time?
- ▶ How else could we collect this data?
- ▶ Could we create a questionnaire where each person ticks their favourite colour?
  - ▶ Would we need to make a lot of copies of the questionnaire?
  - ▶ Would we then have a lot of papers to place into groups?
  - ▶ Might some people not answer the questionnaire in a way that allows us to see their favourite colour?
  - ▶ Might some people choose more than 1 colour?

- ▶ Might some people add their own colour?
- ▶ Is a survey a better way to collect the information when we are there to ask the question and record the data?
- ▶ How else could we collect this data?

Display a child's table of data, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	8

Distribute 1 centimetre grid paper to children

Record, for example,

Favourite Colour

Record, for example, 1 response = 1 square

Record, for example, 12 responses = 12 squares

Record, for example, 2 responses = 1 square

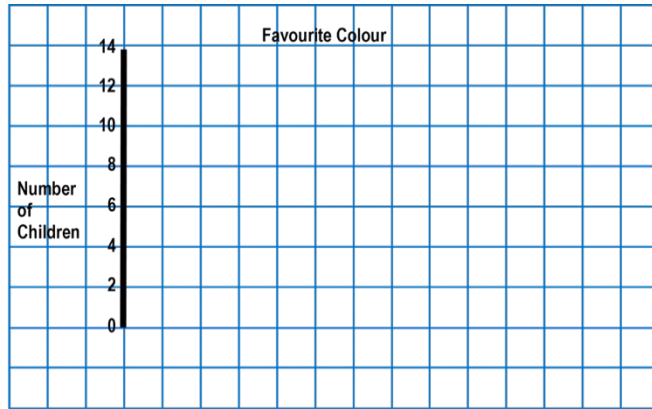
Record, for example, 12 responses = 6 squares

### ▶ Let's record our data in a column graph.

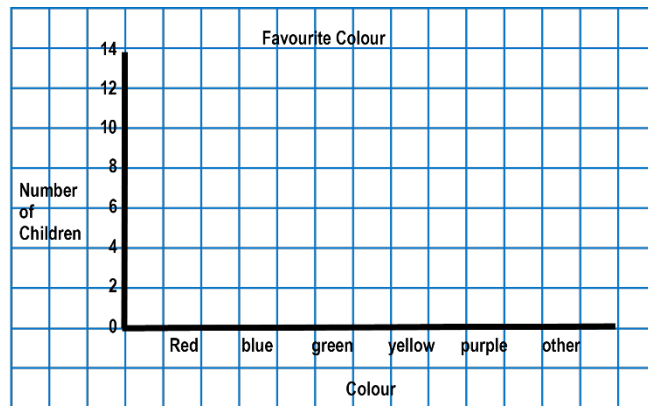
- ▶ What could be the title for our column graph?
- ▶ Could we call our column graph 'Favourite Colour'?
  
- ▶ Which colour had the highest number of responses in our survey?
- ▶ Did blue have the highest number of responses?
- ▶ How many responses did blue have?
- ▶ Did blue have 12 responses?
- ▶ If 1 response is 1 square on our column graph, how many squares will we need to record the 12 people who responded 'blue'?
- ▶ If 1 response is 1 square on our column graph, will we need 12 squares to record the 12 people who responded 'blue'?
- ▶ That's going to make our graph quite tall.
- ▶ How could we make our column graph take up less space?
- ▶ Because 12 is quite a high number, could we record 2 responses as 1 square on our column graph?
- ▶ If 2 responses is 1 square on our column graph, how many squares will we need to record the 12 people who responded 'blue'?
- ▶ If 2 responses is 1 square on our column graph, will we only need 6 squares to record the 12 people who responded 'blue'?
- ▶ If 2 responses is 1 square on our column graph, will we only need half as many squares to record the people who responded each colour?



Record and label the vertical axis, for example,



Record and label the horizontal axis, for example,

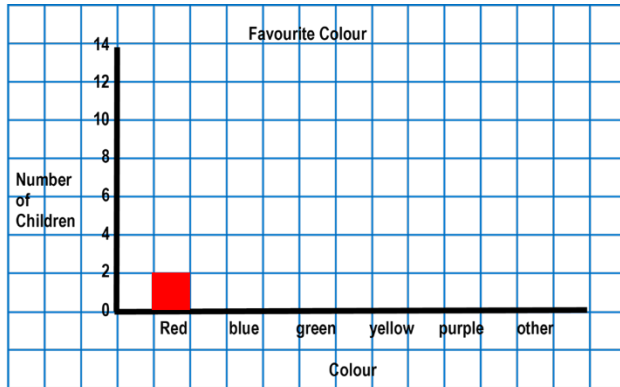


- ▶ We've investigated the lines on a column graph.
- ▶ And we found the lines are horizontal and vertical axes.
- ▶ Let's record our vertical axis a little longer than 6 squares.
  
- ▶ How could we label the vertical axis?
- ▶ Could we label the vertical axis, 'Number of Children'?
- ▶ Could we label the vertical axis like a number line?
- ▶ If every square is worth 2 responses, could we label the vertical axis in multiples of 2?
  
- ▶ How long will our horizontal axis need to be?
- ▶ How many possible responses do we have?
- ▶ Do we have 6 possible responses?
- ▶ So we need 6 columns, plus a space between each column – will our horizontal axis need to be 12 squares long?
  
- ▶ How could we label the horizontal axis?
- ▶ Could we label the horizontal axis, with the same labels that we used on our table?
- ▶ Could we label the horizontal axis 'Colour'?
- ▶ Could we label each column with a different colour?

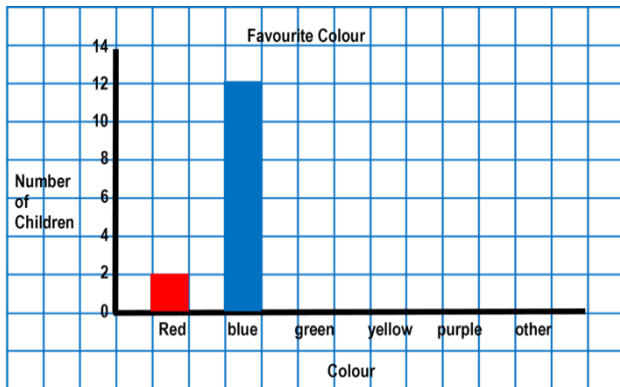
Display the table, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	8

Record the column for red, for example,

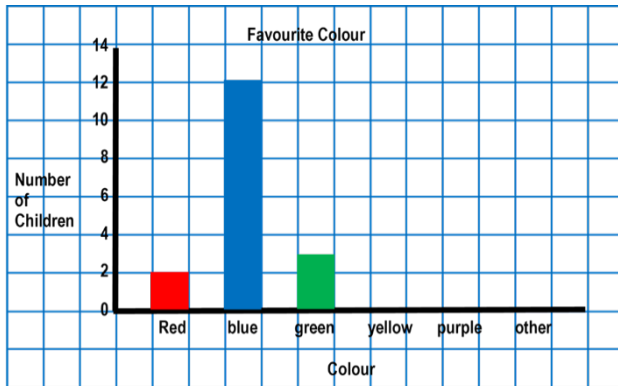


Record the column for blue, for example,

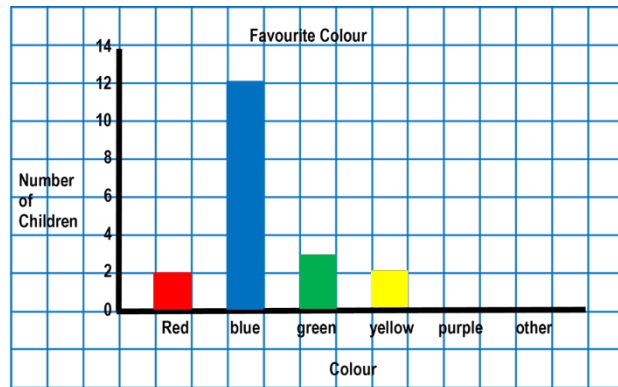


- ▶ Lets construct our columns to represent the data in our table.
- ▶ 2 children like red.
- ▶ If every square is worth 2 children, how many squares will the red column be?
- ▶ Will the red column be 1 square?
  
- ▶ 12 children like blue.
- ▶ If every square is worth 2 children, how many squares will the blue column be?
- ▶ Will the blue column be 6 squares?

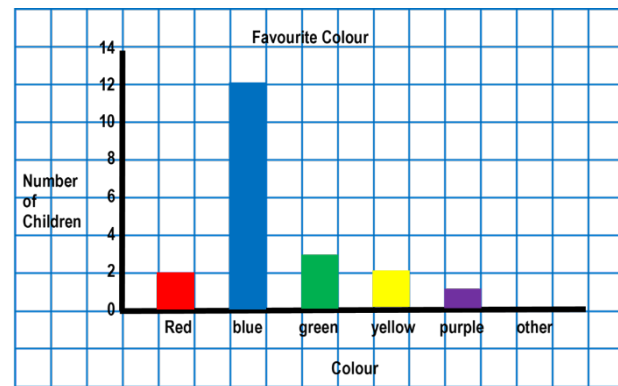
Record the column for green, for example,



Record the column for yellow, for example,



Record the column for purple, for example,

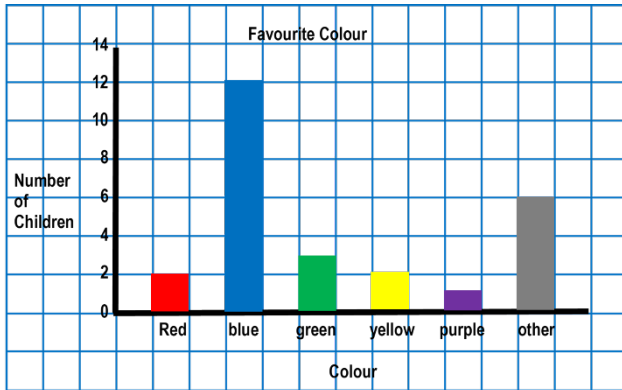


- ▶ Now we have a problem.
- ▶ 3 children like green.
- ▶ If every square is worth 2 children, how many squares will the green column be?
- ▶ If one square is 2 children, will we need half a square for the other child?
- ▶ Will 3 children be 1 and a half squares?

- ▶ 2 children like yellow. If every square is worth 2 children, how many squares will the yellow column be?
- ▶ Will the yellow column be 1 square?

- ▶ Now we have another problem.
- ▶ Only 1 child likes purple.
- ▶ If every square is worth 2 children, how many squares will the purple column be?
- ▶ If one square is 2 children, will we need half a square for 1 child?
- ▶ Will 1 child be half a square?

Record the column for other, for example,



- ▶ 8 children like other colours.
- ▶ If every square is worth 2 children, how many squares will the other column be?

- ▶ Let's look at our graph.
- ▶ Is one square equal to 2 children?
- ▶ We call this one-to-many correspondence, because 1 square on the graph is equal to more than 1 child.
- ▶ Can we still use the data in the graph with one-to-many correspondence to see the popularity of each colour?
- ▶ Which colour was the most popular?
- ▶ Was blue the most popular colour?
- ▶ Is the blue column the tallest?
- ▶ Which colour was the least popular?
- ▶ Was purple the least popular colour?
- ▶ Is the purple column the shortest?

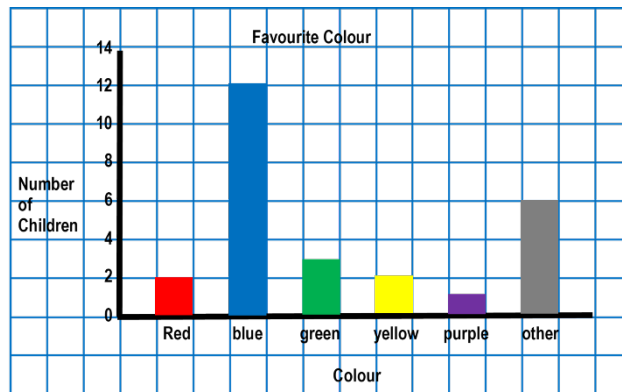
Display the data recorded in a table with tally marks, in a table with numbers, and in

- ▶ **If we wanted to know which colour was the most popular, which**

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	6

a column graph with one-to-many correspondence, for example,

Favourite Colour						
Colour	red	blue	green	yellow	purple	other
Number of Children	2	12	3	2	1	8



### data display would be most useful?

- ▶ Would the graph be most useful?
- ▶ Can we tell immediately, without counting, that blue is the tallest column?
- ▶ Can we tell immediately, without counting, that blue is the most popular?
  
- ▶ If we wanted to know how many people liked blue best, which data display would be most useful?
- ▶ Would the table with the numbers be the most useful?
- ▶ Can we tell immediately, without counting, that there are 12 people who like blue the best?
- ▶ If we wanted to know the difference between the number of people who liked blue best and the number of people who liked purple best, which data display would be most useful?
- ▶ Would the table with the numbers be the most useful?
- ▶ Can we more easily read the number of people who liked blue best and the number of people who liked purple best?
  
- ▶ When are tables with tally marks useful?
- ▶ Are tables with tally marks useful for collecting data?