A Complete Guide to ...

Statistics

Utilising the objectives as written in

MATHEMATICS in the New Zealand CURRICULUM

for

Level 3

This resource contains:

- ☑ Table of contents
- ☑ Teaching notes
- ☑ In class activity sheets involving
  - worked examples
  - basic skills
  - word problems
  - problem solving
  - group work
- ☑ Homework / Assessment activity sheets
- ☑ Answers

These resources are supplied as PHOTOCOPY MASTERS

Author: A. W. Stark

AWS Publications Ltd
Formerly *AWS* Teacher Resources

L3MS

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First Published March 1998

Formatting and publishing by
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AWS Teacher Resources

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Note from the author:

This resource ...

*A Complete Guide to Statistics

is one of a series of **FIVE** resources written utilising the objectives as stated in

Mathematics in the New Zealand Curriculum for Level 3.

With my experiences as a specialist mathematics teacher, I enjoyed mathematics as a subject, but I am aware that not all teachers feel the same way about mathematics. It can be a difficult subject to teach, especially if you are unsure of the content or curriculum and if resources are limited.

This series of resources has been written with you in mind. I am sure you will find this resource easy to use and of benefit to you and your class.

Resources in this series:

A Complete Guide to Number
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 3.
Resource Code: L3MN

A Complete Guide to Measurement
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 3.
Resource Code: L3MM

A Complete Guide to Geometry
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 3.
Resource Code: L3MG

A Complete Guide to Algebra
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 3.
Resource Code: L3MA

***A Complete Guide to Statistics**
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 3.
Resource Code: L3MS

For more information about these and other resources, please contact ...

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Acknowledgement:

I would like to thank the staff and pupils of **Mairehau Primary School, Christchurch** for their assistance in making these resources possible.

This resource has been divided into EIGHT sections as listed below.

Although there are no page numbers, the sections follow in sequential order as listed.

Note: **'In-class' Worksheets Masters** are lesson by lesson reuseable worksheets that can be photocopied or copied on to an OHP.

Homework / **Assessment Worksheets Masters** can be used as homework to reinforce work covered in class or they can be used for pupil assessment.

Section	
1	**List of Statistics Objectives: Table of 'In-class' Worksheets / Objectives covered**
2	**Table of Contents: 'In-class' Worksheets**
3	**'In-class' Worksheets Masters**
4	**Teaching Notes / Answers for 'In-class' Worksheets**
5	**Table of Contents: Homework / Assessment Worksheets**
6	**Homework / Assessment Worksheets Masters**
7	**Answers for Homework / Assessment Worksheets**
8	**Worksheet tracking sheets for teachers to record pupil names / worksheets covered**

1 Statistics

The following are the objectives for **Statistics**, **Level 3**, as written in the **MATHEMATICS** *in the New Zealand Curriculum* document, first published 1992. ***[REFER PAGE 178]***

Statistical investigations

Within a range of meaningful contexts, students should be able to:

- **S1** plan a statistical investigation of an assertion about a situation;
- **S2** collect and display discrete numeric data in stem-and-leaf graphs, and strip graphs, as appropriate.

Interpreting statistical reports

Within a range of meaningful contexts, students should be able to:

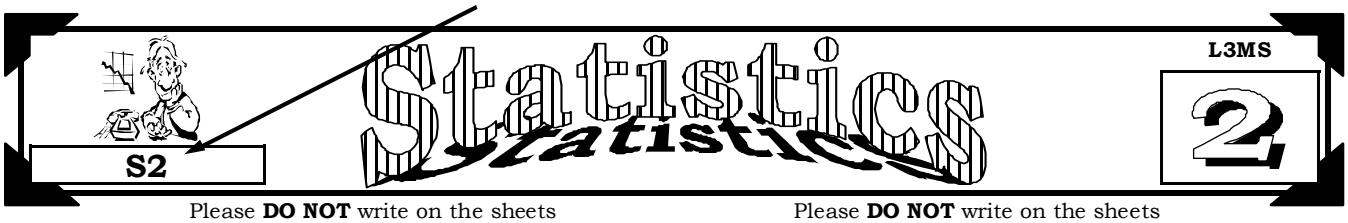
- **S3** use their own language to talk about the distinctive features, such as outliers and clusters, in their own and others' data displays;
- **S4** make sensible statements about an assertion on the basis of the evidence of a statistical investigation.

Exploring probability

Within a range of meaningful contexts, students should be able to:

- **S5** use a systematic approach to count a set of possible outcomes;
- **S6** predict the likelihood of the outcomes on the basis of a set of observations.

At the top of each **'In-class' worksheet** and **Homework / Assessment worksheet**, the Statistics objective(s) being covered has been indicated. *EXAMPLE:* **S1** means objective 1, **S2** means objective 2, etc.



Please **DO NOT** write on the sheets Please **DO NOT** write on the sheets

The **Mathematical Processes Skills:** **Problem Solving**, **Developing Logic & Reasoning**, **Communicating Mathematical Ideas,** are learned and assessed within the context of the more specific knowledge and skills of number, measurement, geometry, algebra and statistics. The following are the **Mathematical Processes Objectives** for **Level 3**.

Problem Solving Achievement Objectives ***[Refer page24]***

- **MP1** pose questions for mathematical exploration;
- **MP2** effectively plan mathematical exploration;
- **MP3** devise and use problem-solving strategies to explore situations mathematically;
- **MP6** use equipment appropriately when exploring mathematical ideas.

Developing Logic and Reasoning Achievement Objectives ***[Refer page26***

- **MP8** classify objects, numbers and ideas;
- **MP9** interpret information and results in context;
- **MP14** use words and symbols to describe and continue patterns.

Communicating Mathematical Ideas Achievement Objectives ***[Refer page28]***

- **MP15** use their own language and mathematical language and diagrams to explain mathematical ideas;
- **MP16** devise and follow a set of instructions to carry out a mathematical activity;
- **MP18** record, in an organised way, and talk about the results of mathematical exploration.

Note:
The codes **MP1**, **MP2**, etc. have been created by numbering the **Mathematical Processes Achievement Objectives** in order as listed in the **MATHEMATICS** *in the New Zealand Curriculum* document. The numbering gaps occur as not all objectives are covered at **Level 3**. ***[REFER TO PAGES 23 - 29 OF THE CURRICULUM DOCUMENT]***

‘In-class’ Statistics Worksheets

Table of Worksheet Number / Objectives Covered

See the opposite page for details of each objective.

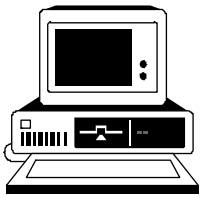
	Statistics Objectives						Mathematical Processes Objectives									
Worksheet Number	S 1	S 2	S 3	S 4	S 5	S 6	MP 1	MP 2	MP 3	MP 6	MP 8	MP 9	MP 14	MP 15	MP 16	MP 18
1	✖						✖	✖	✖					✖	✖	
2		✖						✖	✖			✖		✖	✖	✖
3		✖						✖	✖			✖		✖		✖
4		✖						✖	✖			✖		✖		✖
5		✖	✖					✖				✖		✖		✖
6		✖	✖					✖				✖		✖		✖
7		✖						✖				✖		✖		✖
8		✖	✖					✖	✖			✖		✖	✖	✖
9			✖	✖								✖			✖	✖
10			✖									✖			✖	
11			✖	✖				✖	✖			✖			✖	✖
12			✖	✖								✖			✖	
13			✖	✖								✖			✖	
14			✖	✖								✖		✖	✖	✖
15			✖	✖								✖		✖	✖	✖
16			✖	✖				✖	✖			✖		✖	✖	✖
17					✖				✖			✖		✖	✖	✖
18					✖				✖			✖		✖	✖	✖
19						✖						✖				
20		✖				✖		✖	✖			✖		✖	✖	✖

Table of Contents for the 'In-class' Worksheet Masters for Statistics, Level 3

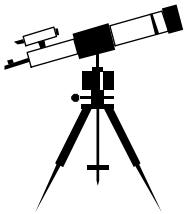
Statistics

Every year the Mairehau Primary School Home & School Committee organises a school fair, with the help of parents, teachers and pupils. The money raised is used to improve the school environment in some way.

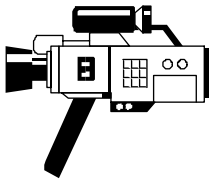
How is the money to be spent?



more computers?



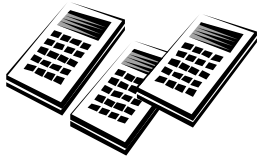
a telescope?



a video camera?

books for the library?

new sports equipment?



class sets of calculators?

plant trees around the school?

Planning an Investigation

With the money raised this year the pupils want new playground equipment, teachers want new computers and the principal wants more library books. Who should decide?

Task 1

Working on your own, or in a small group, plan an investigation on how YOU would work out how the money raised from the fair should be spent.

- Write a plan of how you are going to conduct this investigation.
  - Are you going to use a questionnaire?
    What questions should you ask?
  - Who are you going to ask and why?
  - How are you going to ask these questions?
    Example: ring people up, ask people at the school gate, etc.

Task 2

- Present your plan to the class.

▫ ▫

Other topics you may like to investigate could include:

- should the school have a school uniform?
- changes to the school uniform
- where to go on a school trip?
- how much homework should you have each night?
- favourite television programmes
- favourite music groups
- favourite sports
- favourite pets

or any other topic that is of interest to you.

Collecting and Organising Data

Discussion:

Look at this list of vowels. **[a, i, e, a, o, u, i, a, u, u]** How many are there of each vowel?

Because there were only 10 vowels it was easy to work out, but if there were 50 or 100 vowels, how could you work out the number of times each vowel occurred?

Using a **tally chart** can help.

Example: u, o, o, i, a, u, e, e, i, o, i, u, e, a, e, u, i, o, e, i ,a, o, u ,u, a, e, o, i, e, u

Make a mark in the **tally column** next to the vowel as you go through the list. Remember to mark off in 5's, ~~IIII~~ means 5.

Frequency means 'how often something occurs'. Add up the frequency column to find out how many vowels there were. Answer, 30 vowels.

Tally chart of the vowels in the list.

Vowel	Tally	Frequency
a	IIII	4
e	~~IIII~~ II	7
i	~~IIII~~ I	6
o	~~IIII~~ I	6
u	~~IIII~~ II	7
		30

Creating Tally Charts

Task 3

Pupils in a class were asked how many pets they each had.

1. Create a **tally chart** to display these results.
2. How many pupils had 2 pets?
3. How many pupils are in this class?

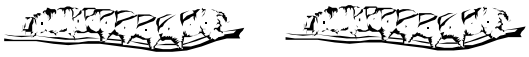
2, 3, 0, 1, 4, 3, 4, 3, 2, 2, 4, 3, 0, 1, 2, 2, 2, 3, 4, 1, 0, 2, 1, 3, 4, 0, 2, 1, 0, 3,

Pupils in Room 5 were asked how they travelled to school.

4. Create a **tally chart** to display these results.
5. How many pupils walked to school?
6. How many pupils biked to school?
7. How many pupils in this class?

walk, bike, bus, walk, bike, bike, car, walk, car, bike, bus, car, walk, walk, bike, walk, bike, walk, bus, bus, car, walk, walk, bike

Mr. McGregor has a problem with caterpillars on his cabbages. One day he counted the number of caterpillars on each cabbage plant. These were his results.



5, 6, 9, 5, 7, 8, 6, 7, 10, 7, 5, 6, 8, 9, 6, 7, 8, 7, 9, 6, 7, 7, 6, 8, 9, 10, 9, 7, 8, 7, 8, 9, 10, 5, 6, 5, 8, 6, 4, 6, 8, 7, 9, 4, 5, 6, 9, 5, 7, 4, 10, 9

8. Create a **tally chart** to display these results.
9. What was the most common number of caterpillars on a cabbage?
10. How many cabbage plants were there?

Carrying out an Investigation

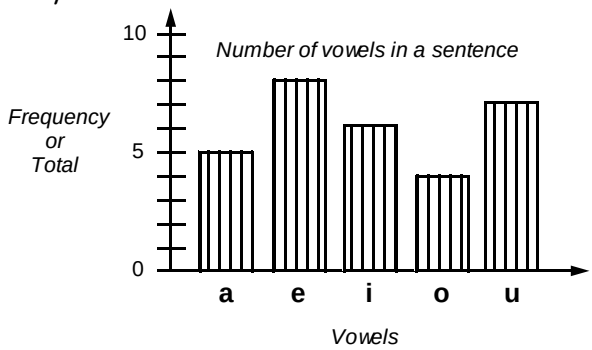
Task 4

Using the plan you created in **Task 1** worksheet 1, collect the data you need so that you can work out how the school is going to spend the money raised at the school fair. Present your results in a **tally chart**.

Displaying Data: Column Graphs

Data that has been collected using a tally chart can be displayed in several ways.

Example:



All column graphs should have ...

- a title or name,
- a label on each axis (lines with arrows),
- a scale on the frequency axis,
- gaps between columns.
- all columns should be the same width

From this graph we can see that there were 8 e's. How many u's were there?

Creating Column Graphs

Task 5

Jim counted the number of cars going past the school gate in 30 minutes. He noted the colour of each car.

Car Colour	Frequency
red	8
white	9
blue	7
grey	5
black	6

1. Create a **column graph** to display his results.
2. What was the most common car colour?
3. How many more white cars than grey cars were there?
4. What colour of car came past the gate 8 times?
5. How many cars did Jim count altogether?

Pupils in the year 5 & 6 classes have to choose one sport to play during the winter. This table shows their choices.

Sport	Total
netball	11
hockey	16
rugby	12
soccer	13

6. Create a **column graph** to display these results.
7. What sport was most popular?
8. How many wanted to play soccer?
9. If both classes have the same number of pupils in them, how many are there in each class?

On a school camp, pupils can have either an apple, a banana, an orange or a pear for afternoon tea. This is what they selected.

banana, apple, orange, orange, pear, banana, pear, orange, pear, apple, apple, orange, pear, banana, pear, pear, apple, apple, pear, orange, banana, orange, pear, orange, apple, pear, apple, apple, pear, apple, banana, pear, orange, pear

10. Organise this data into a **tally chart**.
11. Create a **column graph** using your tally chart results.
12. What fruit was the most popular choice?
13. What fruit was chosen 5 times?
14. If all pupils on camp ate fruit, how many pupils were on camp?

15. Create **column graphs** from the **tally charts** you created in **Task 3**, **Worksheet 2**.

Carrying out an Investigation

Task 6

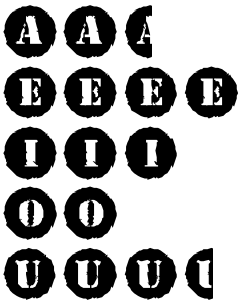
Using the tally chart you created in **Task 4**, **Worksheet 2** create a **column graph** of your results.

Displaying Data: Pictograms

Data that has been collected using a tally chart can be displayed in several ways.

Example:

Number of vowels in a sentence



Key	
a =	A
e =	E
i =	I
o =	O
u =	U

Each picture = 2 vowels

Pictograms represent data with pictures.

All pictograms should have …

- a title or name,
- a key,
- a scale stating how many each picture represents.

From this pictogram we can see that there were 4 e's drawn, so therefore there were 8 e's in the sentence. How many vowels are represented by a 'half' diagram in this pictogram, such as in the a's and u's ?

Creating Pictograms

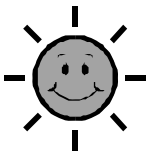
Task 7

In Jacqui's class, pupils were asked which pet they liked better, cats or dogs. The results are shown in this table.

Pet	Total
cat	15
dog	12

1. Draw a **pictogram** to display these results.
2. How many pupils in Jacqui's class?

During June, at 3:00 p.m. each day, the weather was recorded as either sunny, cloudy or raining. This table shows the results, but the rainy days were not noted.



Weather	Total
sunny	10
cloudy	5
raining	?

3. On how many days in June was it raining at 3:00 p.m.?
4. Draw a **pictogram** to display these results.

On a school camp, pupils can have a biscuit or a piece of cake, some ice-cream and a drink for dessert.
The box shows what they selected.

drink, cake, drink, ice-cream, drink, biscuit, cake, ice-cream, biscuit, cake, ice-cream, drink, ice-cream, biscuit, drink, cake, ice-cream, drink, biscuit, drink, ice-cream, ice-cream, drink, drink, biscuit, cake, drink, ice-cream, drink, cake, cake, drink

5. Organise this data into a **tally chart**.
6. Create a **pictogram** using your tally chart results.
7. What was more popular, cake or biscuits?
8. If half the class had ice-cream, how many in the class?
9. How many in the class DID NOT have a drink?

10. Create **pictograms** from the **tally charts** you created in **Task 3**, **Worksheet 2**.

Carrying out an Investigation

Task 8

Using the tally chart you created in **Task 4**, **Worksheet 2**, create a **pictogram** of your results.

Displaying Data: Stem & Leaf Graphs

Data can be organised using a stem and leaf graph, without having to draw a tally chart.

Example:

Pupils have been collecting cards from packets of chips. Below is a list of how many cards each pupil has collected.

12, 23, 34, 25, 17, 20, 31, 15, 27, 29, 30, 24, 21, 27, 37, 18, 23, 16

Number of cards pupils have collected

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

As these numbers are in the 10's, 20's or 30's, the numbers 1, 2 and 3 form the **stem** of the graph.
The second numbers or digits form the **leaf** part of the graph and can be added to the graph in the order listed.

Understanding Stem & Leaf Graphs

Task 9

1. List the numbers that are represented in these **stem & leaf** graphs.

Number of books pupils have read this year.

0	7, 9, 3, 5
1	5, 6, 2 ,0, 6 ,9
2	2, 6 ,7 ,3, 1
3	2, 0

2. How many pupils in the class?

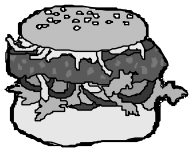
Time taken on telephone toll calls during a long weekend (minutes)

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

3. What were the longest and shortest toll calls?

Creating Stem & Leaf Graphs

Task 10



A survey was conducted to find out how much families spent on 'take-aways' each week. The results are shown in this box below (rounded to the nearest dollar).

$12, $16, $12, $9, $13, $17, $24, $21, $14, $29, $8, $17, $14, $22, $19, $25, $16, $12, $20, $11

1. Create a **stem & leaf** graph for these results.
2. What was the least amount spent on 'take-aways'?
3. How many families were surveyed?

A class was given a test to find out how well they knew their basic multiplication facts. The results are shown in Box A.

4. Create a **stem & leaf** graph for the results in Box A.
5. What were the lowest and highest marks in the test?

Box A

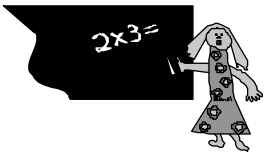
41, 37, 28, 31, 37, 39, 41, 27, 31, 26, 34, 27, 39, 28, 25, 36, 37, 42, 24, 39, 31, 28, 35, 37, 42, 29, 24, 30

The class was given two weeks to relearn the basic multiplication facts before being given the same test again. The results of the second test are shown in Box B.

6. Create a **stem & leaf** graph for the results in Box B.
7. What were the new lowest and highest marks in the second test?
8. What do you think the test was out of?
9. Did the class improve? Can you tell this from looking at the two stem and leaf graphs? Explain your answer.

Box B

29, 36, 39, 42, 48, 46, 38, 45, 37, 32, 46, 50, 41, 39, 37, 29, 36, 48, 46, 32, 46, 37, 30, 46, 40, 46, 37, 34



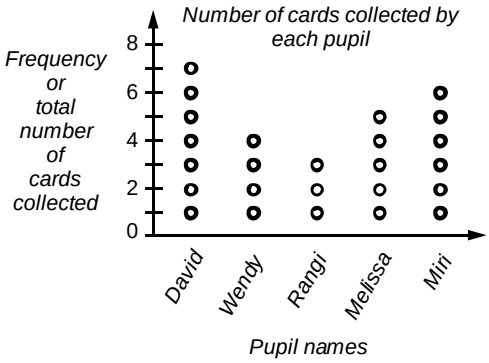
Displaying Data: Dot Plot Graphs

Data can be organised using a dot plot graph, without having to draw a tally chart.

Example:

Pupils have just started collecting cards from packets of chips. Below is a list of how many cards each pupil has collected.

Name	Total
David	7
Wendy	4
Rangi	3
Melissa	5
Miri	6



All dot plot graphs should have …

- a title or name,
- a label on each axis,
- a scale on the frequency axis

New dots could be added to the graph in any order.

Creating Dot Plot Graphs

Task 11

15 pupils were asked to choose their favourite colour from this list: blue, red, white and black. Their choices are shown in this table.

Colour	Total
blue	4
red	3
white	6
black	2

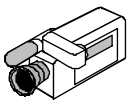
1. Create a **dot plot graph** to display these results.
2. What was the most favourite colour chosen?
3. Four more pupils choose blue, blue, red and white. Add these to the graph.

Every day for two school weeks (Monday to Friday), Jason recorded his mark in the '10 Quick Questions', done at the beginning of each maths lesson.

These were his marks. 8, 9, 7, 9, 7, 9, 6, 10, 9, 10

4. Create a **dot plot graph** to display his results.
5. What was his most common mark?
6. On what day did he score 6 out of 10?

A radio station ran a competition with a walkman, CD player, video camera and televison as prizes. People were asked what they would like, if they won first prize. Their choices are in the box.



walkman, TV, CD player, video camera, TV, walkman, CD player, walkman, CD player, video camera, TV, CD player, TV, CD player, video camera, walkman, video camera, CD player, TV, walkman, TV, video camera, TV, CD player, TV

7. Create a **dot plot graph** to display their choices.
8. What was the most popular prize chosen?
9. How many people chose a walkman as their prize?
10. How many people were asked altogether?
11. What prize would you have chosen?

12. Create **dot plot graphs** from the **tally charts** you created in **Task 3**, **Worksheet 2**.

Task 12

Using the tally chart you created in **Task 4 Worksheet 2** create a **dot plot graph** of your results.

Displaying Data: Strip Graphs

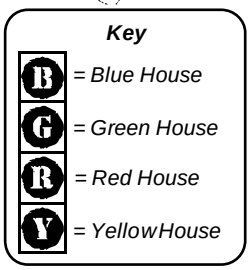
Data that has been collected using a tally chart can be displayed in several ways.

Example:

House points have been awarded during the school athletic sports. This strip graph shows the results.

Points scored by each House

*Each square = **10** points*



All strip graphs should have …

- a title or name,
- a key,
- a scale stating how many each square represents.

From this strip graph we can see that there were 3 squares for Blue House. This means they scored 3 x 10 points = 30 points at the sports.

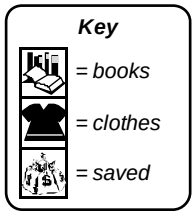
Understanding Strip Graphs

Task 13

The strip graph below shows what Karen did with money she was given for her birthday.

Karen's Birthday Money

*Each square = **$8.00***



1. How much money does each square in the strip graph represent?
2. How much did she spend on books?
3. How much did she spend on clothes?
4. How much did she save?

Creating Strip Graphs

Task 14

In Emma's class pupils wear different styles of footwear. This table shows the style of shoes worn.

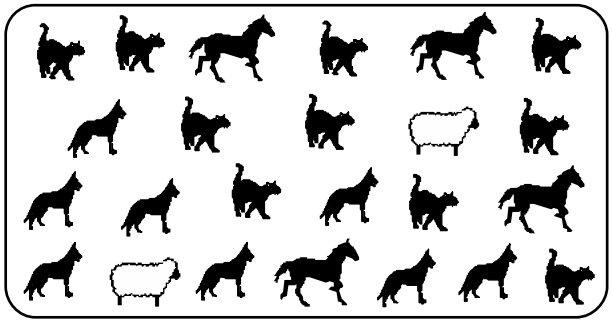
Style of shoe	Total
boots	6
sports	12
leather	9

1. Draw a **strip graph** that is NINE squares long, where each square represents 3 pupils' shoes.
2. Shade in the squares needed to display these results.
3. How many pupils in Emma's class?

In Brett's class there are **12** boys and **16** girls.

4. Draw a **strip graph** that is SEVEN squares long and shade in the squares needed to display these results.

In Tim's class pupils were asked what pets they had at home. The box below shows what pets they have.

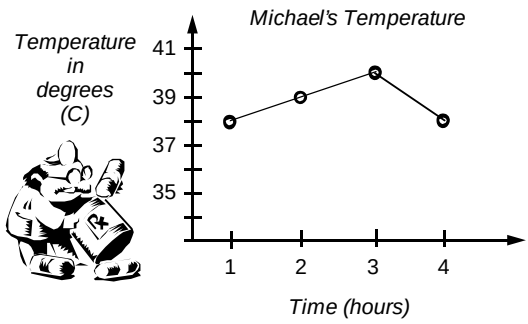


5. Organise this data into a **tally chart**.
6. How many pupils have a horse?
7. How many pupils have a dog?
8. How many pupils have a sheep?
9. How many pets were there altogether?
10. Use your tally chart results to create a **strip graph** to display these results.

Displaying Data: Time-Series Graphs

Data that changes with time can be graphed on a time-series graph.

Example:
Michael has been unwell. He recorded his temperature every hour for 4 hours. These results are shown on the graph.



All time-series graphs should have ....
- a title or name,
- time on the bottom axis
- label and scale on each axis
- ● or X to mark each point, joined by lines.

From this graph we can see that Michael's temperature was 39°C after two hours. What was his temperature after 4 hrs?

Creating Time-Series Graphs

Task 15

During a school week, Monday to Friday, Wendy recorded the number of pupils away from class each day.
Below is a table of her findings.

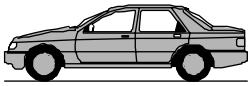
Mon	Tues	Wed	Thur	Fri
5	2	3	1	4

1. Create a **time-series graph** to display these results.
2. On what day of the week were the most pupils away?
3. On what day were there 2 pupils away?

Every day after school, for 1 week, the number of cars parked in the wrong place outside the school gate was noted. These results are shown in the table.

Mon	Tues	Wed	Thur	Fri
3	5	2	6	4

4. Create a **time-series graph** to display these results.
5. On what day were there 5 cars parked in the wrong place?
6. What would be a good way to tell the parents NOT to park in the wrong place?



Every day Jim goes for a run around the same course.
He records the time it takes him, to the nearest minute.
He has run 7 times so far and these are his times.

17	18	16	17	16	16	15

7. Create a **time-series graph** to display his times.
8. What was his most common time taken to run the course?

Each day for a week, starting on Sunday, the air temperature (°C) at the airport at 3:00 p.m. was recorded. These were the results.

23°C	26°C	13°C	19°C	24°C	26°C	18°C

9. Create a **time-series graph** to display these results.
10. What day(s) of the week was the temperature highest?
11. On what day do you think it might have rained? Explain why.

Collecting Time-Series Data

Task 16

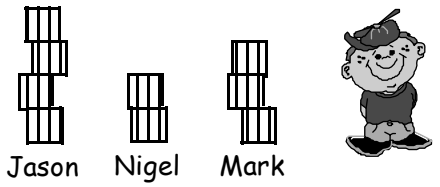
- Using a thermometer, record the temperature of your classroom every 30 minutes, or each hour, of the school day. Create a **time-series graph** of your results.

Data Calculations: Finding the Mean (Average)

Looking at any data display graph can tell you a lot about the data, but there are some calculations you can do that will give you more information about the data, that you cannot get by just looking at a graph.

Example:

Three boys each have some blocks as shown below.



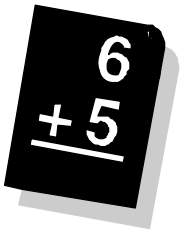
How many blocks are there altogether?

If you collected all blocks and then shared them equally among the three boys, how many blocks would each boy get?

By doing this you are finding the 'average' or **mean** number of blocks that the boys would have.

Answer: The mean number of blocks each boy would have is 3.

To find the **mean** for a list of scores (numbers), there are two steps.
Step 1: **Add** up all the scores.
Step 2: **Divide** this total by the number of scores you added up.



Example; Find the **mean** of 5, 6, 7 & 10.

This would be the working: Add up the scores, 5 + 6 + 7 + 10 = 28,
There are four scores, so divide by 4, 28 ÷ 4 = 7
Answer: **Mean** = 7

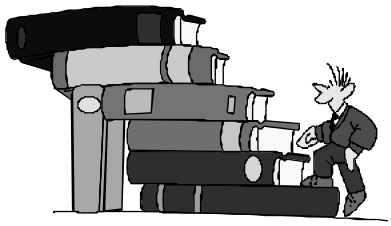
Task 17

Find the **mean** (average) for each list of scores below.

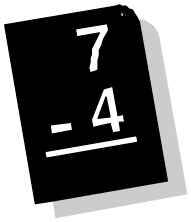
1.	5, 9	2.	10, 16	3.	17, 13
4.	5, 8, 8	5.	7, 10, 13	6.	3, 4, 5, 8
7.	5, 8, 10, 13	8.	9, 9, 13, 17	9.	10, 30, 40 ,40
10.	4, 7, 9, 12, 13	11.	4, 5, 8, 9, 10, 12	12.	3, 5, 6, 8, 6, 4, 7, 9

Each week the pupils in Mr. Stevenson's class are expected to read books, as part of their homework. He hopes they will read 2 or 3 books each per week. Last week this is the number of books each pupil read.

4, 3, 2, 5, 1, 3, 4, 3, 2, 3, 4, 2



13. How many pupils in Mr. Stevenson's class?
14. Find the **mean** number of books read by the pupils in his class.
15. Would Mr. Stevenson be happy with the class mean? Explain.



Mr Stevenson gave his class a maths test on fractions, marked out of 10. Mr Stevenson said, "The class will have to do the test again, if the class mean is less than 7!" The results were as follows.

8, 5, 6, 1, 8, 8, 9, 3, 9, 6, 7, 2

16. Just by looking at the results, do you think the class average is higher than 7?
17. Find the **mean** of this test. Will Mr. Stevenson be pleased or not? Explain.

Data Calculations: Finding the Median (Middle Score)

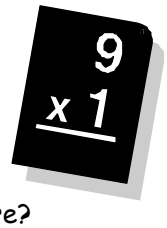
Looking at any data display graph can tell you a lot about the data, but there are some calculations you can do that will give you more information about the data, that you cannot get by just looking at a graph. Finding the **mean** is one type of 'average', but so is the **median**.

The **median** is the middle score or number, once the scores are in order from smallest to biggest.

Example:
The results of a class test are listed below.

6, 8, 10, 10, 9, 7, 5

What is the **median** or 'middle' score?



To find the **median**, scores must be placed in order from smallest to biggest.
In this example, the scores in order would be ...

5, 6, 7, 8, 9, 10, 10

Then, start counting one off each end, keep going until you have one score left in the middle
What number is in the middle of this list, as this is the **median**? Answer: The number 8 is the **median**.

Task 18

Find the **median** (middle score) for each list of scores below. (Remember scores must be in order)

1. 4, 8, 9
2. 4, 6, 6, 7, 9
3. 4, 9, 12, 13, 16, 19, 21
4. 1, 3, 4, 6, 8, 9, 9
5. 6, 8, 9, 15, 17, 18, 21
6. 2, 3, 3, 4, 5, 6, 7, 8, 9, 9, 11
7. 6, 4, 9
8. 7, 6, 1, 3, 8
9. 5, 2, 4, 7, 9, 4, 5

In the questions above, there is an odd number of scores and one number is left in the middle. When you have an even number of scores, there will be two scores left in the middle.

The **median** or middle score, is taken as halfway between the two middle scores.

Example: 3, 6, 8, 9 6 & 8 are in the middle, Halfway between 6 & 8 is 7. The **median** is 7.

Find the **median** (middle score) for each list of scores below. (Remember scores must be in order)

10. 1, 5, 7, 8
11. 4, 6, 10, 12
12. 1, 3, 6, 8, 12, 16
13. 6, 8, 9, 13, 14, 17
14. 8, 10, 15, 17, 19, 22
15. 3, 6, 6, 7, 8, 10, 10, 12
16. 6, 2, 7, 4
17. 3, 10, 8, 7, 10, 12
18. 6, 15, 6, 8, 13, 7, 12, 17

Miri likes throwing her frisbee. She threw it 7 times and measured the distance to the nearest metre. These were her results.

34, 25, 42, 39, 45, 29, 31

19. Find the **median** distance (m) the frisbee was thrown.

During the holidays these girls set up a lemonade stall. They recorded the number of glasses of lemonade sold each day. These results are listed below.

5, 6, 8, 4, 10, 6, 9, 10, 8, 2, 3, 8, 9, 5

20. Find the **median** number of glasses of lemonade sold.

Data Calculations: Finding the Mode (Most Common Score)

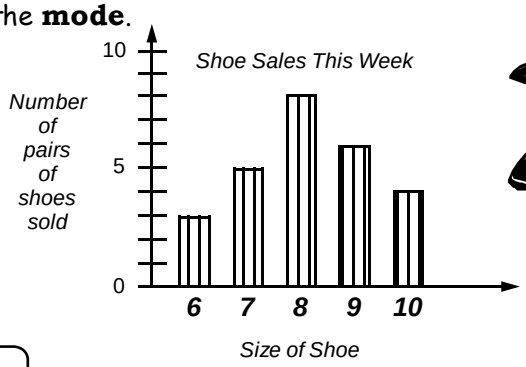
Looking at any data display graph can tell you a lot about the data, but there are some calculations you can do that will give you more information about the data. The **mean** and **median** are two calculations you can do, but sometimes the most common score is helpful to know.

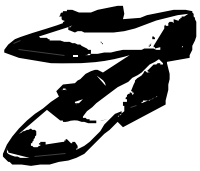
The most common score is called the **mode**.

From a data display you may be able to work out the **mode**.

Example:

At a local shoe shop, the owner records the size of each pair of shoes sold. This data is shown in the column graph.





Answer: The **mode** or most common size of shoe sold was size 8, the tallest column in the graph.

Note: There may be more than one **mode**, or NO **mode** if all scores are different.

Example:

For the scores 4, 5, 5, 6, 7, 7, 8 both 5 & 7 are **modes**.

For the scores 2, 3, 5, 6, 7, 8, 9 there is no **mode**..

Task 19

Find the **mode** (most common score) for each list of scores below. (Remember there may not be one)

1. 1, 2, 3, 7, 6, 3
2. 6, 8, 7, 6, 5, 9, 10
3. 6, 9, 7, 5, 6, 3, 8, 7
4. 6, 4, 8, 3, 7, 11, 12, 9
5. 6, 8, 10, 9, 10, 8, 9, 5
6. 7, 6, 9, 2, 7, 5, 3, 9, 6, 7
7. 3, 6, 8, 2, 4, 6, 9, 3, 2, 4
8. 6, 9, 5, 2, 3, 7, 6, 9, 4, 6
9. 1, 6, 0, 8, 7, 9, 4, 5, 3, 2

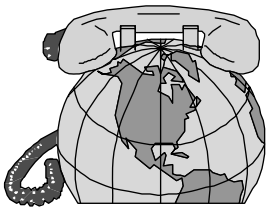
Every time a T-shirt is sold, its size is noted. During the morning these T-shirts were sold.

size 8, size 10, size 8, size 8, size10, size 12, size 10, size 12, size 14, size 10, size 8, size 10, size 12, size 10, size 12, size 12, size 8, size 10

10. Organise the data into a **tally chart**.
11. Use your tally chart to find the **mode** or most common size of T-shirt sold.
12. Why would it be helpful for a shop-keeper to record this information?

During the weekend toll calls are only $5.00 and you can talk for as long as you like. In the box below are the length of twenty tolls to the nearest minute.

15, 16, 20, 14, 16, 22, 36, 42, 20, 32, 45, 46, 37, 34, 26, 14, 20, 36, 24, 36



13. Find the **mode** or most common time for a toll call.

Data Calculations: Finding the Range (Spread)

Looking at any data display graph can tell you a lot about the data, but there are some calculations you can do that will give you more information about the data, that you may not be able to get by just looking at a graph. The difference between the highest and lowest score may be useful to know.
This is called the **range** or spread of the scores.

Example:
In the school cross-country the fastest time was 23 minutes and the slowest time was 39 minutes.

What is the **range** of these times?

Range = Highest score – Lowest score

Answer:
39 – 23 = 16 minutes.
The **range** is 16 minutes

Task 20

Find the **range** (spread) for each list of scores below.

1.	4, 8, 9	2.	4, 6, 6, 7, 9	3.	4, 9, 12, 13, 16, 19
4.	1, 3, 4, 6, 8, 9, 9	5.	6, 8, 9, 15, 17, 18, 21	6.	2, 3, 3, 4, 5, 6, 7, 8, 9, 9, 11
7.	6, 4, 9, 14, 2	8.	7, 6, 0, 3, 8, 12, 21	9.	6, 2, 4, 7, 9, 4, 6
10.	12, 56, 12, 24, 63, 19	11.	14, 23, 141, 56, 74, 69	12.	85, 23, 45, 39, 111, 109, 161

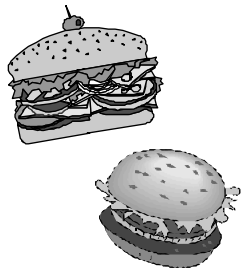
In Brett's family there are five children. Brett has two sisters who are 5 and 13. He has two brothers who are 8 and 17. Brett is 10 years old.

13. What is the **range** of ages in Brett's family?

These children have just had their height measured in centimetres.
These were the results.

123, 117, 109, 128, 132, 115

14. What is the **range** of heights for these children?



Heather likes hamburgers. There are several 'take-away' bars she can buy them from. One day she walked around each 'take-away' bar and checked out the price for a double meat & cheese burger. This is what she found.

$2.95, $2.75, $3.10, $2.65, $2.80

15. How many 'take-away' bars did she visit?
16. What is the **range** of hamburger prices?
17. When buying hamburgers, is cheapest best? What do you think?

The weather has been very changeable lately. The temperature has been up and down.
The daily high and low temperatures are listed below (°C).

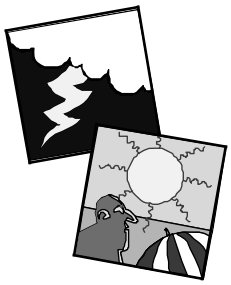
Daily high temperatures

15°C, 13°C, 9°C, 17°C, 27°C, 16°C, 23°C

Daily low temperatures

9°C, 5°C, 7°C, 11°C, 15°C, 9°C, 15°C

18. Find the **range** for the high and low daily temperatures.



Data Calculations: Mean, Median, Mode & Range

Reminder:

The **mean** is the 'average' of all numbers or scores.

The **median** is the middle score, once the scores are in order.

The **mode** is the most common score, there may be more than one or none at all.

The **range** is the highest score – the lowest score.

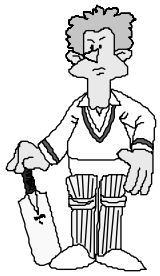
Use this information above to work out the following problems.

Task 21

Find the **mean**, **median**, **mode** & **range** for each list of scores below.

1. 2, 2, 4, 6, 11
2. 4, 8, 8, 9, 10, 12, 12
3. 8, 13, 19, 20
4. 5, 2, 7, 9, 2
5. 9, 6, 8, 12, 3, 8, 10
6. 8, 0, 23, 14, 7, 14

Martin and John both like cricket. During the season they both scored many runs, but who is the better batsman?
Each batsman had five turns at bat and scored the following runs.
John said, "I'm the better batsman!" Is he correct?



Martin	John
14, 9, 21, 9, 47	22, 13, 7, 36, 22

7. Find the **mean** for both Martin and John's batting scores.
8. Find the **median** for both Martin and John's batting scores.
9. Find the **mode** for both Martin and John's batting scores.
10. Find the **range** for both Martin and John's batting scores.
11. Was John correct? Using the information you have calculated above, who is the better batsman? Explain your answer.

Two groups of 10 pupils within a class sat the same test.
Their test results are in the boxes.
Michelle, who is in Group B, said, " Our group is better as we had three pupils who got 10 out of 10!" Is Michelle correct?

Group A	Group B
7, 4, 4, 6, 5, 5, 9, 7, 8, 5	10, 2, 4, 10, 1 5, 3, 10, 3, 2

12. Find the **mean** for both test results.
13. Find the **median** for both test results.
14. Find the **mode** for both test results.
15. Find the **range** for both test results.
16. Was Michelle correct? Using the information you have calculated above, which of the two groups scored better in the test? Explain your answer.

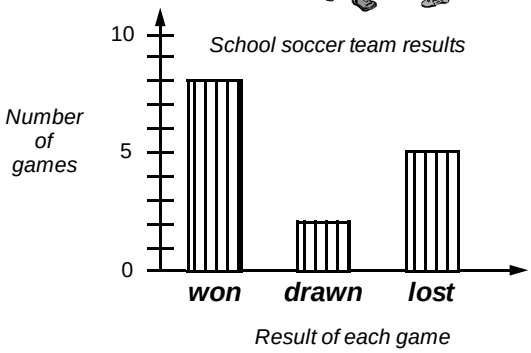
Understanding Data Displays:

Look at each data display and use them to answer these questions.

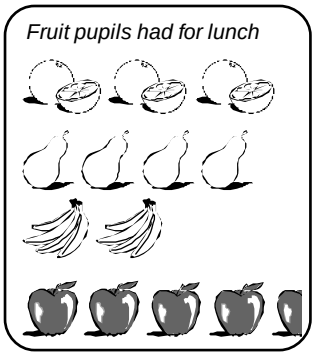
Task 22

This column graph displays the results of the soccer games played by a school team during a season.

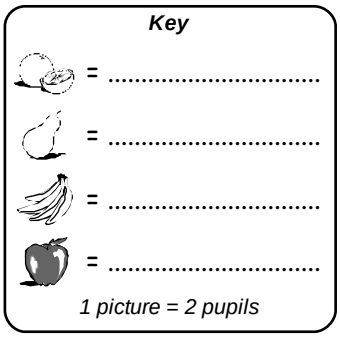
1. How many games did they win?
2. How many games were drawn?.
3. What was the total number of games they played?
4. If they obtained 3 points if they won, 2 points for a draw and 1 point if they lost, how many points did they score in this season?
5. What can you say about their soccer season?



What fruit do you like best? This pictogram shows the fruit that pupils in Mrs. Jacob's class had in their lunch boxes on one day of the week. All pupils had one piece of fruit each.



6. **Copy** and complete the key by naming each fruit.
7. How many pupils does each picture represent?
8. How many pupils had oranges?
9. How many pupils had apples?
10. What fruit did 8 pupils have in their lunch boxes?
11. How many pupils in Mrs. Jacob's class?



During the Christmas school holidays, a local garden centre ran a tomato growing competition. On the last Friday of the holidays, children brought in the largest tomatoes they had. Each tomato was weighed, to the nearest gram, with the results being displayed in a stem & leaf graph.

12. **Copy** the stem & leaf graph.
13. Kim's tomatoes weighed 29, 35, 16 and 40 grams. On your stem & leaf graph, circle the numbers in the leaf part that represent Kim's 4 tomatoes she entered.
14. Find the mean (average) weight of Kim's 4 tomatoes.
15. List the weights of all tomatoes in order from lightest to heaviest.
16. What is the median (middle) tomato weight?
17. What was the weight of the winning tomato?
18. What is the range of tomato weights?
19. What was the most common weight of tomato, also called the mode?
20. How many tomatoes were entered in the competition?

Weight of tomatoes (grams)

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

Understanding Data Displays:

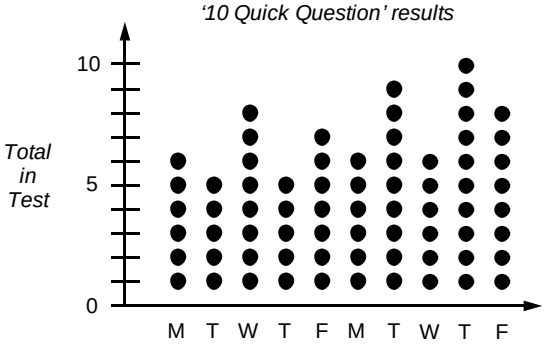
Look at each data display and use them to answer these questions.

Task 23

This dot plot graph displays how well Jeremy scored in the '10 Quick Questions' called out at the beginning of each day for two school weeks.

1. What was the highest score Jeremy got and on which day?
2. On what day did he score 7?
3. Work out the range for his scores.
4. List the scores in order of lowest to highest.
5. What is his median score?
6. Calculate the mean of these scores.
7. What was the mode or most common score?
8. Should Jeremy be pleased with his results? Explain.

'10 Quick Question' results



Pets pupils have

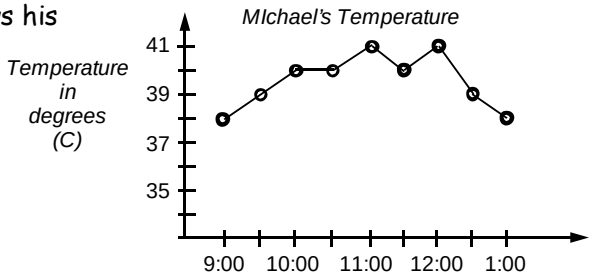
Each box = 5 pets

This strip graph displays the three most popular pets that the pupils in one class have.

9. How many boxes are in this strip graph?
10. How many pets does each box in the strip graph represent?
11. How many pet cats were there?
12. How many pet dogs were there?
13. How many more pet cats were there than pet horses?
14. How many pets were there altogether?
15. If 12 pupils each had 2 pets and the other pupils only had 1 pet each, how many pupils are in this class?

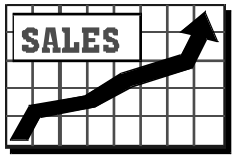
Michael has not been well. His temperature has been taken every 30 minutes, starting at 9:00 a.m. This time-series graph shows his temperature readings.

MIchael's Temperature



16. For how many hours was his temperature taken?
17. What was his highest recorded temperature?
18. List his temperature readings from lowest to highest.
19. What was his median (middle) temperature reading?
20. What was the range of his temperature readings?
21. What was the mode or most common temperature reading?
22. Add up all the temperature readings and use your answer to find Michael's mean or average temperature reading.

Creating Statistical Reports:



Working in groups of 2 or 3, your task is to use the data below to create a statistical report that will prove or disprove a statement. Remember you can create many types of graphs and work out the mean, median, mode or range to use in your report.
Finish your report with a conclusion.

Task 24

In a recent mathematics competition test for year 5 & 6 pupils, the best pupils at Mairehau Primary scored the following marks. The test was marked out of 20.

Mairehau Primary School results

15, 14, 13, 10, 18, 19, 19, 16, 17, 15, 16, 13, 12, 15, 16, 18, 17, 16, 17, 16, 19, 19, 15, 16, 14, 16, 14, 17, 15, 14, 18, 16, 14, 18, 19

St Albans Primary School results

12, 13, 10, 14, 16, 14, 12, 16, 18, 17, 19, 14, 11, 12, 15, 14, 16, 17, 12, 13, 10, 11, 12, 14, 13, 16, 13, 14, 12, 10, 11, 15, 20, 14, 13

St Albans School also sat the same mathematics competiton test and the results of their top year 5 & 6 pupils are shown in the box on the left.

Karen, who goes to St Albans School said, *"Our school did better than your school in the test as we had someone get 20 out of 20 for the test!"*

Is Karen's statement correct or not? Your task is to prove or disprove her statement.
Draw at least **TWO** different types of **graphs or tables.** What other calculation can you do?

Task 25

Mr. McGregor is a market gardener who grows vegetables to sell to supermarkets. This year he has been growing two new varieties of carrots. He is unsure as to which variety he should grow next season.
Mr. McGregor said, *"I will grow the carrot variety that produces the longer carrots."*

Your task is to use the data below to help Mr. McGregor decide which carrot variety to grow.
Draw at least **TWO** different types of **graphs or tables.** What other calculations can you do?

Carrot Variety A
Length of carrot measured to the nearest centimetre

17, 9 , 21, 31, 7, 8, 16, 23, 25, 32, 15, 19, 27, 30, 18, 29, 25, 25, 17, 31

Carrot Variety B
Length of carrot measured to the nearest centimetre

25, 12, 9, 7, 25, 33, 14, 7, 27, 15, 17, 28, 21, 15, 19, 22, 18, 16, 25, 9

Exploring Probability: Finding Outcomes

When John gets up in the morning he has to decide which pair of socks he will wear.
If he has a blue pair and a red pair, the choice is easy.

The possible **outcomes** would be either the blue pair of socks or the red pair.

Finding all possible outcomes is not always easy.

Example: Two coins are tossed at the same time. List the possible outcomes.
One way of finding the outcomes is to use a 'box' or 'grid'.

2nd coin

1st coin

	H	T
H	HH	HT
T	TH	TT

On the left hand side are the outcomes for the first coin (H, T).
Across the top are the outcomes for the second coin (H, T).
Where H = heads and T = tails.

The double letters in the box are the outcomes when both coins are tossed.
Answer:
For this experiment the **outcomes** are …
(H,H), (H,T), (T,H), & (T,T).
In the brackets the order of the coin is … (1st coin, 2nd coin).
Note that (H,T) is different from (T,H) as there are two coins.

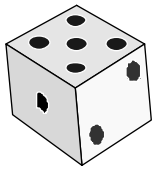
Task 26

1. A coin and a six-sided die (dice) are tossed at the same time. **Copy** and **complete** this box, then use it to list all the possible outcomes.
2. How many possible outcomes are there altogether?

Six-sided die (dice)

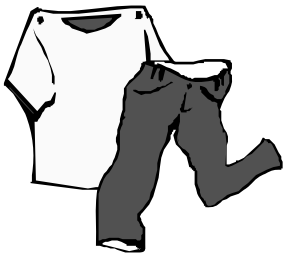
coin

	1	2	3	4	5	6
H	H1					
T				T4		



Depending on the weather, Stuart has a choice of wearing shorts or sweatpants, and a t-shirt or skivey.

3. What clothes could Stuart wear? Draw a 'box', as in the question above, to help you work out all possible outcomes.
4. How many possible outcomes are there?



In the summer pupils can play either cricket, softball or tennis. In the winter pupils can play either netball or soccer.

5. If you can choose one summer and one winter sport, list all possible outcomes by using a 'box' as above.
6. How many possible outcomes are there?

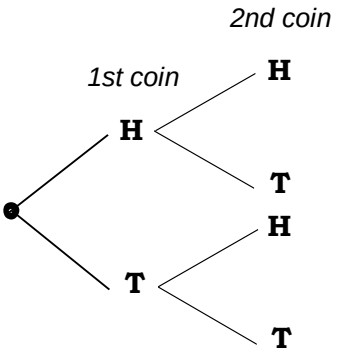
For breakfast Jim can either have cornflakes, ricies or toast to eat. He can have a drink of either milk, juice or milo.

7. Draw up a box to help work out all possible outcomes for Jim's breakfast.
8. How many possible outcomes are there?

Exploring Probability: Finding Outcomes

Using 'boxes' to work out all possible outcomes is one way, but using **tree diagrams** can also be useful.

Example: Two coins are tossed at the same time.
List the possible outcomes.



It is called a **tree diagram** because of its shape.

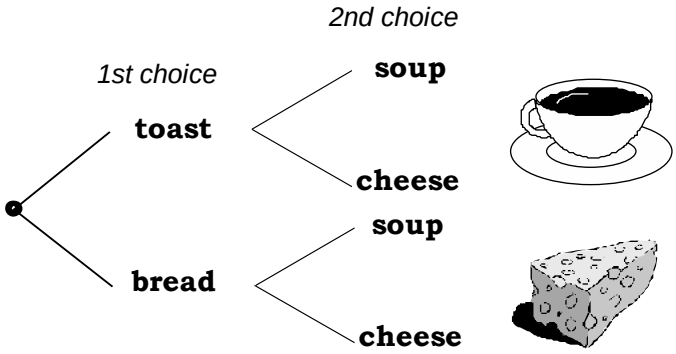
To work out all possible outcomes, follow each branch of the diagram, from left to right, recording each outcome.

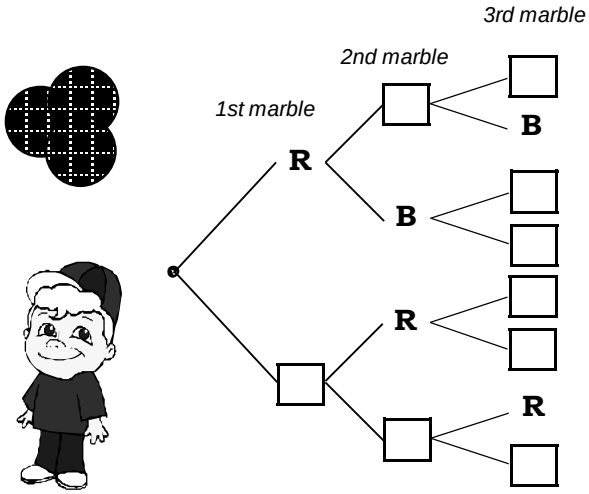
Answer:
There are four branches, therefore there are four outcomes.
For this event or experiment the **outcomes** are ...
(H,H), (H,T), (T,H), & (T,T).

Task 27

"What can I have for lunch?" said Mary.
Look at this tree diagram.

1. Use this **tree diagram** to list all possible choices or outcomes for Mary's lunch.
2. How many choices does Mary how?





Some red and blue marbles are in a bag. If you were to take three marbles out of the bag, what colour combinations could you get?

3. What do the letters R and B stand for?
4. **Copy** and **complete** the **tree diagram** filling in the missing letters that would go in the empty boxes.
5. List all possible outcomes.
6. How many outcomes are there altogether?

At a local restaurant you can choose what you would like to eat. Bruce decided he would have one 'starter', one 'main' and one 'dessert'.

7. Draw a **tree diagram** to show all possible choices that Bruce could make.
8. How many choices are there altogether?
9. If Bruce does not like garlic bread or icecream, how many choices does Bruce have?
10. If Bruce had soup, chicken and apple pie, what did it cost him?
11. What is the most expensive meal?
12. What is the least expensive meal?

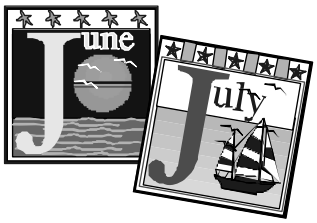
'Starters'	
Soup	$3.50
Garlic Bread	$2.75
'Mains'	
Chicken	$16.50
Fish	$15.00
T-Bone Steak	$17.50
'Desserts'	
Ice-cream	$4.50
Apple Pie	$5.00

Language Associated with Chance:

The likelihood of an event or something happening could be described by using one of the following words ...

certain, possible, impossible.

Example:



if this month is June it is certain that next month is July
if a ball hits the window it is possible it might break
it is impossible to have a birthday on the 30th of February

Other words that could be used are ...

certain, likely, unlikely, impossible

or **certain**, **good chance, even chance, poor chance, impossible**.

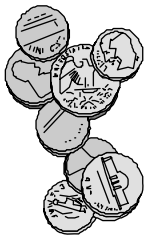
Task 28

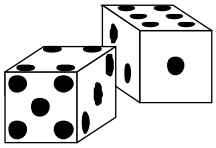
1. Use the words
   certain, likely, unlikely, and **impossible**,
   to write statements about events that you know of, that could be described by using these words.

2. Arrange these events in order of likelihood. Put the least likely event first.
   - A If today is Saturday then tomorrow will be Sunday.
   - B It will snow in Whangarei on Christmas Day.
   - C A dinosaur will walk down the street today.
   - D If you toss a coin you will get heads.
   - E A bottle will break when dropped.

Decide if these events are **certain, likely, unlikely, possible** or **impossible**.

3. It will rain tomorrow.
4. The Queen will visit your school tomorrow.
5. The sun will rise tomorrow.
6. All pupils in your class will be away sick tomorrow.
7. Christmas Day will occur on the 25th of December this year.
8. It is your birthday tomorrow.
9. Tomorrow you will go to the dentist.
10. Today it will be dark by 11:00 p.m.
11. I will win first prize in Lotto this week.
12. Someone in New Zealand will win first prize in Lotto this week.





Use either **even chance, good chance,** or **poor chance** to describe the following events happening.

13. A die (dice) is thrown and one comes up
14. A die is thrown and a six comes up.
15. A die is thrown and an even number comes up.
16. A die is thrown and a number less than 5 comes up.
17. A die is thrown and a number greater than 5 comes up.
18. A coin is tossed and a head comes up.
19. Two coins are tossed and two tails come up.
20. Two coins are tossed and one is a head, one is a tail.

Using data to Predict Outcomes:

Data that has been collected can be used to make predictions about a group or a population, or anything that the data is about. This can be very useful especially if you run a business.

Example:

A local sports shop recorded the brand of shoes sold in a week.
The results are shown in this table.

Nike	5
Adidas	3
Reebok	7
Puma	2
Tiger	3
	20

20 pairs were sold in the week.

From this data we can say, '5 out of 20 shoes sold were Nike shoes'.

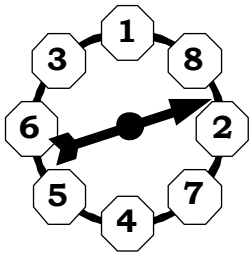
What can you say about the other brands?

This information can be used when the shop owner decides how many of each brand to buy, when replacing stock sold.

Task 29

This spinner will always land on a number. The chance of it landing on the number '8' is 1 chance out of 8.

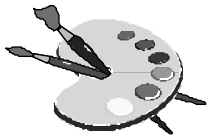
1. What is the chance that the spinner will land on an even number?
2. What is the chance that the spinner will land on a number greater than 5?
3. What is the chance that the spinner will land on a number less than 3?



blue	6
red	7
green	5
orange	4
white	6
black	2
	30

30 pupils were asked to choose their favourite colour from this list.

blue, red, green, orange, white, black



This frequency table displays their choices.

4. Which colour was chosen '2 out of 30' times?
5. How many pupils chose green?
6. Which colours ended up with the same chance of being selected?
7. '4 out of 30' pupils chose orange. If there were 60 pupils, how many pupils could you expect to choose orange?

School lunches must be ordered early in the day. There is a choice of chicken (CR), ham (HR) or salad (SR) bread rolls, fruit juice (FJ) and flavoured milk (FM).
This table shows what was ordered on Monday, using the letter codes above.

Choice of Bread Roll

HR, CR, CR, SR, HR, CR, HR, HR, CR, SR, HR, SR, CR, HR, HR, CR, SR, SR CR, SR, HR, HR, CR, SR, CR, HR, SR, HR, CR, SR

Choice of Drink

FM, FJ, FM, FM, FJ, FJ, FJ, FM, FM, FJ, FM, FJ, FM, FJ, FJ, FM, FJ, FJ, FM, FJ, FM, FJ, FM, FJ, FM

8. Draw two **tally charts** to display their choices.
9. How many bread rolls and drinks were sold?

10. What is the chance that a pupil had a chicken bread roll?
11. What is the chance that a pupil had a flavoured milk drink?
12. If 90 pupils ordered a bread roll, how many salad bread rolls would you expect to be sold?
13. If 100 pupils ordered a drink, how many fruit juices would the school expect to sell?

‘In-class’ Worksheet

Teaching Notes & Answers

How to use this section:
Teaching notes are enclosed in a box with a ‘push-pin’ at the top left corner. The teaching notes precede the answers for each worksheet / task. The teaching notes have been included to provide assistance and background information about each topic or unit of work.

Worksheet 1

Introduction:

Statistics is concerned with the planning of investigations, the collection, presentation and analysis of quantities of information or data. This information can then be used to draw conclusions or make predictions.

Worksheet 1, **Task 1** is concerned with conducting an investigation. There are some important statistical words that need to be understood.

Survey: A **survey** is a brief or detailed study, whereby data that is collected can be used to do an analysis so that conclusions or predictions can be made.

Questionnaire: A **questionnair**e is one way of surveying a population when you are asking opinions about an issue. A good questionnaire has questions that are clear and concise, with not too many questions.

Population: In everyday language the word ‘**population**’ refers to the number of people in a town, city or country. In statistics a ‘population’ can refer to a group of not just people or animals but a group of anything. *Example:* a population of school desks, a population of trees.

Sample: A **sample** is part of a population you are taking about. A sample of the population is used if the population is very large or if it is not necessary to survey the whole population.

Representative Sample: When we want to make statements about a population, using a survey of a sample of the population, the sample must be a **representative sample**.
Example: If we wish to find the opinions of pupils in a class that has twice as many girls than boys, then our sample should contain twice as many girls than boys.

Biased Sample: A sample that is not a representative sample is called a **biased sample**.

Once pupils have decided on their investigation topic, the aim of **Task 1** is to encourage pupils to think about what questions should be asked, who should be asked, how they are going to be asked. Producing a simple questionnaire is a good idea. The questions asked and the data collected needs to be done in such a way that it will be easy to do an analysis and draw data displays.

Task 2 is to have pupils present their plan. There are no model answers for **Task 1** & **Task 2**.

Worksheet 2

Tally Charts:
The use of **tally charts** is an effective way to collect data that is randomly collected, called out or presented in a list. Encourage pupils to count in ‘fives’ as this makes for easier adding up, marking off each data item as they read from left to right. Searching for all of one type of data, then another type, can result in data being overlooked. The word **frequency** (or total) means how often something occurs.

Task 3 is designed to give practice at creating tally charts and then to use them to answer questions.

Note: In the tally charts **F** stands for frequency.

For **Task 4** pupils are to conduct their investigation and present the data in tally charts as appropriate.

Answers: Task 3

1. *Number of pets pupils have*

No. of pets	Tally	F
0	卌	5
1	卌	5
2	卌 III	8
3	卌 II	7
4	卌	5
		30

2. 8 pupils had two pets
3. 30 pupils in the class

4. *Ways of travelling to school*

Ways of travel	Tally	F
bike	卌 II	7
bus	IIII	4
car	IIII	4
walk	卌 IIII	9
		24

5. 9 pupils walked to school
6. 7 pupils biked to school
7. 24 pupils in the class

8. *Number of caterpillars on each cabbage plant*

No. of caterpillars	Tally	F
4	III	3
5	卌 II	7
6	卌 卌	10
7	卌 卌 I	11
8	卌 III	8
9	卌 IIII	9
10	IIII	4
		52

9. 7 caterpillars
10. 52 cabbage plants

Worksheet 3

Column Graphs:
All **column graphs** should have ...

- a title or name
- a label on each axis
- a scale on the frequency axis, usually starting from zero
- gaps between columns
- all columns should be the same width

Column graphs are used to display **discrete data**. Discrete data is any data that has been collected by **counting,** and usually takes whole number values. *Example:* The number of pupils in a class.

A column graph without gaps between the columns is called a **histogram**. A histogram is used for **continuous data**. Continuous data is any data that has been collected by measuring and can take any value, depending on the accuracy of the measuring.
Example: The height of pupils in a class. At this level, if you round data obtained by measuring to the nearest cm, m etc., it could be graphed as a column, (although this is strictly not correct).

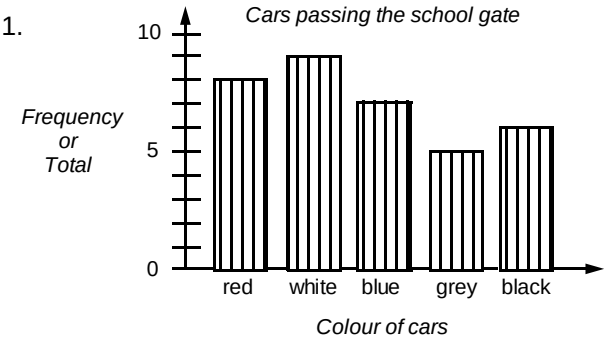
The important point is that column graphs should have gaps.

Task 5 is designed to give practice at creating column graphs and then to use them to answer questions.

For **Task 6** pupils are to present the data from their investigations as column graphs, if appropriate.

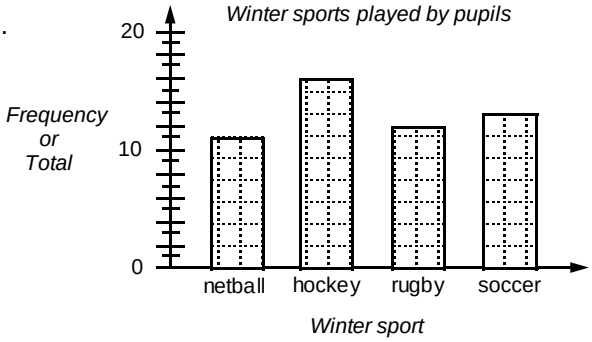
Answers: Task 5

1.



2. white cars
3. 4 more cars
4. red cars
5. 35 cars

6.

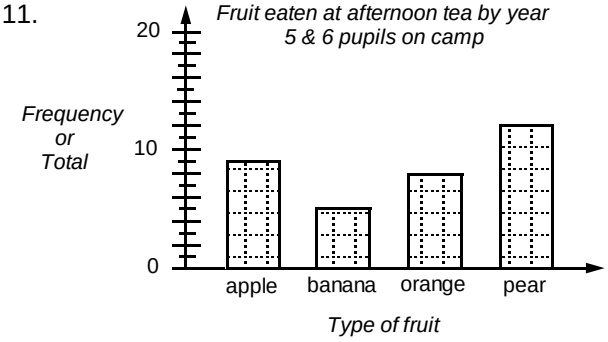


7. hockey
8. 13 pupils
9. 52 pupils in total, therefore 26 in each class.

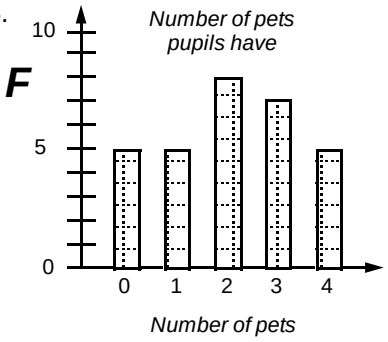
10. *Fruit eaten at afternoon tea*

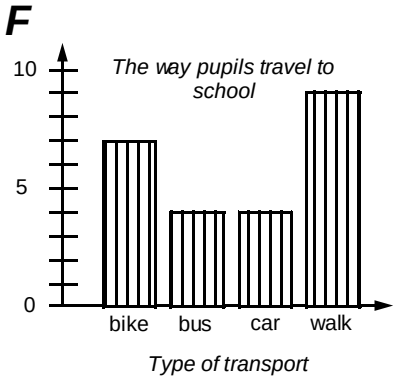
Fruit type	Tally	F
apple	卌 IIII	9
banana	卌	5
orange	卌 III	8
pear	卌 卌 II	12
		34

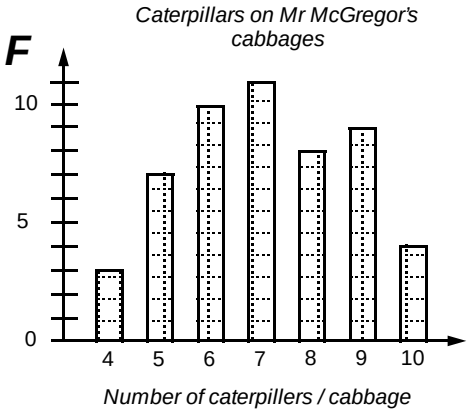
11.



12. pears
13. bananas
14. 34 pupils
15.







Worksheet 4

Pictograms

Pictograms represent data with pictures. All pictograms should have ...

- a title or name
- a key
- a scale stating how many each picture is worth

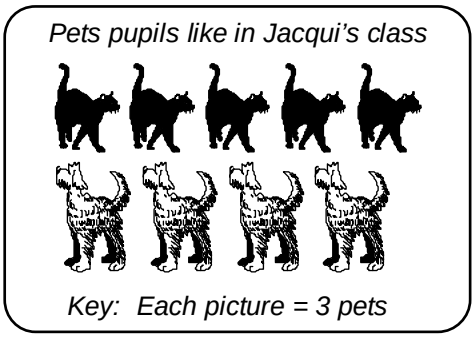
If pupils are having trouble working out how many pictures to draw, start with a 1 to 1 scale.
As part of your discussion, ask questions such as, *"If each picture represents 5 people, how many pictures would you draw if you have 20 people."*

Task 7 is designed to give practice at creating pictograms and then to use them to answer questions. There will be more than one correct answer, depending on how many each picture represents.

For **Task 8** pupils are to present the data from their investigation as a pictogram(s), if appropriate.

Answers: Task 7

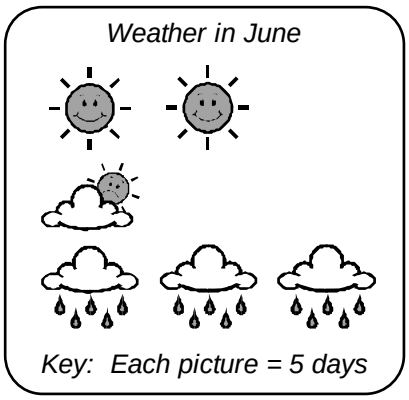
1.



2. 27 pupils

3. 15 rainy days in June

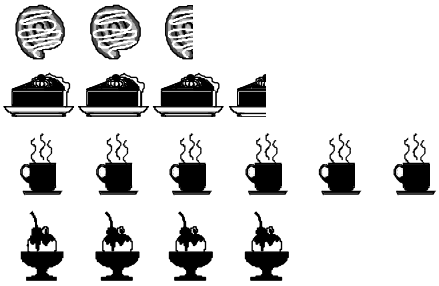
4.



5. *Choices of dessert*

No. of pets	Tally	F
biscuit	𝍸	5
cake	𝍸 II	7
drink	𝍸 𝍸 II	12
ice-cream	𝍸 III	8

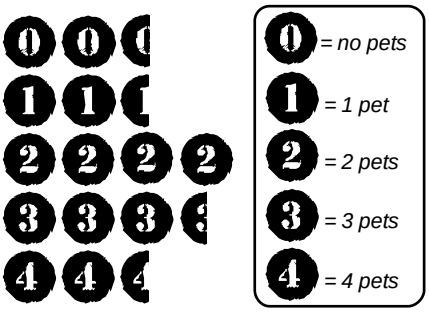
6. *Desserts pupils had on camp*



Key: Each picture = 2 food items

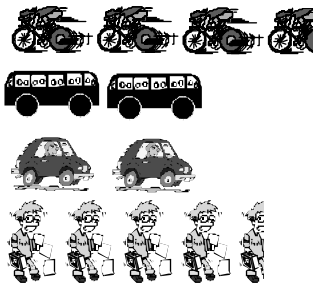
7. cake
8. 16 pupils in the class
9. 4 did not have a drink

10. *Number of pets pupils have*



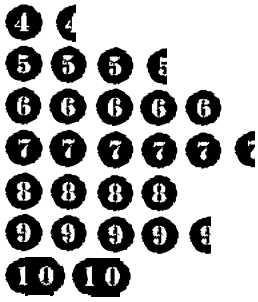
Key: Each picture = 2 pupils

Ways of travelling to school



Key: Each picture = 2 pupils

Number of caterpillars on each cabbage plant



Key: Each picture = 2 caterpillars

Worksheet 5

Stem & Leaf Graphs

Stem & leaf graphs are so called because of the shape. If you are collecting two digit numbers (54) then the stem part contains the 10's and the leaf part contains the units. If the numbers were three digit numbers (234), the stem has both the 100's & 10's and the leaf still has the only the units. Can also be used for data that contains decimals.

Stem & leaf graphs can be used to collect data as it is collected, much like a tally chart. 'Back-to-back' stem & leaf graphs are good when comparing two sets of related data.
Example: Pre and post test results. All stem & leaf graphs should have a title.

Task 9 is designed to assist pupils to understand stem and leaf graphs.

Task 10 is designed to give practice at creating stem and leaf graphs and then to use them to answer questions.

Answers: Task 9

1. 7, 9, 3, 5, 15, 16, 12, 10, 16, 19, 22, 26, 27, 23, 21, 32, 30

   22, 20, 29, 25, 23, 24, 39, 35, 34, 37, 36, 33, 31, 48, 42, 47, 40, 56, 52, 57, 59, 50
2. 17 pupils in the class
3. 59 minutes, 20 minutes

Answers: Task 10

1. *Money spent on 'take-aways' ($)*

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

2. $8.00
3. 20 families

4. *Test results for first test*

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

5. lowest mark = 24, highest mark = 42

6. *Test results for second test*

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

NOTE: you could draw a back-to-back stem & leaf graph for these two tests results.

7. lowest mark = 29, highest mark = 50
8. At least 50, but not really possible to say for sure.
9. YES, the class did better in the second test. There are more scores in the 40's and one in the 50's. Both the new low and high marks have improved.

Worksheet 6

Dot Plot Graphs

A **dot plot graph** is basically the same as a column graph, where the columns have been replaced by dots. Like tally charts and stem & leaf graphs, dot plot graphs can be created as the data is collected, once the axis have been drawn up.

All dot plot graphs should have ...

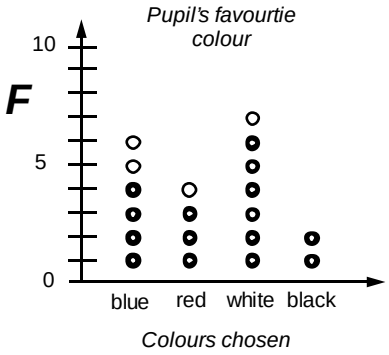
- a title or name
- a scale on the frequency axis
- all dots should be the same size
- a label on each axis
- gaps between columns of dots

Task 11 is designed to give practice at creating dot plot graphs and then to use them to answer questions.

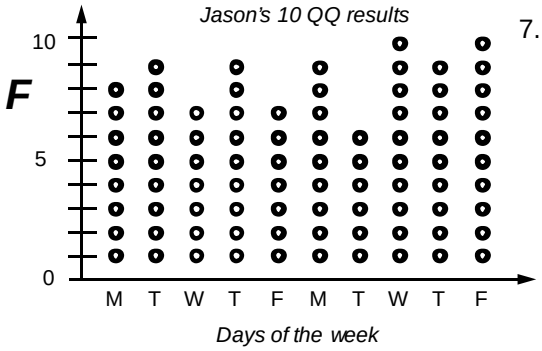
Task 12 is designed to create more dot plot graphs from the tally charts created in **Task 3**.

Answers: Task 11

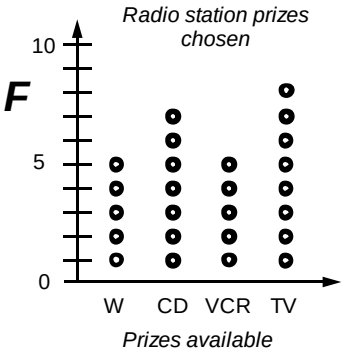
1.



4.

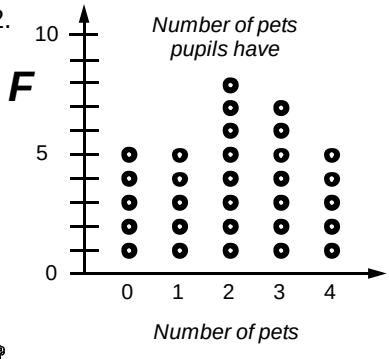


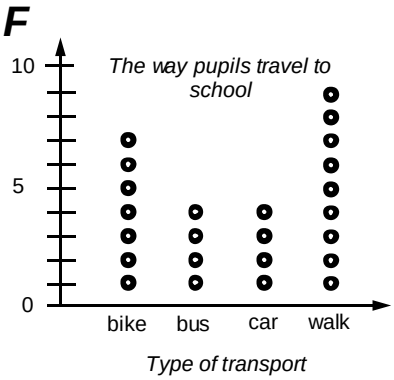
7.

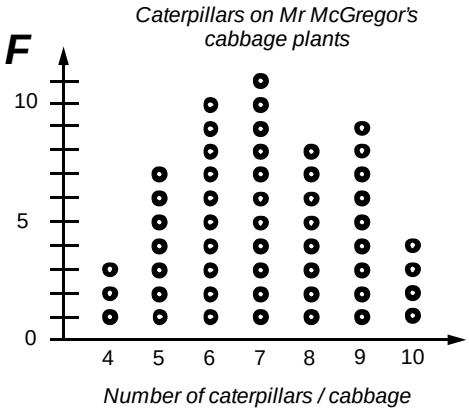


2. white
3. ○ are the new colours added
5. 9 out of 10
6. Tuesday, second week
8. television
9. 5 people
10. 25 people

12.







Worksheet 7

Strip Graphs

A **strip graph** is also known as a **bar graph** or **percentage bar graph**. At this level it is too difficult for pupils to work out percentages to be shaded, so the strip graph has been divided into squares, with each square representing a certain number of data scores. *Example:* one square = 5 people

All strip graphs should have ...

- a title or name
- a key
- a scale stating how much each picture is worth

Task 12 is designed to assist pupils to understand strip graphs.

Task 13 is designed to give practice at creating strip graphs, then to use them to answer questions.

Answers: Task 13

1. Each square represents $8.00 2. $8.00 3. $16.00 4. $24.00

Answers: Task 14

1. *Shoes worn in Emma's class*

2.

B	**B**	**S**	**S**	**S**	**S**	**L**	**L**	**L**

Key: B = boots, S = sports shoes, L = leather shoes

3. 27 pupils

Each square = 3 pupils

4. *Pupils in Brett's class*

B	**B**	**B**	**G**	**G**	**G**	**G**

Key: B = boys, G = girls *Each square = 4 pupils*

5.

pet	tally	F
cat	~~IIII~~ ~~IIII~~	10
dog	~~IIII~~ III	8
horse	IIII	4
sheep	II	2

6. 4 pupils had a pet horse
7. 8 pupils had a pet dog
8. 2 pupils had a pet sheep
9. 24 pets

10. *Pets pupils have in Tim's class*

C	**C**	**C**	**C**	**C**	**D**	**D**	**D**	**D**	**H**	**H**	**S**

Key: C = cats, D = dogs, H = horse, S = sheep *Each square = 2 pets*

Worksheet 8

Time-Series Graphs

As the name implies, time-series graphs are used to display data that has been collected over time. Example: temperature, height or weight of something etc. This type of data is often continuous data, as it is obtained by measuring. However at this level, the data collected will be graphed as discrete data, rounded to the nearest whole number.

All time-series graphs should have ...

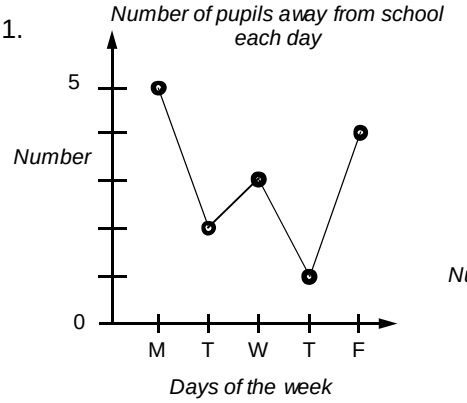
- a title or name
- a scale on the frequency axis
- time on one axis, usually the horizontal
- a label on each axis
- dots or X joined by lines

Task 15 is designed to give practice at creating time-series graphs and then to use them to answer questions.

Task 16 is designed for pupils to practise collecting and graphing their own time-series data.

Answers: Task 15

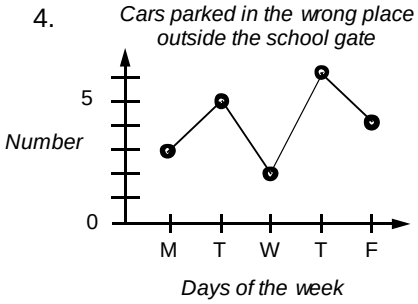
1.



2. Monday

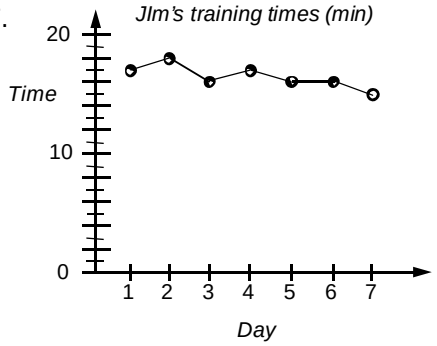
3. Teacher or pupil to approach drivers of cars in wrong place after school.

4.



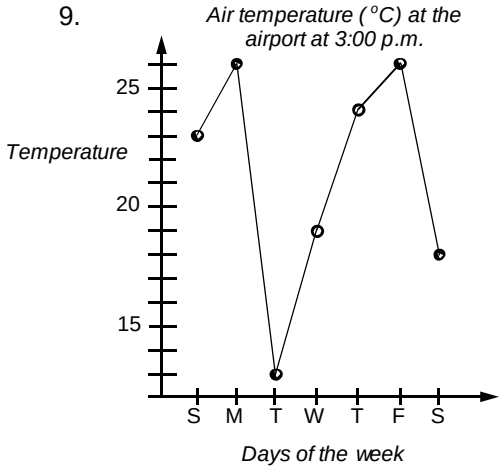
5. Tuesday
6. Letter home to parents or mention the problem in the school newsletter.

7.



8. 16 minutes

9.



10. Monday and Friday
11. Tuesday, as the temperature was only 13°C.

Worksheet 9, 10, & 11

Finding the 'Average'

There are **three different types of 'averages'** that can be worked out, depending on what information you require from your data.

The **mean** is commonly known as the 'average'. To find the mean, add up all the scores, then divide by the number of scores. *Example:* Find the mean of 4,7, & 10: 4 + 7 + 10 = 21, 21 ÷ 3 = 7
Not all answers will be whole numbers.

The **median** is the middle score, once the scores are in numeric order. If there is an odd number of scores, cross one off each end until there is only the middle score left. If there is an even number of scores then the median is halfway between the two scores left in the middle.
Example: 1, 6, 8, 9, 10 has a median of 8: 5, 8, 10, 12 has a median of 9 (halfway between 8 & 10)

The **mode** is the most common score. There can be more than one mode or none at all.
Example: 2, 2, 4, 6, 8 has a mode of 2: 4, 4, 5, 8, 8, 9 has a mode of 4 & 8: 5, 8, 9, 10 has no mode

Which 'average' to use?
Example: For test results the mean may be helpful. If a class is to be divided into two groups based on their ability, the median would be useful. A shop-keeper would use the mode when replacing jeans sold.

Task 17 is designed to give practice at working out the **mean** and using this to explain results.

Task 18 is designed to give practice at working out the **median** and using this to explain results.

Task 19 is designed to give practice at working out the **mode** and using this to explain results.

Answers: Task 17

1.	7	2.	13	3.	15	4.	7	5.	10	6.	5
7.	9	8.	12	9.	30	10.	9	11.	8	12.	6

13. 12 pupils
14. 3 books
15. Yes, Mr Stevenson would be pleased as the class mean was 3 books. All pupils, except one, read at least 2 books.
16. It should be as there were many scores of 7, 8 & 9.
17. mean = 6, Mr. Stevenson would not be pleased as the mean was below 7, therefore the test will have to be done again.

Answers: Task 18

1.	8	2.	6	3.	13	4.	6	5.	15	6.	6
7.	6	8.	6	9.	5	10.	6	11.	8	12.	7
13.	11	14.	16	15.	7.5	16.	5	17.	9	18.	10.
19.	34m	20.	7 glasses of lemonade								

Answers: Task 19

1.	3	2.	6	3.	6 & 7	4.	no mode	5.	8, 9, 10	6.	7
7.	2, 3, 4	8.	6	9.	no mode						

10. *T-Shirts sold*

T-shirt size	Tally	F
8	𝍸	5
10	𝍸 II	7
12	𝍸	5
14	I	1
		18

11. size 10 t-shirt
12. The shop-keeper can use this information to assist when reordering new stock to replace the t-shirts sold. He may also want to buy more of the most popular sizes, so he does not run out of stock.
13. 20 & 36 minutes

Worksheet 12

Range

The **range** for a set of data scores indicates how spread out the scores are. The range is calculated as follows.

Range = highest score – lowest score

Why work out the range?

Example: Compare the two sets of scores.

10, 20, 30, 40, 50 & 28, 29, 30, 31, 32

Both sets of scores have a mean and median of 30, **BUT** the ranges are 50 – 10 = 40 & 32 – 28 = 4.
If these were test results the range would be helpful, as it indicates the range of pupil ability, for this test.

Task 20 is designed to practice working out the **range** and using this information to explain results.

Answers: Task 20

1.	5	2.	5	3.	15	4.	8	5.	15	6.	9
7.	12	8.	21	9.	7	10.	51	11.	127	12.	138
13.	12 years	14.	23cm	15.	5 take-away bars			16.	45 cents		

17. Cheapest may not be best. What the hamburgers taste like is more important.
18. Range for high temperatures was 18°C. Range for the low temperatures was 10°C.

Worksheet 13

Mean, Median, Mode & Range

By calculating all or some of the above, informed statements can be made about a set of data scores.

Task 20 is designed to give practice at working out the **mean, median, mode & range** and using this information to explain results.

Answers: Task 21

1. mean = 5, median = 4, mode = 2, range = 9
2. mean = 9, median = 9, mode = 8 & 12, range = 8
3. mean = 15, median = 16, no mode, range = 12
4. mean = 5, median = 5, mode = 2, range = 7
5. mean = 8, median = 8, mode = 8, range = 9
6. mean = 11, median = 11, mode = 14, range = 23

	Martin's scores	***John's scores***
7.	mean = 20 runs	mean = 20 runs
8.	median = 14 runs	median = 22 runs
9.	mode = 9 runs	mode = 22 runs
10.	range = 38 runs	range = 29 runs

11. John was correct. They both had the same mean but John had the better median and mode. Although Martin had the highest score, John's scores were more consistent as the range was less spread out.

	Group A	***Group B***
12.	mean = 6	mean = 5
13.	median = 5½	median = 3½
14.	mode = 5	mode = 10
15.	range = 5	range = 9

16. Michelle's statement was incorrect. Group A may not have had anyone who scored 10 out of 10, but their mean and median were higher than that of Group B. Group A had a narrower range indicating this group was of similar ability, whereas Group B had a range of 9. The mode of 10 for Group B does not reflect the overall ability of this group.

Worksheet 14

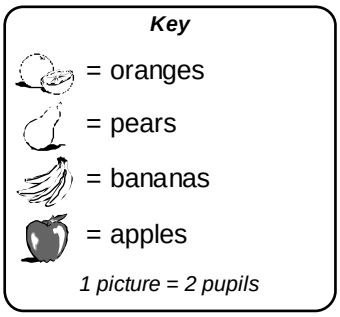
Understanding Data Displays

Given information as a data display, what does it all mean? Looking at the display and completing further calculations, such as mean, median ,range and noting the mode, can all be useful so that informed statements about the data can be made.

Task 22 is designed to practice the interpretion of information expressed as a column graph, a pictogram and a stem & leaf graph.

Answers: Task 22

1. 8 games won
2. 2 games drawn
3. 15 games
4. 33 points
5. It was a good season as the soccer team won more games than it lost or drew.
6.



7. 2 pupils
8. 6 pupils
9. 9 pupils
10. pears
11. 27 pupils

12.

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

13. See stem & leaf diagram, Kim's tomato weights are circled.
14. 30 grams
15. 10, 12, 14, 16, 17, 23, 23, 24, 26, 27, 27, 27, 29, 30, 32, 33, 34, 35, 36, 38, 40, 41, 43, 44
16. 28 grams
17. 44 grams
18. 34 grams
19. 27 grams
20. There were 24 tomatoes entered

Worksheet 15

Understanding Data Displays

Given information as a data display, what does it all mean? Looking at the display and completing further calculations, such as mean, median ,range and noting the mode, can all be useful so that informed statements about the data can be made.

Task 23 is designed to practice the interpretion of information expressed as a dot plot graph, a strip graph and a time-series graph.

Answers: Task 23

1. 10 out of 10 on the second Thursday
2. Friday on week one
3. 10 – 5 = 5
4. 5, 5, 6, 6, 6, 7, 8, 8, 9, 10
5. median = 6½
6. mean = 7
7. mode = 6
8. Jeremy might be pleased as he has scored above 5 each time, with a mean of 7. But how do his marks compare with the rest of the class? If the rest of the class had a mean of 8, then Jeremy may not be so pleased. Without more information we cannot say for sure If Jeremy is pleased with his results. However he does seem to be improving.
9. 6 boxes
10. 5 pets
11. 15 cats
12. 10 dogs
13. 10 more cats
14. 30 pets
15. 12 × 2 = 24 pets, 30 – 24 = 6, therefore 12 + 6 = 18 pupils
16. 4 hours
17. 41°C
18. 38, 38, 39, 39, 40, 40, 40, 41, 41
19. median = 40°C
20. range = 3°C
21. mode = 40°C
22. mean = 39.55°C

Worksheet 15

Creating Statistical Reports

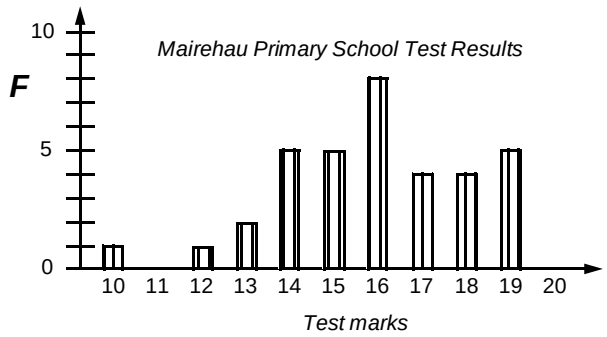
Having completed all the preceding tasks, pupils are now ready to give a full **statistical report** using some of the many skills they have learnt.

In **Tasks 24 & 25**, pupils have been given two sets of data and a statement about the data. Pupils are to decide which graphs they are going to create. Calculations involving either the mean, median, mode or range could be done. From the graphs drawn and the calculations done, pupils are to prove or disprove each statement, In other words they are to write a **statistical report**.

Answers: Task 24

Mairehau Primary School results

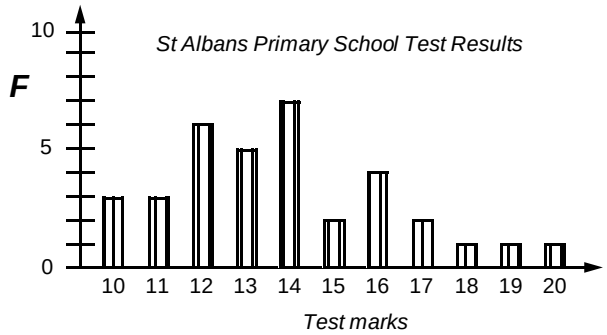
Test mark	Tally	F
10	I	1
11		0
12	I	1
13	II	2
14	~~IIII~~	5
15	~~IIII~~	5
16	~~IIII~~ III	8
17	IIII	4
18	IIII	4
19	~~IIII~~	5
20		0



Calculating the mean for this data would be difficult at this level, however the Mean = 15.9
Scores in order
10, 12, 13, 13, 14, 14, 14, 14, 14, 15, 15, 15, 15, 15, 16, 16, 16, 16, 16, 16, 16, 16, 17, 17, 17, 17, 18, 18, 18, 18, 19, 19, 19, 19, 19
Median = 16, Mode = 16, Range = 9

St Albans Primary School results

Test mark	Tally	F
10	III	3
11	III	3
12	~~IIII~~ I	6
13	~~IIII~~	5
14	~~IIII~~ II	7
15	II	2
16	IIII	4
17	II	2
18	I	1
19	I	1
20	I	1

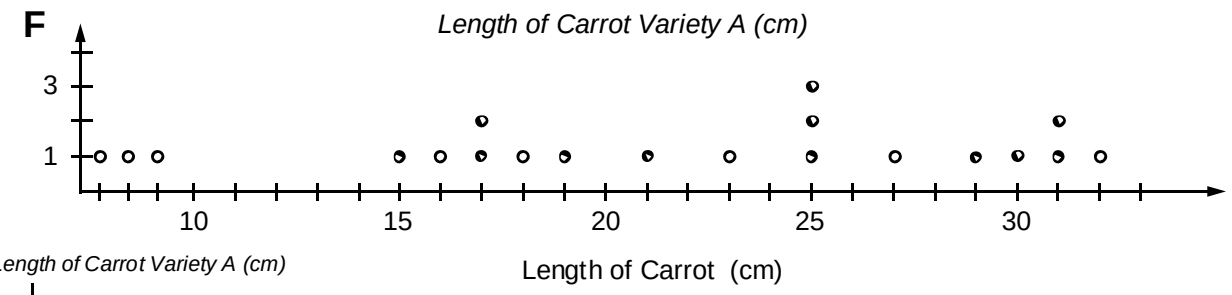


Calculating the mean for this data would be difficult at this level, however the Mean = 13.8
Scores in order
10, 10, 10, 11, 11, 11, 12, 12, 12, 12, 12, 12, 13, 13, 13, 13, 13, 14, 14, 14, , 14, 14, 14, 14, 15, 15, 16, 16, 16, 16, 17, 17, 18, 19, 20
Median = 14, Mode = 14, Range = 10

Looking at the tally chart and the column graphs for the two test results, it appears that Karen's statement about St Albans Primary School performing better than Mairehau Primary School is **incorrect.**

Calculations of the mean, median, mode and range support the fact that Mairehau Primary School did in fact score better in the test.

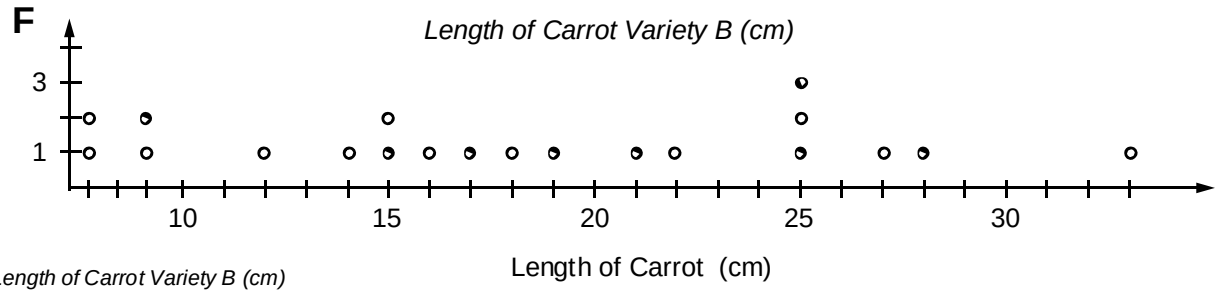
Answers: Task 25



Length of Carrot Variety A (cm)

0	7, 8, 9
1	5, 6, 7, 7, 8, 9,
2	1, 3, 5, 5, 5, 7, 9
3	0, 1, 1, 2

Calculating the mean for this data would be difficult at this level, however the
Mean = 21.25 cm
Median = 22 cm, Mode = 25 cm, Range = 25 cm



Length of Carrot Variety B (cm)

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

Calculating the mean for this data would be difficult at this level, however the
Mean = 18.2 cm
Median = 17½ cm, Mode = 25 cm, Range = 26cm

Looking at the dot plot graphs and the stem & leaf graphs, carrot variety A has more longer carrots. Calculations of the mean and median support this fact. Both carrot variety A & B had the same mode and a similar range. Mr. McGregor should plant carrot variety A.

Worksheets 17 & 18

Exploring Probability: Finding Outcomes

Probability is a measure of how likely it is that an event will happen. The rolling of a die, the drawing of a card etc. are **experiments**. An **outcome** is the **result** of an **experiment**. Finding all possible outcomes can be done in several ways. Two ways to do this are using **'boxes'** and **'tree diagrams'**. By using either of these two methods you are more likely to obtain all outcomes.

Tasks 26 & 27 are designed to give practice at finding outcomes using a systematic method, such as the 'box' or 'tree diagram' method.

Answers: Task 26

1.

Six-sided die (dice)

		1	2	3	4	5	6
coin	H	H1	H2	H3	H4	H5	H6
	T	T1	T2	T3	T4	T5	T6

Outcomes:
H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6

2. 12 outcomes

3.

	t-shirt	skivey
shorts	shorts/t-shirt	shorts/skivey
sweatpants	sp/t-shirt	sp/skivey

Outcomes:
shorts/t-shirt, shorts/skivey, sweatpants/t-shirt, sweatpants/skivey

4. 4 outcomes

5.

	cricket (C)	softball (SB)	tennis (T)
netball (N)	N/C	N/SB	N/T
soccer (SR)	SR/C	SR/SB	SR/T

Outcomes:
netball/cricket, netball/softball, netball/tennis
soccer/cricket, soccer/softball, soccer/tennis

6. 6 outcomes

7.

	milk (MK)	juice (J)	milo (MO)
cornflakes (C)	C/MK	C/J	C/MO
ricies (R)	R/MK	R/J	R/MO
toast (T)	T/MK	T/J	T/MO

Outcomes:
cornflakes/milk, cornflakes/juice, cornflakes/milo
ricies/milk, ricies/juice, ricies/milo, toast/milk, toast/juice, toast/milo

8. 9 outcomes

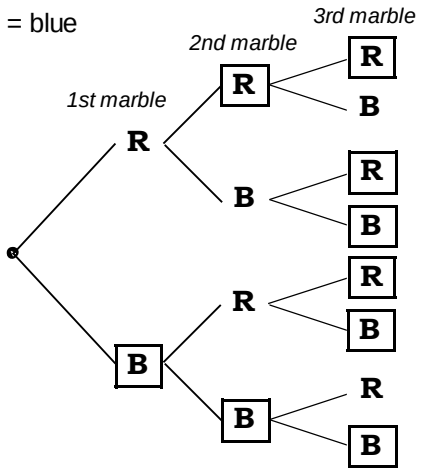
Answers: Task 27

1. toast/soup, toast/cheese, bread/soup, bread/cheese

2. 4 outcomes

3. R = red, B = blue

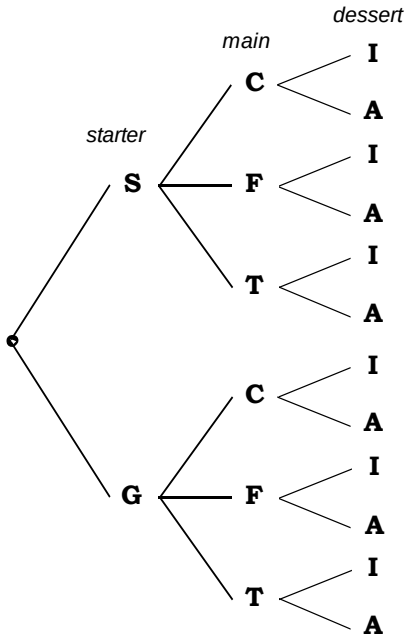
4.



5. red/red/red, red/red/blue, red/blue/red, red/blue/blue, blue/red/red, blue/red/blue, blue/blue/red, blue/blue/blue

6. 8 outcomes

7. Let S = soup, G = garlic bread, C = chicken, F = fish, T = t-bone steak, I = ice-cream A = apple pie



8. 12 possible choices or outcomes
9. 3 choices
10. $3.50 + $16.50 + $5.00 = $25.00
11. $3.50 + $17.50 + $ 5.00 = $26.00
12. $2.75 + $15.00 + $4.50 = $22.25

Worksheet 19

Language Associated With Chance
Many words can be used to describe the chance of something happening. Words such as **certain** or **impossible** are at the extremes. There are a number of words, **likely, unlikely, possible, even chance, poor chance, good chance,** that can be used to describe events that occur between these extremes.

Task 28 is designed to give practice at using words to describe events, to help pupils gain an understanding of what simple probability is.

Answers: Task 28

1. -
2. C, B, D, E, A

For questions 3 to 12 there may be more than one answer.

3. possible
4. impossible
5. certain
6. unlikely or possible
7. certain
8. certain or impossible
9. certain or impossible, unlikely
10. certain
11. impossible, possible but unlikely
12. possible or likely
13. poor chance
14. poor chance
15. even chance
16. good chance
17. poor chance
18. even chance
19. poor chance
20. even chance

Worksheet 20

Using Data To Predict Outcomes

Being able to predict outcomes can be useful. Imagine if you could predict the outcome of Lotto this week! If a sample of a population is surveyed, the outcome of the survey can be used to make predictions about the whole population. If you conduct an experiment, the results of the experiment can also be used to make predictions.

Task 29 is designed to introduce the idea of 'chance' and how this can be used to make predictions. Also practice at making predictions by working out the outcomes for a given situation and applying the chance of an outcome occurring, to making predictions about the situation.

Example: 4 out of 10 people like apples. If there were 100 people, how many would you expect to like apples?

Answers: Task 29

1. 4 out of 8
2. 3 out of 8
3. 2 out of 8
4. black
5. 5 pupils
6. blue and white
7. 8 pupils
8.

Bread Roll	Tally	F
chicken	卌 卌	10
ham	卌 卌 I	11
salad	卌 IIII	9
		30

Drinks	Tally	F
fruit juice	卌 卌 III	13
flavoured milk	卌 卌 II	12
		25

9. 30 bread rolls and 25 drinks
10. 10 out of 30
11. 12 out of 25
12. 27 salad rolls
13. 52 fruit juices

Table of Content for the Homework / Assessment Worksheet Masters for Statistics, Level 3

Statistics

S1 / S2

Homework / Assessment Worksheet

1

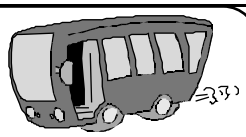
Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

1. 345 + 957 = ...
2. 1000 – 563 = ...
3. 125 × 9 = ...
4. 420 ÷ 7 = ...
5. Convert 23cm to mm .....
6. $2.50 × 8 = ...
7. What is the time on this clock? .....

8. Find ½ of $4.80 .....
9. How many metres in 2km? .....
10. What would 5 books at $2.25 each cost? .....

B: Planning an Investigation



Your class would like to go on a field trip, but where are you going to go?

Plan how you are going to solve this problem by answering these questions. (Write on the back if you need more space.)

1. Your teacher says, *"You have to ask your parents / caregivers."* Why do you think you have to do this? .....
2. Who else should you ask? .....
3. Write THREE questions you might ask each person. .....

C: Completing Tally Charts

1. This tally chart shows the number of children in each family in Mrs. Wilson's class. The total or frequency column of the tally chart has not been completed. Fill in the missing numbers.

Number of children	Tally	Total or Frequency
1	卌 III	
2	卌 卌 II	
3	卌 I	
4	III	

2. How many families had 2 children? .....

D: Creating Tally Charts

In this box are the results of a survey of the number of red jellybeans in each packet sampled.

Number of red jelly beans

8, 9, 10, 12, 7, 10, 9, 11, 12, 10, 9, 8, 9, 10, 12, 10, 11, 9, 8, 7, 7, 9, 12, 11, 10, 9, 12, 11, 10, 9, 7, 9, 7

1. Complete the tally chart.

Number red jellybeans	Tally	F
7		
8		
9		
10		
11		
12		

2. How many packets of jellybeans were sampled? .....

E: Creating Tally Charts

This box shows a test result for Mr Williamson's class.

1. **Create** a tally chart to display these results, in the space below. The test was out of 10.

Test Results

5, 6, 5, 8, 6, 4, 9, 4, 6, 4, 5, 6, 7, 6, 7, 6, 7, 5, 6, 4, 5, 6, 7, 8, 9, 8, 7, 5, 6, 5, 7, 6, 7

2. What was the most common test score? .....
3. How many pupils are in this class? .....

Comments: .....

.....

.....

Please sign: Parent / Caregiver

.....

AWS

Statistics

S2

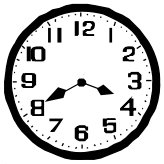
Homework / Assessment Worksheet

2

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

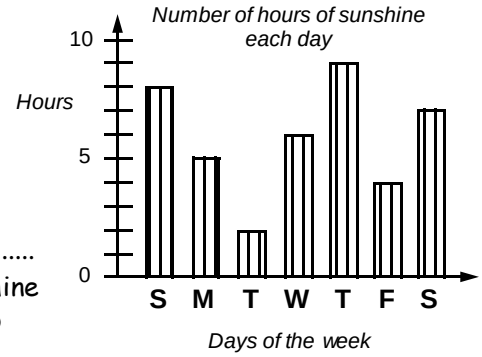
1. 518 + 475 = ...
2. 1500 – 978 = ...
3. 183 × 8 = ...
4. 540 ÷ 9 = ...
5. Convert 250mm to cm .....
6. $3.80 × 7 = ...
7. What is the time on this clock? .....



8. Find ½ of $2.70 .....
9. How many kilometres in 5000m? .....
10. What would 8 books at $1.35 each cost? .....

B: Column Graphs

This column graph displays the number of hours of sunshine recorded each day during one week.



1. On what day were there 4 hours of sunshine? .....
2. How many hours of sunshine were there on Thursday? .....
3. On what day do you think it rained? Explain your choice. .....

C: Creating a Column Graph

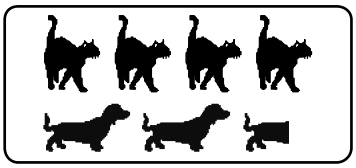
During July, at 3:00 p.m. each day, the weather was recorded as either sunny, cloudy, raining or snowing. This table displays the results.

Weather	Total
sunny	10
cloudy	7
raining	9
snowing	5

1. **Create** a column graph to display these results in the space above.
2. What would be a good title for this column graph? .....

D: Pictograms

The pictogram below shows the number of cats and dogs in the houses of one street.



Key

cat =  *dog =* 

1 picture = 4 pets

1. What would be a good title for this pictogram? .....
2. How many cats were in this street? .....
3. How many dogs were in this street? .....

E: Creating a Pictogram

Use the same information about the weather in July, in **C:** above, for these questions.

1. **Complete** the key for this pictogram

Key

sunny =

cloudy =

raining =

snowing =

1 picture = ... days

2. **Create** a pictogram in the space above.

Comments: .....

.....

.....

Please sign: Parent / Caregiver

.....

AWS

Statistics

S2

Homework / Assessment Worksheet

3

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

1. 942 + 459 = ...
2. 2300 – 759 = ...
3. 108 × 11 = ...
4. 480 ÷ 6 = ...
5. Convert 2500mL to litres .....
6. $24.80 ÷ 8 = ...
7. What is the time on this clock? .....

8. Find $\frac{1}{4}$ of $1.60 .....
9. How many grams in 3kg? .....
10. What would 9 books at $0.65 each cost? .....

B: Stem & Leaf Graphs

List the numbers displayed by these three stem & leaf graphs.

1.

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

42, 46, ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ...

2.

10	5, 4, 3, 5
11	9, 3, 4, 6, 7, 1
12	2, 4, 0

105, 104, ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ...

3.

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

....., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ...

C: Creating a Stem & Leaf Graph

Two year 6 classes sat the same test, with marks out of 25.
The test results for the two classes are shown in these boxes.

Room 7's results

15, 16, 10, 9, 21, 23, 15, 25, 16, 8, 24, 15, 20, 17, 9

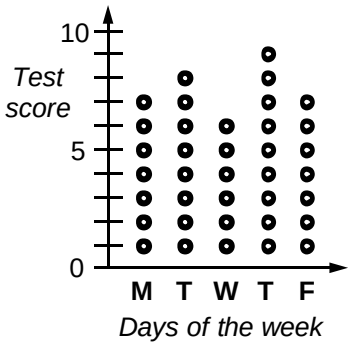
Room 8's results

20, 11, 7, 6, 20, 13, 14, 22, 21, 17, 7, 14, 9, 24, 14

1. **Create** a stem & leaf graph for each class.
2. What are the highest (H) and lowest (L) scores?
   Room 7: H = ... & L = ... Room 8: H = ... & L = ...

D: Dot Plot Graphs

Sam's class has a spelling test each morning. Sam records his results in this dot plot graph.



1. What would be a good title for this graph? .....
2. How many words did Sam get right on Monday? .....
3. On what day did Sam get 9 words right? .....

E: Creating a Dot Plot Graph

What is the most common colour of car? Mary stood at the school gate and recorded the colour of the cars as they went by. Her results are displayed in this box.

Car Colours

red, blue, black, white, red, white, white, black, white, blue, blue, red, white, black, white, blue, white, black, black, red

1. **Create** a dot plot graph in the space above, remember to give your graph a title.
2. How many cars went past the school gate? .....

Comments: .....

Please sign: Parent / Caregiver

AWS

Statistics

S2

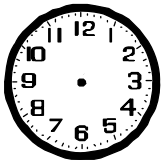
Homework / Assessment Worksheet

4

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

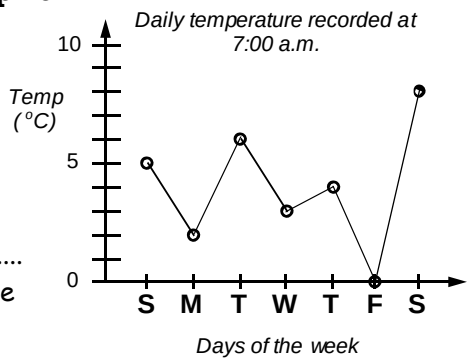
1. 1024 + 98 = ...
2. 1400 – 986 = ...
3. 164 × 11 = ...
4. 3500 ÷ 7 = ...
5. Convert 500cm to metres .....
6. $6.30 × 8 = ...
7. Draw on this clock the following time 09:15



8. Find $\frac{1}{4}$ of $12.40 .....
9. How many kilolitres in 4500L? .....
10. If 5 books cost $24.00, what does one book cost? .....

B: Time-Series Graphs

This time-series graph displays the air temperature in a city recorded each day at 7:00 a.m., for one week in July.



1. On what day was the temperature 4°C? .....
2. What was the temperature on Tuesday? .....
3. On what day do you think there was a frost? Explain your choice. .....

C: Creating a Time-Series Graph

Each day for a week, Jason measured the height of a bean plant that had just started to grow. The results are in this table.

Day	Height (cm)
Sunday	1
Monday	2
Tuesday	4
Wednesday	5
Thursday	7
Friday	8
Saturday	10

1. **Create** a time-series graph to display these results in the space above.
2. What would be a good title for this column graph? .....

D: Strip Graphs

The strip graph below shows the type of drinks pupils had for afternoon tea.

Key

coke = *milk =* *juice =*

1 square = 5 pupils

1. What would be a good title for this pictogram? .....
2. How many pupils had a drink of coke? .....
3. How many pupils had a drink of milk? .....
4. How many pupils had a drink of juice? .....

E: Creating a Strip Graph

One Saturday, a shop sold 12 tapes, 16 CD's and 8 videos.

1. How many items were sold altogether? .....

Key

tapes =

CD's =

videos =

1 square = ... items

2. If there are nine squares in the strip graph, how many does each square represent? .....
3. **Complete** the key for this strip graph.
4. **Complete** the strip graph below by shading in the squares.
5. Title = ...

Comments: .....

.....

.....

Please sign: Parent / Caregiver

.....

AWS

Statistics

S2

Homework / Assessment Worksheet

5

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

1. 51.6 + 9.7 = ...
2. 14.75 – 6.34 = ...
3. 157 × 20 = ...
4. 440 ÷ 11 = ...
5. Convert 1.5m to cm .....
6. $6.40 ÷ 8 = ...
7. What is the time on this clock? .....

8. Find ½ of $4.50 .....
9. How many milligrams in 5 grams? .....
10. If 6 books cost $13.80, what does one book cost? .....

B: Mean, Median, Mode & Range

Fill in the missing words from the box, to complete these sentences.

1. To find the 'average' or ..... for a list of scores, first **add** up all the scores, then **divide** by the number of scores you added up.
2. The middle score, once the scores are placed in order from smallest to biggest, is called the ..... .
3. The most common score is called the ..... . There may be more than one or none at all.
4. The highest score — lowest score is called the ..... .

range **mode** **median** **mean**

C: Finding the Mean

Find the **mean** for each list of scores.

1. 6, 8, 10 ..... 2. 5, 5, 8, 10 .....
3. 2, 7, 3, 4, 6, 2 ..... 4. 3, 6, 4, 2, 1, 3, 2 .....
5. 12, 10, 8, 14 ..... 6. 5, 102, 64, 29 .....

D: Finding the Median

Find the **median** for each list of scores.
Remember the scores must be in order.

1. 5, 6, 8, 9, 12 ..... 2. 3, 6, 9, 10, 12 .....
3. 6, 8, 10, 13 ..... 4. 10, 15, 17, 20 .....
5. 3, 6, 7, 2, 9 ....., ..., ..., ..., ... median = ...
6. 5, 1, 9, 3, 7, 10 ....., ..., ..., ..., ..., ... median = ...

E: Finding the Mode

Find the **mode** for each list of scores.

1. 2, 2, 4, 6, 8, 7 ..... 2. 6, 5, 3, 6, 4, 5 .....
3. 2, 10, 9, 5, 1..... 4. 3, 6, 8, 3, 4, 6, 4 .....
5. 3, 3, 5, 6, 7, 9, 6 ..... 6. 1, 6, 7, 2, 3, 9, 7 .....

F: Finding the Range

Find the range for these lists of scores.

1. 2, 6, 8, 9, 12 .....
2. 15, 3, 0, 8, 7 .....
3. 6, 3, 4, 8, 12, 21 .....
4. 12, 36, 19, 24, 15 .....
5. 57, 36, 17, 81, 47 .....
6. 36, 45, 12, 8, 24 .....
7. Five cars were sold for the following prices:
   $8500
   $12950
   $7250
   $18420
   $9950

   Calculate the range of the car prices. .....
8. If the cheapest car sells for $8000 and the range of car prices is $7500, what would the most expensive car sell for? .....

G: Word Problems

In the first nine holes of golf, Jeff recorded the following scores. 5, 6, 5, 8, 9, 5, 4, 5, 7

1. Find his mean score. .....
2. What was the range of his scores? .....
3. What was the mode score? .....
4. List the scores from lowest to highest. ....., ..., ..., ..., ..., ..., ..., ..., ...
5. What was the median for his golf scores? .....

In the next nine holes, Jeff recorded the following scores.

5, 3, 9, 8, 4, 6, 7, 5, 6

6. Combine the two sets of nine scores to find the new median. ....., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ..., ... New median = ...

Comments: .....
.....
.....

Please sign:
Parent / Caregiver
.....

AWS

Statistics

S3 / S4

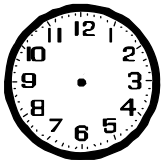
Homework / Assessment Worksheet

6

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

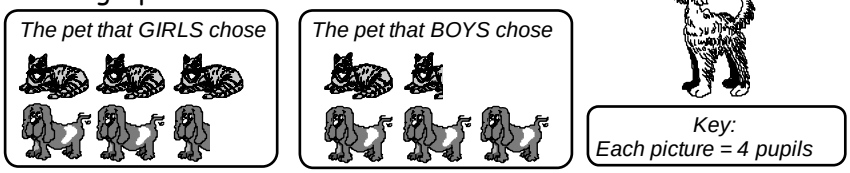
1. 5.36 + 0.47 = ...
2. 26.4 – 17.9 = ...
3. 225 × 9 = ...
4. 15.5 ÷ 5 = ...
5. Convert 5000mm to metres .....
6. $8.15 × 9 = ...
7. Draw on this clock the following time 11:40



8. Find $\frac{1}{4}$ of $20.40 .....
9. How many litres in 2.3kL? .....
10. If 9 books cost $11.70, what does one book cost? .....

B: Understanding Data Displays

Do you like cats or dogs ? Kim asked two classes the same question and then graphed the results.



Look at these two pictograms. What **five** statements can you say about Kim's results?

1. .....
2. .....
3. .....
4. .....
5. .....

C: Understanding Data Displays

Simon and Mark play for the same cricket team. The runs they have scored are listed in these boxes.

Simon's scores	Mark's scores
11, 32, 4, 21, 7	24, 5, 31, 10

1. Prove who is the better batsman by working out the mean, median, mode or range.
   .....
   .....
   .....

D: Understanding Data Displays

This stem & leaf graph shows the distance each person threw a frisbee at the school sports.

Frisbee Distance (m)

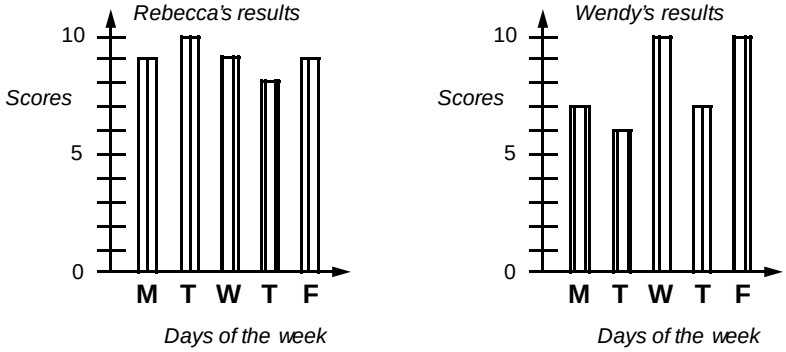
2	6, 8
3	2, 6, 7
4	0, 2, 5, 7
5	3, 5
6	3

What can you say about these results?

1. .....
   .....
2. .....
   .....
3. .....
   .....
4. .....
   .....
5. .....
   .....

E: More Data Displays

Rebecca and Wendy have both recorded the results of the '10 Quick Questions" they did last week.



Wendy said, *"I did better than you Rebecca, I got 10 out of 10 twice!"*. Is Wendy's statement correct? Comment on these results.

1. .....
   .....
   .....

Comments: .....
.....
.....

Please sign:
Parent / Caregiver
.....

AWS

Statistics

S5

Homework / Assessment Worksheet

7

Name: **Class:** **Complete by:**

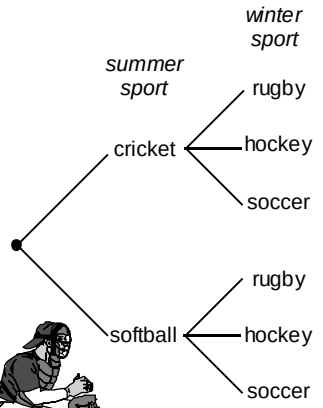
A: 10 'Quick Questions'

1. 5.23 + 18 = ...
2. 12.00 – 4.75 = ...
3. 132 × 60 = ...
4. 2400 ÷ 12 = ...
5. Convert 526cm to metres .....
6. $5.65 × 8 = ...
7. What is the time on this clock? .....

8. Find $\frac{1}{4}$ of $4.80 .....
9. How many grams in 2500mg? .....
10. What would 15 books at $3.50 each cost? .....

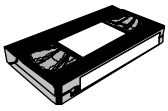
B: Listing Outcomes

At Linwood Primary School pupils can play either cricket or softball in the summer and either rugby, hockey or soccer in the winter.



1. If each pupil is to play one summer and one winter sport, list all possible outcomes.
   .....
   .....
   .....
2. How many outcomes are there altogether? .....

C: Creating a Tree Diagram



Paul wants to hire a video. His mum says he can hire it on Saturday or Sunday, but not on both days. Paul likes comedy, horror and sport videos.

1. **Draw** a tree diagram to show all possible choices that Paul can make.
2. How many possible choices does Paul have? .....

D: More Outcomes

Jim has some blue (Bu), red (R) and black (Bl) socks.

He likes to wear his sports (S), leather (L) or canvas (C) shoes.

This 'box' diagram shows all the possible combinations of socks/ shoes he could wear.

	S	L	C
Bu	Bu/S	Bu/L	Bu/C
R	R/S	R/L	R/C
Bl	Bl/S	Bl/L	Bl/C

1. List all of Jim's choices.
   .....
   .....
   .....
   .....
   .....
2. How many combinations did Jim have to choose from?.....

E: Creating a 'Box' Diagram

The local policeman is due to teach road safety at two schools, St. Albans School and Mairehau School. He teaches either on Monday, Tuesday, Thursday or Friday. Where should he go first?

1. **Draw** a 'box' diagram to show all possible outcomes.

2. How many possible outcomes were there? .....

Comments: .....
.....
.....

Please sign:
Parent / Caregiver
.....

AWS

Statistics

S2 / S6

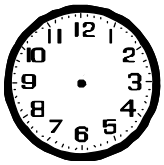
Homework / Assessment Worksheet

8

Name: **Class:** **Complete by:**

A: 10 'Quick Questions'

1. 28 + 0.25 = ...
2. 20.0 – 12.4 = ...
3. 246 × 70 = ...
4. 7500 ÷ 5 = ...
5. Convert 2.3 metres to mm .....
6. $5.70 × 11 = ...
7. Draw on this clock the following time 22:10



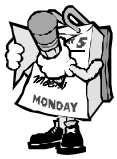
8. Find $\frac{3}{4}$ of $12.40 .....
9. How many kilograms in 2700g? .....
10. If 7 books cost $20.65, what does one book cost? .....

B: Language Associated with Chance

Describe if these events are **certain, likely, unlikely, possible** or **impossible**.

1. We will get a frost in December. .....
2. One day our Prime Minister will be a woman. .....
3. Today it will be dark at 11:00 p.m. .....
4. The All Blacks will always win every game. .....
5. Your name is Andrew. .....
6. List these events (A to E) in order of likelihood. Put the most likely event first..
   - A If you toss a coin, you will get heads.
   - B A glass jar will break when dropped.
   - C If today is Monday, yesterday was Sunday.
   - D A dinosaur will visit your school today.
   - E It will snow in Hamilton at Easter time.

   Order: ....., ..., ..., ..., ...



C: Using Data to Predict Outcomes

At one shop, milkshakes come in 4 flavours. This table shows how many of each flavour was sold today.

Milkshake Flavour	Number sold
chocolate	15
banana	8
vanilla	12
lime	5

1. How many milkshakes were sold? .....
2. What was the chance that a milkshake flavour was chocolate? ..... out of .....
3. What milkshake flavour had a chance of 12 out of 30 of being chosen? .....
4. If 80 milkshakes were sold, how many banana milkshakes would you expect to be bought? .....

This year the weather has been very changeable. Each day at 3:00 p.m. Karen noted what the weather was like using the words hot, warm, cool and cold. She recorded her results in this table.

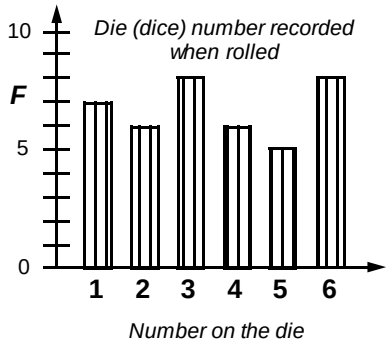
hot, cold, cool, warm, hot, hot, warm, cool, hot, cold, warm, cold, cold, warm, hot, cold, hot, cold, cool, hot, cool, warm, warm, hot, warm, cold, cool, cold, hot, cold

Weather	Tally	Total
hot		
warm		
cool		
cold		

5. **Complete** the tally chart.
6. How many days did Karen survey the weather? .....
7. What was the chance of the weather being hot? .....
8. What weather condition had a chance of 5 out of 30 occurring? .....

D: More Predicting

This column graph shows the results of an experiment.



1. How many times did each number come up?
   1 = ... **2** = ...
   3 = ... **4** = ...
   5 = ... **6** = ...
2. What was the chance that a number 4 came up? .....
3. What was the chance that a number 7 came up? .....

AUTUMN

Comments: .....
.....
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Please sign: Parent / Caregiver .....

AWS

Homework / Assessment Worksheet

Answers

Worksheet 1

A:

1. 1302 2. 437 3. 1125 4. 60 5. 230mm 6. $20.00 7. 20 past 8 8. $2.40 9. 2000m 10. $11.25

B:

1. Parents / caregivers need to give permission. They may have to pay towards the cost of the trip and / or help with transport and come along as parent help.
2. other classmates, teachers, friends or in fact anyone who might know of good places to visit on a class trip. The principal, as he/she will need to give permission as well as perhaps the BOT.
3. Where should we go? (3 or 4 choices)
   Will the trip be ½ day or full day?
   Will we combine the trip with another class? etc. etc.

C:

1.

Number of children	Tally	Total or Frequency
1	卌 III	8
2	卌 卌 II	12
3	卌 I	6
4	III	3

2. 12 families

D:

1.

Number red jellybeans	Tally	F
7	卌	5
8	III	3
9	卌 IIII	9
10	卌 II	7
11	IIII	4
12	卌	5

2. 33 packets

E:

1.

Test Results	Tally	F
4	IIII	4
5	卌 II	7
6	卌 卌	10
7	卌 II	7
8	III	3
9	II	2

2. 6 3. 33 pupils

Worksheet 2

A:

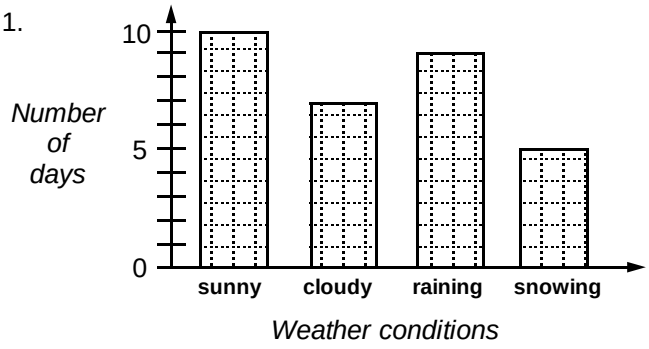
1. 993 2. 522 3. 1464 4. 60 5. 25cm 6. $26.60 7. 20 to 4 8. $1.35 9. 5km 10. $10.80

B:

1. Friday 2. 9 hours 3. Tuesday, as the temperature was only 2°C

C:

1.



2. July weather conditions, recorded daily at 3:00 p.m.

D:

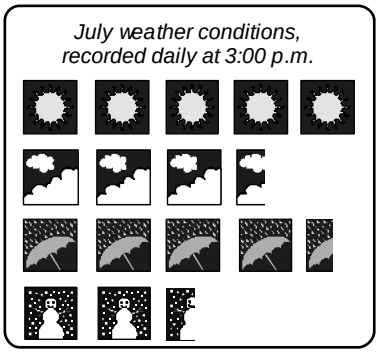
1. Number of cats and dogs living in one street.
2. 16 cats
3. 10 dogs

E:

1. Key: 1 picture = 2 days

sunny = 
raining = 
cloudy = 
snowing = 

2.



Worksheet 3

A:

1. 1401 2. 1541 3. 1188 4. 80 5. 2.5L 6. $3.10 7. 25 past 9 8. $0.40 9. 3000g 10. $5.85

B:

1. 42, 46, 47, 40, 58, 51, 56, 54, 53, 54, 66, 64, 60, 61, 67, 79, 74, 73
2. 105, 104, 103, 105, 119, 113, 114, 116, 117, 111, 122, 124, 120
3. 8, 7, 9, 6, 13, 14, 15, 16, 17, 19, 20, 22, 25, 33, 34, 35, 39, 37

C:

1.

Room 7's test results

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

Room 8's test results

0	7, 6, 7, 9
1	1, 3, 4, 7, 4, 4
2	0, 0, 2, 1, 4

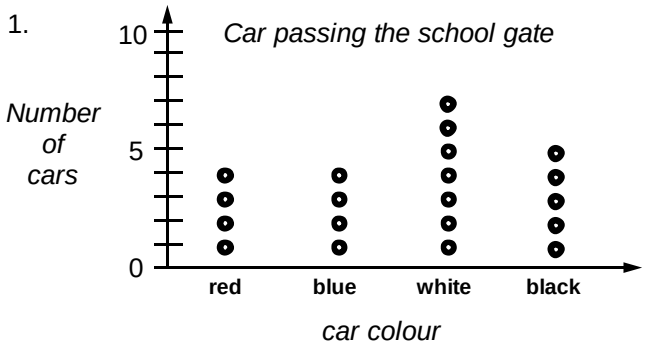
2. Room 7: H =25 & L = 8, Room 8: H = 24 & L = 6

D:

1. Sam's spelling test results for one week 2. 7 words 3. Thursday

E:

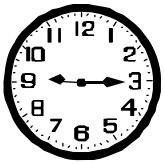
1.



2. 20 cars

Worksheet 4

A:

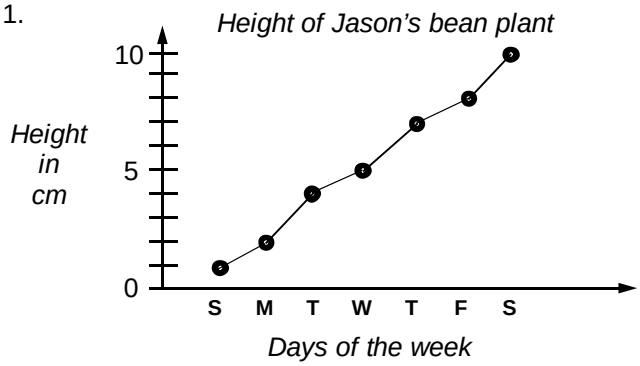
1. 1122 2. 414 3. 1804 4. 500 5. 5m 6. $50.40 7.  8. $3.10 9. 4.5L 10. $4.80

B:

1. Thursday 2. 6°C 3. Friday, as the temperature was 0°C at 7:00 a.m.

C:

1.



2. Height of Jason's bean plant

D:

1. Drinks pupils had at afternoon tea 2. 15 pupils 3. 5 pupils 4. 10 pupils

E:

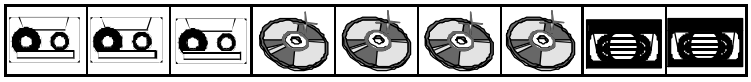
1. 36 items 2. 4 items

3. Key: 1 square = 4 items

tapes = 

CD's = 

videos = 

4. 

5. Items sold on Saturday

Worksheet 5

A:

1. 61.3 2. 8.41 3. 3140 4. 40 5. 150cm 6. $0.80 7. 25 to 10 8. $2.25 9. 5000mg 10. $2.30

B:

1. mean 2. median 3. mode 4. range

C:

1. 8 2. 7 3. 4 4. 3 5. 11 6. 50

D:

1. 8 2. 9 3. 9 4. 16 5. 2, 3, 6, 7, 9 median = 6 6. 1, 3, 5, 7, 9, 10 median = 6

E:

1. 2 2. 5 & 6 3. no mode 4. 3, 4 & 6 5. 3 & 6 6. 7

F:

1. 10 2. 15 3. 18 4. 24 5. 64 6. 37 7. $11170 8. $15500

G:

1. 6 2. 5 3. 5 4. 4, 5, 5, 5, 5, 6, 7, 8, 9 5. 6
6. 3, 4, 4, 5, 5, 5, 5, 5, 5, 6, 6, 6, 7, 7, 8, 8, 8, 9 new median = 5½

Worksheet 6

A:

1. 5.83 2. 8.5 3. 2025 4. 3.1 5. 5m 6. $73.35 7.  8. $5.10 9. 2300L 10. $1.30

B:

Possible comments:
12 girls chose cats, 6 boys chose cats, 10 girls chose dogs, 12 boys chose dogs, more boys than girls chose dogs, more girls than boys chose cats, there are 40 pupils in these two classes, etc.

C:

1. Simon's batting scores: mean = 15 runs, median = 11, no mode, range = 28
   Mark's batting scores: mean = 17.5 runs, median = 17, no mode, range = 26

Mark has a better mean and median, therefore Mark was the better batsman.

D:

Possible comments:
The furtherest throw was 63m, the shortest throw was 26m, the median was 41m, the range was 37m, there was no mode, the mean was 42m

E:

Rebecca's daily results were 9, 10, 9, 8 & 9, with a mean of 9, a median of 9, a mode of 9 and range was 2.
Wendy's daily results were 7, 6, 10, 7, 10, with a mean of 8, a median of 7, a mode of 10 and range of 4.
While Wendy scored two 10 out of 10 scores, Rebecca's results were more consistent, with a better mean, median and range. Wendy's statement is incorrect.

Worksheet 7

A:

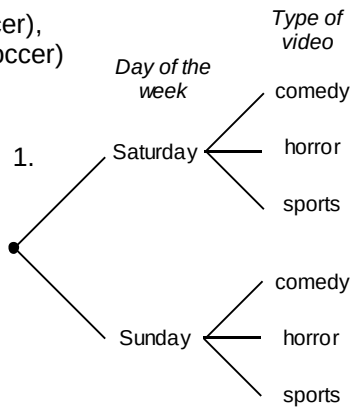
1. 23.23 2. 7.25 3. 7920 4. 200 5. 5.26m 6. $45.20 7. 10 to 5 8. $1.20 9. 2.5g 10. $52.50

B:

1. (cricket, rugby), (cricket, hockey), (cricket, soccer), (softball, rugby), (softball, hockey), (softball, soccer)
2. 6 outcomes

C:

1.



2. 6 choices

D:

1. (blue socks, sports shoes), (blue socks, leather shoes), (blue socks, canvas shoes), (red socks, sports shoes), (red socks, leather shoes), (red socks, canvas shoes), (black socks, sports shoes), (black socks, leather shoes), (black socks, canvas shoes)
2. 9 combinations

E:

1. Let S = St Albans School and M = Mairehau School
   Let Mo = Monday, Tu = Tuesday, Th = Thursday and Fr = Friday

	Monday	Tuesday	Thursday	Friday
St Albans	S/Mo	S/Tu	S/Th	S/F
Mairehau	M/Mo	M/Tu	M/Th	M/F

2. 8 possible outcomes or combinations

Worksheet 8

A:

1. 28.25 2. 7.6 3. 17220 4. 1500 5. 2300mm 6. $62.70 7.  8. $9.30 9. 2.7kg 10. $2.95

B:

1. unlikely 2. possible, likely or certain 3. certain 4. possible but unlikely 5. certain or impossible
6. C, B, A, E, D

C:

1. 40 milkshakes 2. 15 out of 40 3. vanilla 4. 16 banana milkshakes
5.

Weather	Tally	Total
hot	~~IIII~~ IIII	9
warm	~~IIII~~ II	7
cool	~~IIII~~	5
cold	~~IIII~~ IIII	9

6. 30 days 7. 9 out of 30 8. cool weather

D:

1. **1** = 7, **2** = 6, **3** = 8, **4** = 6, **5** = 5, **6** = 8 2. 6 out of 40 3. zero out 40

Tracking Sheet: ‘In-class’ Activity Sheets

Worksheet	Objectives	Comments														
20	S2 / S6															
19	S5															
18	S5															
17	S5															
16	S3 / S4															
15	S3 / S4															
14	S3 / S4															
13	S3 / S4															
12	S3 / S4															
11	S3 / S4															
10	S3															
9	S3 / S4															
8	S2 / S3															
7	S2															
6	S2 / S3															
5	S2 / S3															
4	S2															
3	S2															
2	S2															
1	S1															
Statistics	Name															

Tracking Sheet: Homework / Assessment Worksheets

Statistics

Worksheet	Objectives	Name														Comments
8	S2 / S6															
7	S5															
6	S3 / S3															
5	S2															
4	S2															
3	S2															
2	S2															
1	S1 / S2															