

Assessing pupils' progress in mathematics at Key Stage 3

Year 7 assessment package
Handling data
Teacher pack



Year 7 Handling data task: *Controversial* and *Feeling confident*

Levels 3/4/5

The lesson plans in this pack are set out in two columns. The left-hand column has indicative times for activities, highlights the resource sheets required and also has some examples of questions which teachers may wish to use with pupils during the activities. The right-hand column describes each activity in detail.

APP ASSESSMENT CRITERIA

These lessons may generate evidence to help inform judgements against a number of assessment criteria, including the following:

Handling data

- level 4: understand and use the mode and range to describe sets of data
- level 5: interpret graphs and diagrams, including pie charts, and draw conclusions
- level 5: understand and use the mean of discrete data and compare two simple distributions, using the range and one of the mode, median or mean

Using and applying mathematics

- level 5: solve word problems and investigations in a range of contexts
- level 5: show understanding of situations by describing them mathematically using symbols, words and diagrams
- level 5: draw simple conclusions of their own and give an explanation of their reasoning.

LESSON 1: *CONTROVERSIAL*

Resources

- Each pupil needs five digit cards, numbered 1 to 5. The teacher resource sheet below is provided with the digit cards for both lessons:
Digit cards, 0 to 9 (T3L1&2resource1)
If pupils do not already have sets of digit cards available, print or stick the resource sheet onto card to produce enough digit cards for the pupils to have one set each
- Five controversial statements of your choice.
Preparation: before the lesson, write each statement on a large sheet of paper. Suggestions are given below, but use your knowledge of the class to ensure that statements are sensitive to individuals and their cultures and, most importantly, are likely to generate a full range of opinion:
Art is more enjoyable than PE
The summer holidays are too long
Girls and boys should be taught separately
It is all right to eat meat
- Teacher OHT/whiteboard slide: *24 people (T3L1teacher1)*
- Each group needs one or two of the following resource sheets (note that to save paper and photocopying, two copies of these resource sheets are shown on the template):
Bar chart (T3L1pupil1)
Pictogram (T3L1pupil2)
Pie chart (T3L1pupil3)
- Each pupil needs the following assessment sheet (level 3/4/5):
Data find sheet 1 (T3L1assess1)
- For pupils working at level 3/4, the following worksheet is available:
Data find sheet 2 (T3L1assess2)
- For pupils working at level 5 or above, the following worksheet is available:
Data find sheet 3 (T3L1assess3)
- Squared, graph and plain paper for the group activity
- Calculators should not be needed for the activities, but may be used if desired, as it is the skills of data handling that are being assessed

Starter
about 10 minutes

T3L1&2resource1
T3L1teacher1

Why might a 1 to 5 scale not be as good as a 1 to 4 or a 1 to 6 scale?
[This could be discussed here or after pupils have responded to the 'controversial' statements. An even number of responses ensures that people respond on either the 'positive' or the 'negative' side.]

What is meant by the range of a set of data? How do you work it out?
What does the range tell us?

Ask the pupils if they, or any people they know, have ever been asked to answer questions in a survey. What sorts of questions have they been asked? Lead the discussion to the fact that a number scale is often used to record how much people agree or disagree with given statements.

Explain that we are going to do the same using the numbers 1 to 5. The first thing, therefore, is to agree what each number represents. Show the grid below. How could it be completed? (E.g. 2 could represent 'Disagree', 3 could represent 'Don't know' and 5 could represent 'Strongly agree'.)

Number	What the number represents
1	Strongly disagree
2	
3	
4	Agree
5	

Now tell pupils they are going to use their set of digit cards with numbers 1 to 5 (**T3L1&2resource1**) (give them out at this stage, if appropriate). Leave the completed table visible.

Show one of the five statements, prepared before the lesson. Read it out, then ask the pupils to hold up one of their five digit cards to show how much they agree or disagree with the statement. Repeat with the remaining four statements.

Choose one of the statements to act as a focus for the lesson: it may be more interesting if there is a spread of opinion on the issue. Ask the pupils to show again their digit card for the chosen statement.

Ask the pupils what the **range** of their numbers is. Reinforce that the range of a data set is the largest value take away the smallest value.

Discuss whether there appears to be more agreement than disagreement with the statement within the class or vice versa. Do people seem to feel strongly, or are there only a few 1s or 5s?

Explain that the best way to know for sure is to collect the results in a frequency table. For ease, however, tell the pupils that they are going to work in groups on the responses to their chosen statement from a group of 24 other people.

Depending on the statement chosen, show **only one** of the frequency tables (either data set A or data set B) on the teacher OHT/whiteboard slide:

24 people (**T3L1teacher1**)

Data set A is skewed so that there is more general disagreement with the statement than agreement. Data set B is the reverse of this, with more agreement. If neither seems appropriate for the statement chosen, teachers can modify and give their own frequencies on the board, provided the total is still 24.

<p>Group activity about 20 minutes</p> <p>T3L1pupil1 T3L1pupil2 T3L1pupil3</p> <p><i>Why should the bars in the bar chart be separated? What scale would be sensible to use for the bar chart?</i></p> <p><i>What key could you use for the pictogram? Why might using one symbol to represent one person be less efficient than other keys? Why might using one symbol to represent five people be less useful than other keys?</i></p> <p><i>Without a template, how can you work out the number of degrees that should be in each 'slice' of the pie chart?</i></p>	<p>Tell the pupils that their task is to work in their groups to draw one or two different charts or graphs to summarise the data for the 24 people. Ask for suggestions of different types of charts or graphs and record the results on the board.</p> <p>Suggestions may include:</p> <ul style="list-style-type: none"> • a bar chart (data is discrete, so discuss and encourage separated bars) • a pictogram • a pie chart • a vertical line diagram <p>Templates for the first three of these are given in the pupil sheets: Bar chart (T3L1pupil1) Pictogram (T3L1pupil2) Pie chart (T3L1pupil3)</p> <p>Allocate one or two diagrams to each group, differentiating and supporting as appropriate. For example, more able pupils could complete diagrams of their own on squared, graph or plain paper without using the templates.</p> <p>After the activity, briefly discuss the different types of chart, though discussion of the benefits of each can be continued in greater depth in the plenary. Groups could stick up their charts on the wall or board before the discussion.</p> <p>Ask what different scales are sensible for a bar chart using these data. Discuss different keys for a pictogram using the given data. Talk about how to work out angles in pie charts if you do not have a template to use.</p>
<p>Assessment activity about 10 minutes</p> <p>T3L1assess1 T3L1assess2 T3L1assess3</p>	<p>Give each pupil a copy of the assessment sheet (level 3/4/5): Data find sheet 1 (T3L1assess1)</p> <p>Clarify that each of the diagrams is complete and shows responses for eight people. The task is to write the data (numbers) on each set of eight blank cards.</p> <p>For level 3/4 pupils, the following worksheet can be completed after sheet 1: Data find sheet 2 (T3L1assess2)</p> <p>For level 5 pupils, the following worksheet can be completed after sheet 1: Data find sheet 3 (T3L1assess3)</p> <p>Pupils finishing early can be challenged to draw a chart for eight other digit cards, e.g. 1, 1, 1, 2, 3, 3, 5, 5</p>

Plenary
about 5 minutes

What does a bar chart or vertical line graph show us that a pie chart does not?

What does a pie chart show us that a bar chart or vertical line graph does not?

If we had responses numbered from 1 to 10, do you think a bar chart or vertical line graph would be easier to interpret than a pie chart? Why?

Why might a bar chart or pie chart be more helpful to look at than a frequency table?

If we had lots of people responding to a questionnaire, how might we build up a frequency table?

Revisit the diagrams drawn by the different groups earlier in the lesson, and ask: Which type of chart shows the results in the best way?

Which charts are most helpful if you do not know what the total number of people in the survey was? Why?

Which chart is best if you want to know quickly the proportions of people giving each type of response?

Discuss when it might be most appropriate to use a frequency table, a bar chart, a pictogram, a pie chart, a block graph or a vertical line diagram. When might a line graph or even a scatter graph be useful?

LESSON 2: FEELING CONFIDENT

Resources

- Each pupil needs ten digit cards, numbered 0 to 9. A teacher resource sheet: *Digit cards, 0 to 9 (T3L1&2resource1)* is provided
- Five statements of your choice, designed to probe how confident the pupils felt when they joined the school at the beginning of Year 7, or, for teachers working in middle schools, how confident pupils feel about transferring to their next school.
Preparation: before the lesson, write each statement on a large sheet of paper. Several suggestions are given below, but use your knowledge of the class to ensure that the five statements are sensitive to individuals and their cultures and, importantly, are likely to generate a range of opinion:
 - Arriving at school on the first day
 - Finding their way around their new school
 - Meeting new people
 - Speaking out loud in front of their new class
 - Starting a new subject that they haven't studied before
 - Admitting that they could not do some of the new work
 - Having a test in the new school
- Sticky notes (at least two per pupil, of a reasonable size since the writing on them will need to be visible when stuck on the board)
- Teacher resource OHT/whiteboard slides:
 - Ten point (T3L2teacher1)*
 - Survey report (T3L2teacher2)*
 - New foods (T3L2teacher3)*
- Each pupil needs one of the following assessment sheets (level 3/4/5):
 - How confident are we? (T3L2assess1)*
- Squared, graph, plain and lined paper for the assessment
- Calculators may be used if pupils are working with percentages

<p>Starter about 10 minutes</p> <p>T3L2teacher1 T3L1&2resource1</p> <p><i>Look at the phrases we used in the last lesson. Are you happy with them or are there better ways to word any of them?</i></p> <p>[If odd/even numbers of responses were discussed in the first lesson:] <i>What did we say was a possible problem with having five numbers in lesson 1?</i></p> <p>[If not previously discussed:] <i>Why might a 1 to 4 or a 1 to 6 scale be better than a 1 to 5 scale?</i></p>	<p>Start by reminding the class that last time they chose from five digit cards to show how much they agreed with a particular statement, then show the completed scale used in the first lesson.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Number</th> <th>What the number represents</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Strongly disagree</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;"><i>As phrased in lesson 1</i></td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;"><i>As phrased in lesson 1</i></td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Agree</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;"><i>As phrased in lesson 1</i></td> </tr> </tbody> </table> <p>Explain that not all surveys use the numbers 1 to 5, and say that this time the pupils are going to choose from ten numbers, numbered 0 to 9, to show how confident they feel in different situations.</p>	Number	What the number represents	1	Strongly disagree	2	<i>As phrased in lesson 1</i>	3	<i>As phrased in lesson 1</i>	4	Agree	5	<i>As phrased in lesson 1</i>
Number	What the number represents												
1	Strongly disagree												
2	<i>As phrased in lesson 1</i>												
3	<i>As phrased in lesson 1</i>												
4	Agree												
5	<i>As phrased in lesson 1</i>												

<p><i>Why do you think it's helpful to know how pupils felt when they joined this school?</i></p> <p>[Middle school with Y8/Y9 transfer:] <i>Why do you think it's helpful to know how pupils might feel about going to their next school?</i></p> <p><i>Think of some other situations that did or could occur during the first week at a new school.</i></p>	<p>Show the OHT/whiteboard slide: <i>Ten point (T3L2teacher1)</i></p> <p>Ensure the pupils understand that the answer 0 represents 'not at all confident' and that the answer 9 represents 'very confident'. (Note that pupils may wish to strengthen this, e.g. 'very, very'.) Ask what the number 3 could represent (e.g. 'only a little') and then ask what number 6 would represent (e.g. 'fairly confident'). Note that as only four descriptions are to be given on the scale, you should ensure they are evenly distributed along the ten-point scale.</p> <p>Once the four descriptions are attached to give meaning to the ten-point scale, ask why a ten-point scale might be better than a five-point scale. (E.g. more numbers give you the ability to say a bit more precisely how you feel; a middle number is not available so people must make a decision one way or the other.) Why might it not be better than a five-point scale? (Too much choice.) Why would we not want to put descriptions on each of the ten numbers? (Too much information to be read quickly; too prescriptive.)</p> <p>Explain that the class is going to do some research to find out how confident pupils felt when they joined the school at the beginning of Year 7. (Teachers in middle schools can ask how confident pupils feel about transferring to their next school.) Say this research will be used to produce a brief report for the headteacher, so it is important that pupils respond honestly.</p> <p>Now tell pupils they are going to use their set of digit cards with numbers 0 to 9 (T3L1&2resource1) (give them out at this stage if appropriate).</p> <p>Now show one of the five statements that you prepared before the lesson. Read it out, then ask the pupils to hold up one of their ten digit cards to show how confident they felt, or would feel, in this situation. Remind pupils that the full scale of digits 0 to 9 can be used. Repeat with the remaining four statements.</p> <p>Note which two statements provoke the most diverse reaction. (One will be used immediately. The other is for the assessment activity.) Ensure that pupils note down the number of the card they showed for each of these two statements.</p>
<p>Group activity about 15 minutes</p> <p>T3L2teacher2</p> <p><i>How do we find the mode of a set of data? What does the mode tell us? Can there be more than one mode?</i></p> <p><i>What is (are) the modal value(s) for the class?</i></p>	<p>Tell the pupils which statement you are working on for this part of the activity, and make sure they have the digit card they showed in response to this statement to hand.</p> <p>You may need to remind the pupils what the 'mode' of a set of data is before asking them to stand up, look at other people's cards, and find the mode.</p> <p>The pupils are likely to start this activity by attempting to see what everyone else has on their cards. Pupils may then attempt to organise themselves, e.g. by arranging themselves into groups of pupils with the same number. If necessary, prompt the class to do this to ensure speedy grouping.</p>

<p><i>What do the words 'grouped data' mean? If we only asked five pupils to give responses, would we want to group the data then? Why not?</i></p> <p><i>What is wrong with using these class intervals: 0–4, 4–7, 7–9, etc?</i></p> <p><i>What if the responses had been spread differently [e.g. clustering of responses in one zone]? Would we have needed to change the class intervals?</i></p>	<p>Ask why organising themselves into groups is an efficient way to summarise the data.</p> <p>Tell the pupils to return to their seats and write the number from their card, as big and bold as possible, on a sticky note.</p> <p>Each pupil should then place his or her sticky note anywhere on the board, i.e. not grouped. Explain to the pupils that one way to organise their data is to draw up a frequency table; then do this on the board with pupil input. For less able groups, the sticky notes could be physically placed in a frequency table prior to being counted.</p> <p>Now show pupils the OHT/whiteboard slide: Survey report (T3L2teacher2)</p> <p>It is not intended that the report should be completed, but the key issue to resolve, through discussion with the class, is how the data can be grouped for the summary report. It is intentional that the ten possible responses cannot be divided into the three categories in the report equally.</p> <p>Remind pupils of the second statement that was selected in the starter activity, and ask pupils to write their score on a sticky note (again, their writing needs to be as big and bold as possible). The sticky notes are then stuck on the board, but this time they are grouped so that the same numbers are together.</p>
<p>Assessment activity about 15 minutes</p> <p>T3L2assess1 T3L2teacher2</p>	<p>Give out the assessment sheet (level 3/4/5): How confident are we? (T3L2assess1)</p> <p>Ensure that a range of paper is available for the report and for their chart or diagram. More able pupils can be encouraged to use more complex mathematics, e.g. percentages. You may wish to leave the OHT/whiteboard slide Survey report (T3L2teacher2) visible for pupils to refer to if needed.</p>
<p>Plenary about 5 minutes</p> <p>T3L2teacher3</p> <p><i>Describe one good thing and one not-so-good thing about using a pictogram. What does it tell us? What doesn't it tell us? Imagine 500 people had responded. What could be good or not-so-good about a pictogram? [Good: e.g. general impression. Not-so-good: e.g. hard to read accurately for large total frequencies.]</i></p>	<p>Show the OHT/whiteboard slide: New foods (T3L2teacher3)</p> <p>Say that the chart shows how some people responded when asked: How confident are you when trying new foods? What information is missing from the chart? (The key.)</p> <p>The key cannot be '1 face represents 1 person'. Why not? What do they think the most likely key is? Why? What other keys are possible? (1 face represents any even number.)</p> <p>What advice could be given to someone trying to get people to taste new foods based on the chart? Emphasise the importance of interpreting charts as well as drawing them.</p>

Teacher resource sheets

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

T3L1teacher1

24 people

Data set A

Response	Frequency
1	4
2	6
3	7
4	4
5	3
Total	24

Data set B

Response	Frequency
1	3
2	4
3	7
4	6
5	4
Total	24

T3L2teacher1

Ten point

How confident are you when ... ?

Choose a number from 0 to 9

0	1	2	3	4	5	6	7	8	9
Not at all									Very

Survey report

To: The Headteacher

From: Year 7, Mathematics Class _____

We have been finding out how confident Year 7 pupils are about going to their new school.

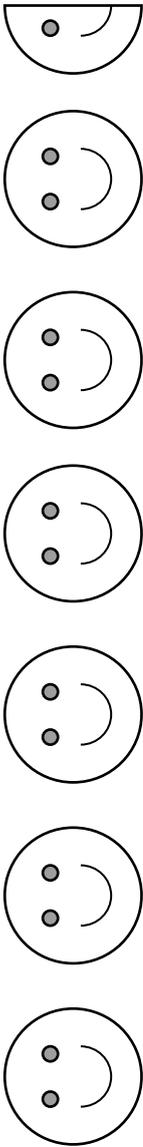
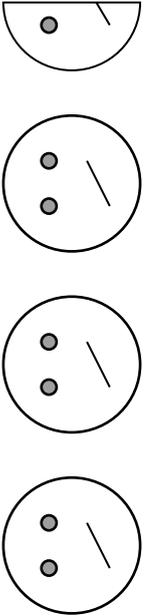
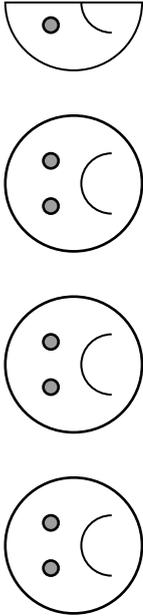
We did a survey about

We found that _____ were **not** confident about this,

_____ were confident about it,

and the other _____ were in the middle.

How confident are you when trying new foods?

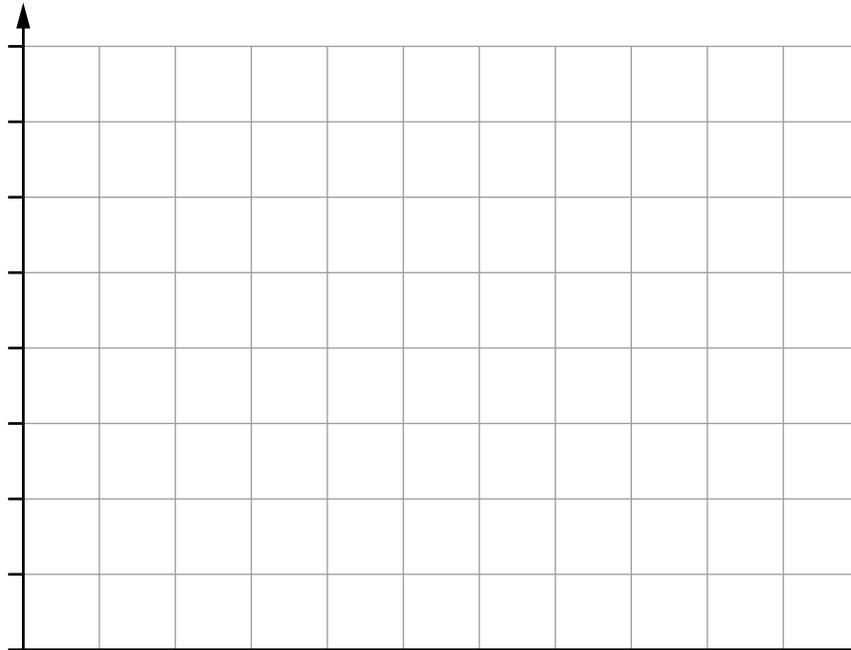
Very confident	
Don't mind	
Not very confident	

Pupil sheets

T3L1pupil1

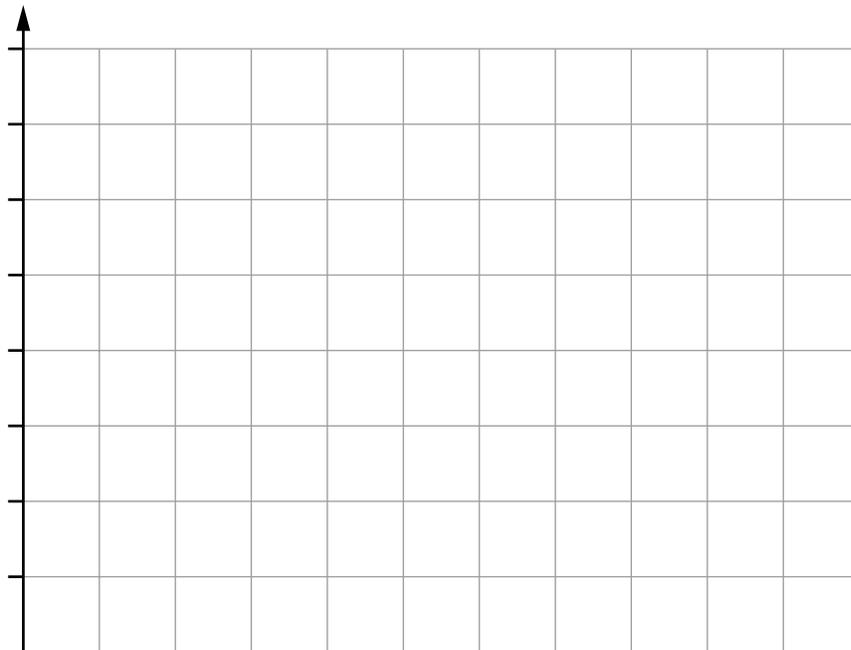
Bar chart

Name(s): _____



Bar chart

Name(s): _____



T3L1pupil2

Pictogram

Name(s): _____

Key:	= _____ people

Pictogram

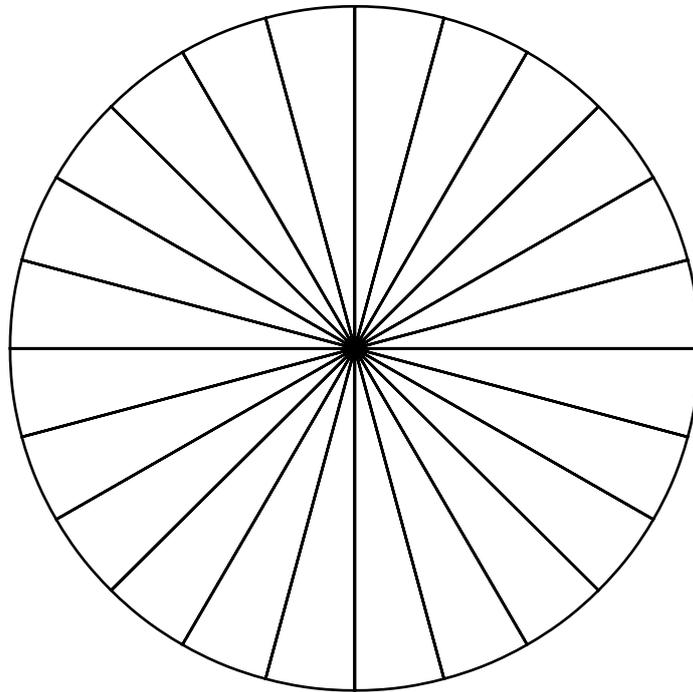
Name(s): _____

Key:	= _____ people

T3L1pupil3

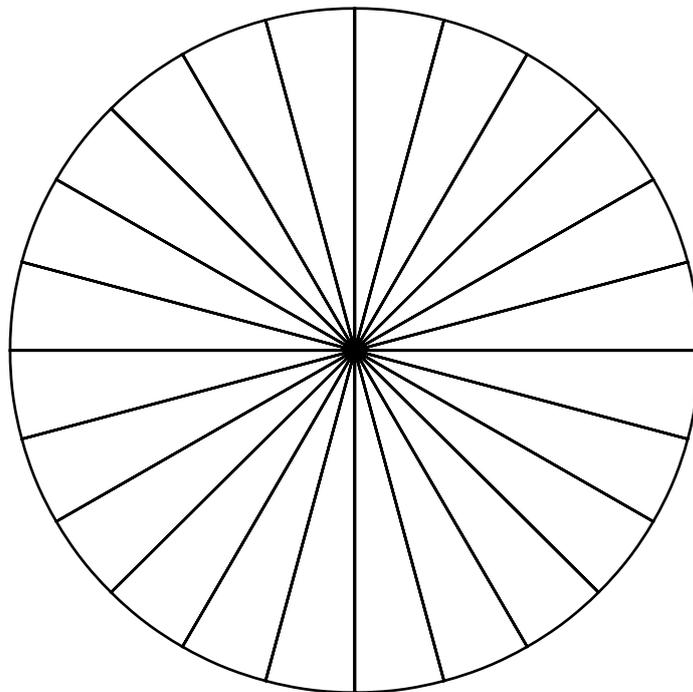
Pie chart

Name(s): _____



Pie chart

Name(s): _____



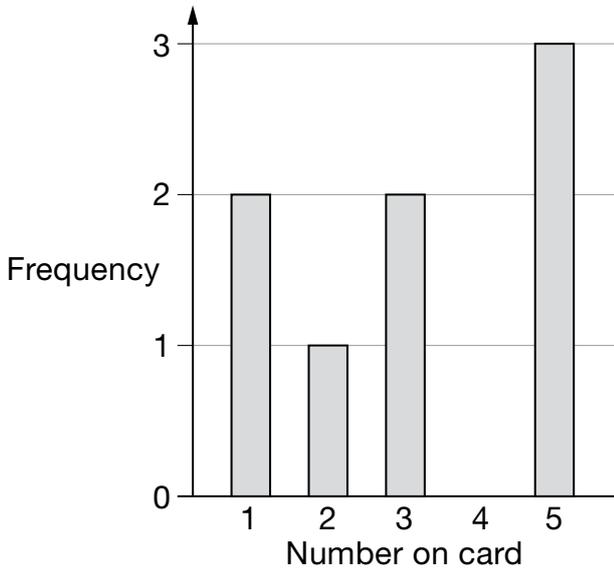
T3L1assess1

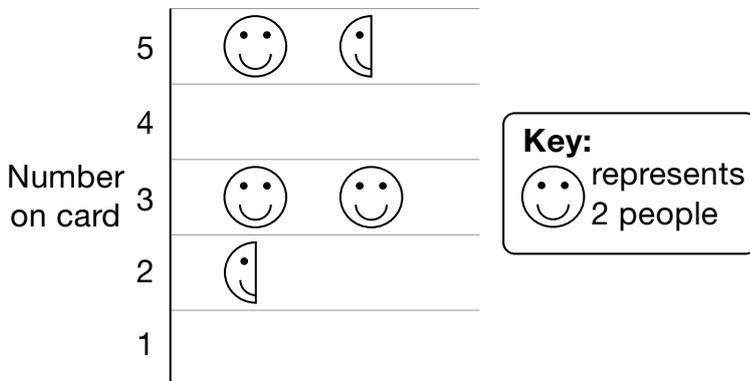
Data find sheet 1

Name: _____

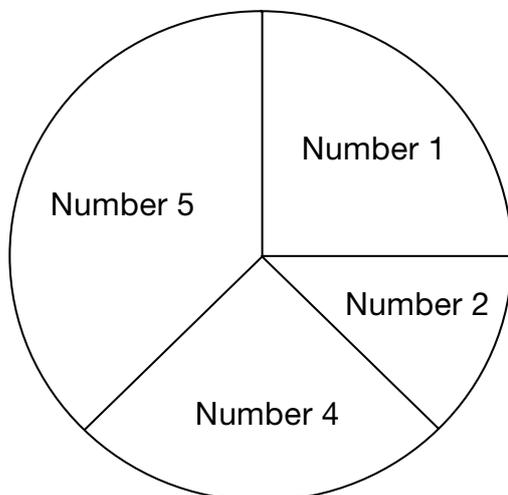
Each chart represents a data set of **8 people**.

For each chart, work out what numbers the 8 people had on their cards.





Key:
 represents 2 people



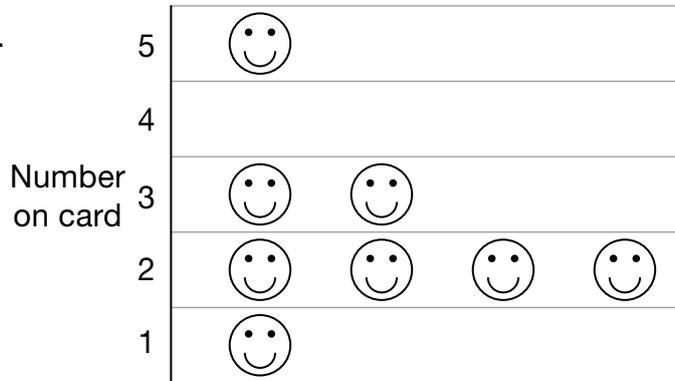
T3L1assess2

Data find sheet 2

Name: _____

A pupil draws this pictogram.

The pupil has forgotten to draw a key.



(a) Could the pictogram represent a data set of **16 people**?
Explain your answer.

(b) Could the pictogram represent a data set of **24 people**?
Explain your answer.

(c) Could the pictogram represent a data set of **20 people**?
Explain your answer.

(d) A different pupil wants to draw a pictogram for these results.

Number on card	1	2	3	4	5
Frequency	3	0	6	9	3

Fill in the box to show what key you think the pupil should use.

Key:

 represents people

T3L1assess3

Data find sheet 3

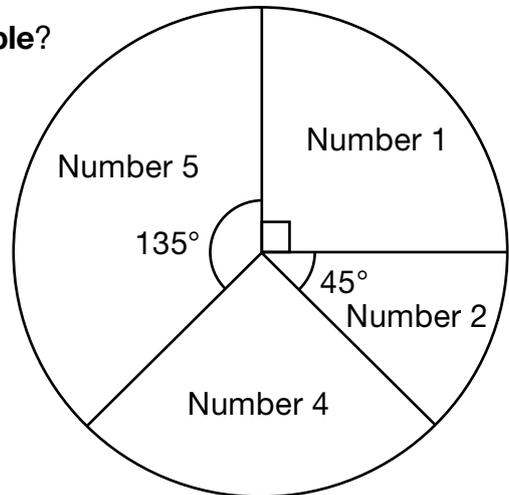
Name: _____

Here is the pie chart from sheet 1.

On sheet 1, the pie chart represented a data set of **8 people**.

Could the pie chart also represent a data set of **16 people**?

Explain your answer.



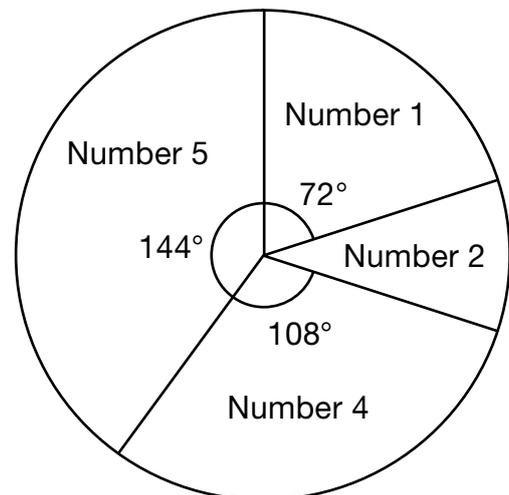
Could the pie chart represent a data set of **10 people**?

Explain your answer.

Here is a different pie chart.

Could this pie chart represent a data set of **8 people**?

Explain your answer.



Could the pie chart represent a data set of **10 people**?

Explain your answer.

T3L2assess1

How confident are we?

Name: _____

Use the data that you have just collected to complete this frequency table:

Number on the card	Frequency
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

What is the **mode** of the data?

What is the **range** of the data?

On another piece of paper, write a short survey report to the headteacher.

Draw a chart or diagram to help explain what you have found out.

Solutions and performance indicators

LESSON 1: *CONTROVERSIAL* Solutions

<i>Data find sheet 1</i> (target level 3/4/5)		T3L1assess1
Solutions	Notes	
The numbers 1, 1, 2, 3, 3, 5, 5, 5, in any order	<p>Good responses show some understanding of how many of each number are being represented.</p> <p>Better responses give all eight correct numbers.</p>	
The numbers 2, 3, 3, 3, 3, 5, 5, 5, in any order		
The numbers 1, 1, 2, 4, 4, 5, 5, 5, in any order		
<i>Data find sheet 2</i> (target level 3/4)		T3L1assess2
Solutions	Notes	
<p>Indicates 'yes'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> 'Each symbol can represent 2 people and there are 8 symbols, so $8 \times 2 = 16$' 'There are 8 faces, so there could be 16 people if each one is worth 2 people' 'There would be 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 5, 5' 	<p>Good responses show understanding that there could be 16 people.</p> <p>Better responses show understanding of the link between 8 symbols and 16 people.</p>	
<p>Indicates 'yes'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> 'Each symbol can represent 3 people and there are 8 symbols, so $8 \times 3 = 24$' 'There are 8 faces, so there could be 24 people if each one is worth 3 people' 'There would be three 1s, twelve 2s, six 3s and three 5s' 	<p>Good responses show understanding that there could be 24 people.</p> <p>Better responses show understanding of the link between 8 symbols and 24 people.</p>	
<p>Indicates 'no'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> 'The pictogram has 8 symbols but 8 doesn't go into 20' 'You can't have fewer than 8 people, but you can only have numbers in the 8 times table' 'You would have $2\frac{1}{2}$ number 1s which is impossible' 'You would have to cut the cards into pieces to get $1\frac{1}{4}$ cards for each person' 'You can't have halves of number cards' 	<p>Good responses show understanding that there could not be 20 people.</p> <p>Better responses show understanding that 8 is the minimum possible and that 8 is not a factor of 20.</p>	
<p>3</p> <p>Note that answers of 1 or 2 are still worthy of credit at the lower levels.</p>	<p>Good responses show how to fill in a useable pictogram key.</p> <p>Better responses show that 3 is the most sensible value.</p>	

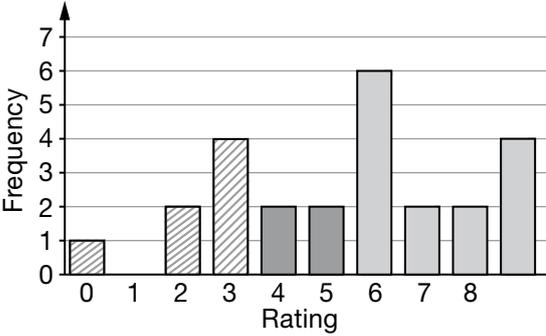
Data find sheet 3 (target level 5)	T3L1assess3
Solutions	Notes
<p>Indicates 'yes'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> • 'You just double the number of each digit you had when there were 8 people' • 'If you can have 8 people then you must be able to have 16 people since you just halve them' • 'There would be 1, 1, 1, 1, 2, 2, 4, 4, 4, 4, 5, 5, 5, 5, 5' • 'The pie chart is divided into eighths and $16 \div 8 = 2$ people for the small slice' • '$360 \div 8 = 45$ and 45 goes into 90 and 135. 8 goes into 16, so you can have 16 people' 	<p>Good responses show understanding that there could be 16 people.</p> <p>Better responses show understanding of the link between 8 people and 16 people or between 45° and 360°.</p>
<p>Indicates 'no'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> • 'The pie chart is divided into eighths but 8 doesn't go into 10' • 'You can't have fewer than 8 people, but you can only have numbers in the 8 times table' • 'You would have $2\frac{1}{2}$ number 4s which is impossible' • 'You would have to cut the cards into pieces to get $1\frac{1}{4}$ digit 2 cards' • 'You can't have halves of number cards' 	<p>Good responses show understanding that there could not be 10 people.</p> <p>Better responses show understanding that 8 is the minimum possible and that 8 is not a factor of 10.</p>
<p>Indicates 'no'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> • 'The smallest slice is 36° which is a tenth, but 10 doesn't go into 8' • '$8 \div 5$ doesn't give a whole number' • 'You can't have 0.8 number cards' 	<p>Good responses show understanding that there could not be 8 people.</p> <p>Better responses show understanding that 10 is the minimum possible and that 10 is not a factor of 8.</p>
<p>Indicates 'yes'</p> <p>A correct explanation, e.g.</p> <ul style="list-style-type: none"> • 'The smallest slice is 36° which is a tenth, so you can have 10 people' • 'There would be 1, 1, 2, 4, 4, 4, 5, 5, 5, 5' 	<p>Good responses show understanding that there could be 10 people.</p> <p>Better responses show understanding of the link between 36° and 360°.</p>

LESSON 1: *CONTROVERSIAL* Performance indicators

Note that performance indicators involving an element of ‘Using and applying mathematics’ are given in **bold**.

Worksheet	Performance indicators
<p><i>Data find sheet 1</i> (target level 3/4/5) T3L1assess1</p>	<p>Level 3: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • interpret a simple bar chart or pictogram to find the frequencies; • explain why a pictogram with 8 symbols could represent 16 people; • use a sensible number, e.g. 1 or 2, as the key for a pictogram where the total frequency is 21. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • interpret <u>both</u> a bar chart and a pictogram to find the frequencies; • use frequencies extracted from the charts to generate a list of the original data;
<p><i>Data find sheet 2</i> (target level 3/4) T3L1assess2</p>	<ul style="list-style-type: none"> • explain why a pictogram with 8 symbols could represent 24 people; • explain why a pictogram with 8 symbols could not represent 20 people; • use the highest common factor of a set of frequencies as the key for a pictogram. <p>Level 4: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • interpret <u>both</u> a bar chart and a pictogram to find the frequencies; • use frequencies extracted from the charts to generate a list of the original data; • explain why a pictogram with 8 symbols could represent 24 people; • explain why a pictogram with 8 symbols could not represent 20 people; • use the highest common factor of a set of frequencies as the key for a pictogram; • explain why a pie chart representing 8 people could also represent 16 people. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • interpret a simple pie chart to find the frequencies; • use frequencies extracted from the pie chart to generate a list of the original data;
<p><i>Data find sheet 3</i> (target level 5) T3L1assess3</p>	<ul style="list-style-type: none"> • explain why a pie chart with 45° as the smallest sector could not represent 10 people. <p>Level 5: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • interpret a simple pie chart to find the frequencies; • use frequencies extracted from the pie chart to generate a list of the original data; • explain why a pie chart with 45° as the smallest sector could not represent 10 people; • work out the missing angle in a pie chart. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • reason generally about the number of people that could be represented by a pie chart with 36° as the smallest sector. <p>Above level 5: At these levels, pupils are generally able to:</p> <ul style="list-style-type: none"> • give evidence for the performance indicators listed previously for pupils working at level 5; plus • reason generally about the number of people that could be represented by a pie chart with 36° as the smallest sector.

LESSON 2: FEELING CONFIDENT Solutions

How confident are we? (target level 3/4/5)	T3L2assess1																								
<p>Solutions</p> <p>Correct mode or modes for their class data</p>	<p>Notes</p> <p>Good responses show understanding that the mode is the most frequent response.</p> <p>Better responses give their mode(s) correctly.</p>																								
<p>Correct range for their class data</p>	<p>Good responses show understanding that the range is the difference between highest and lowest values.</p> <p>Better responses give their range correctly.</p>																								
<p>A report summarising their findings, supported by an appropriate chart or diagram, e.g.</p> <ul style="list-style-type: none"> From the frequency table: <table border="1" data-bbox="316 896 861 1281"> <thead> <tr> <th>Number on the card</th> <th>Frequency</th> </tr> </thead> <tbody> <tr><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>4</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>2</td></tr> <tr><td>6</td><td>6</td></tr> <tr><td>7</td><td>2</td></tr> <tr><td>8</td><td>2</td></tr> <tr><td>9</td><td>4</td></tr> <tr> <td>Total</td> <td>25</td> </tr> </tbody> </table> <p>To: The Headteacher We have been finding out how confident Year 7 pupils are about going to their new school.</p> <p>We did a survey about [inserts their question].</p> <p>We found that 7 (or 28%) were not confident about this, 14 (or 56%) were confident about it, and the other 4 (or 16%) were in the middle.</p> <p><u>Bar chart to show pupil responses</u></p>  <p>Legend: not confident middle confident</p>	Number on the card	Frequency	0	1	1	0	2	2	3	4	4	2	5	2	6	6	7	2	8	2	9	4	Total	25	<p>Good responses summarise some of the data in writing and show a simple chart.</p> <p>Better responses interpret the data clearly and support the findings with an accurate and appropriate chart.</p>
Number on the card	Frequency																								
0	1																								
1	0																								
2	2																								
3	4																								
4	2																								
5	2																								
6	6																								
7	2																								
8	2																								
9	4																								
Total	25																								

LESSON 2: FEELING CONFIDENT Performance indicators

Note that performance indicators involving an element of ‘Using and applying mathematics’ are given in **bold**.

Worksheet	Performance indicators
<p><i>How confident are we?</i> (target level 3/4/5) T3L2assess1</p>	<p>Level 3: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • make some general comment about the responses to a survey question; • draw a simple bar chart, pictogram or other simple chart from a set of data to support this comment. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • find the mode from a frequency table; • group responses sensibly and make comments about <u>numbers of responses that were positive, negative and ‘in the middle’;</u> • avoid errors in the scale or body of their chart; • ensure their chart has appropriate heading, labels and/or key. <p>Level 4: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • find the mode from a frequency table; • group responses sensibly and make comments about <u>numbers of responses that were positive, negative and ‘in the middle’;</u> • draw accurately a simple bar chart or pictogram from a set of data; • ensure their chart has appropriate heading, labels and/or key. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • find the range from a frequency table; • group responses sensibly and make comments about <u>proportions of responses that were positive, negative and ‘in the middle’;</u> • ensure the response groupings are clear within the chart and that an overall impression of responses is easy to see. <p>Level 5: At this level, pupils are generally able to:</p> <ul style="list-style-type: none"> • find the range from a frequency table; • group responses sensibly and make comments about <u>proportions of responses that were positive, negative and ‘in the middle’;</u> • draw accurately a simple chart from a set of data, using their own grouping of categories as appropriate; • ensure the response groupings are clear within the chart and that an overall impression of responses is easy to see. <p>However, they are less likely to be able to:</p> <ul style="list-style-type: none"> • deal confidently with percentages when reporting on responses; • draw a pie chart from a set of data; • draw overall conclusions from the results of the survey question. <p>Above level 5: At these levels, pupils are generally able to:</p> <ul style="list-style-type: none"> • give evidence for the performance indicators listed previously for pupils working at level 5; plus • deal confidently with percentages when reporting on responses; • draw a pie chart from a set of data; • draw overall conclusions from the results of the survey question.

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