Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use the language associated with probability to discuss events, including those with equally likely outcomes	

As outcomes, Year 5 pupils should, for example:	**As outcomes, Year 6 pupils should, for example:**

Use, read and write, spelling correctly:
fair, unfair…
likely, unlikely, likelihood…
certain, uncertain...
probable, possible, impossible…
chance, good chance, poor chance, no chance…
risk, doubt…

Use cross-curricular opportunities to discuss events which have a good chance of happening and those which have a poor chance. For example:

• Discuss statements like:
  I doubt whether I will catch the 4 o'clock bus.
  Snakes and Ladders is not a fair game – the first player has the best chance of winning.
  There is little risk of catching measles these days.

• Match one of these words to each of the statements below:

  CERTAIN   LIKELY   UNLIKELY   IMPOSSIBLE

  a. I will watch television tonight.
  b. It will snow next Christmas.
  c. I will grow taller than my mother.
  d. It will get dark tonight.
  e. I will see Queen Victoria on my way home.

  Place the statements on this scale:
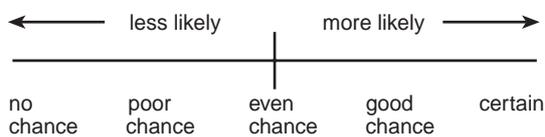
Use, read and write, spelling correctly, the vocabulary from the previous year, and extend to:
equally likely…
equal chance, even chance, fifty-fifty chance...
biased, random…

Discuss events which might have two equally likely outcomes. For example:

• a new baby is equally likely to be a boy or a girl;
• if I drop a picture postcard there is an even chance it will land picture side up;
• if I roll a dice I am just as likely to roll an even number as an odd number…

Discuss events with two or more equally likely outcomes. For example:

• Consider a 1 to 6 dice.
  What is the probability of:
  a. rolling a 4;
  b. rolling an even number;
  c. rolling a number greater than 2;
  d. rolling zero;
  e. rolling a number lying between 0 and 7?

  Place each probability on this scale.
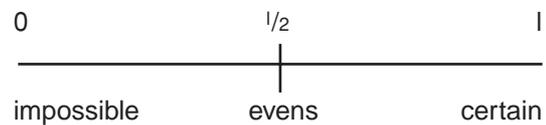
Discuss the difference between the theory of outcomes and the actual, experimental results. For example:

• Discuss outcomes when a coin is tossed.

  How many heads and how many tails might turn up if a coin is tossed 10 times, 20 times, 30 times...?

  Work in pairs and record results on squared paper. In 20 tosses, did heads and tails each come up 10 times? What happens when you combine your results with another pair?

  Discuss whether the results would be the same if the experiment were repeated.

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Solve a problem by collecting, organising, representing, extracting and interpreting data in tables, graphs and charts	Use, read and write: *vote, survey, questionnaire, data, count, tally, sort, set, represent… table, list, graph, chart, diagram, axes, label, title… most common or popular…*

Find the answer to a question by collecting data quickly then making a **tally chart**. For example:

Do many children get measles nowadays?

Find out by asking at home who has had German measles, chicken pox, mumps, flu… Make a tally chart. Discuss the findings, such as the risk of catching measles, or flu.

ILLNESSES

German measles	₩₩ ///
Mumps	///
Chicken pox	₩₩ ₩₩
Flu	₩₩ ₩₩ ///
Measles	/

Find the answer to a question by using data collected in another subject or at home. Make a **pictogram, where the symbol represents several units**. For example:

It is said that thrushes are becoming less common. Are there any around our school?

Discuss the findings. For example:

- How many thrushes?
- How many more sparrows than thrushes?
- How many birds altogether?
- Were there many thrushes compared with other birds? Why might this be?
- How might more accurate data be collected?

Number of birds visiting the bird table during 15 minutes on a Friday in May

blackbird

blue tit

thrush

sparrow

represents 5 birds
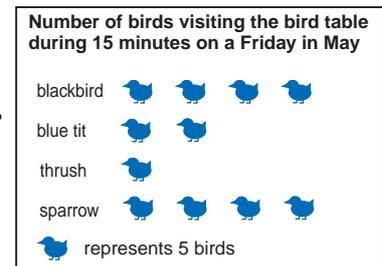
Answer a question or solve a problem by interpreting a **bar chart** with the vertical axis marked in multiples of 2, 5, 10 or 20, noting that the graph has a title, and axes are labelled. For example:

At what time of day do most people use the local bus?

Number of people on each bus on Friday
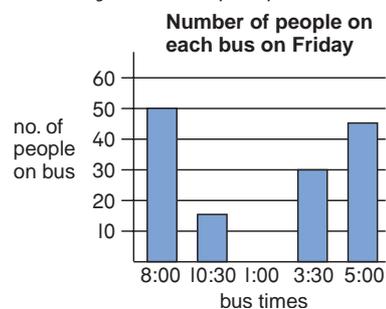
- 25 people were on the 1:00 bus. Draw in the bar.
- On a Friday, which bus is most likely to be full?
- Which bus had the fewest people on it? Why?
- What might the graph for Saturday look like?
- How often do the buses run? Do you think that the bus timetable should change? How and why?

As outcomes, Year 5 pupils should, for example:	As outcomes, Year 6 pupils should, for example:

Use, read and write, spelling correctly, the vocabulary from the previous year, and extend to:
classify, mode, maximum/minimum value, range… outcome…

Test a hypothesis about the frequency of an event by collecting data quickly: for example, from a simple experiment, a local newspaper, a reference book, work in other subjects… Discuss a **bar chart** or **bar line chart** showing the frequency of the event and check the prediction. For example:

We think Rovers scored more than 3 goals in a quarter of their matches last season.

Goals scored by Rovers
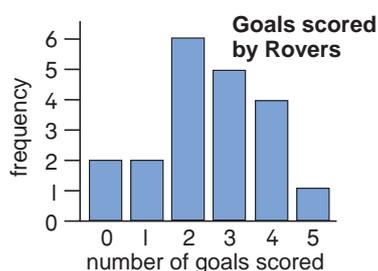
This **bar chart** shows the number of goals scored by Rovers in last season's matches. Discuss questions like:
* How many matches in total did Rovers play?
* What was the maximum number of goals Rovers scored in a match?
* In how many of their matches did Rovers score more than 3 goals?
* What was the most common number of goals (mode)?
* How likely are Rovers to score 7 goals in a match when they play in the same league this season?

You are more likely to throw a 6 on a dice than any other number. Is this true?

Scores on a dice rolled 50 times
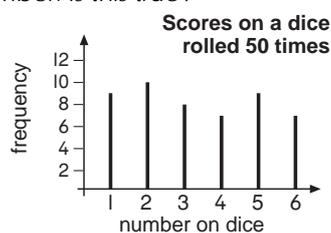
This **bar line chart** shows how many times each number was thrown when a dice was rolled 50 times. Discuss questions such as:
* Which number was rolled most often?
* Was this what you would have expected? Why?
* Do you think the next time you roll the dice you are more likely to roll a 2 than a 6? Why?
* What do you think will happen if you roll the dice 50 more times? Now try it and see.

Know that it is not appropriate to join the tops of the bars when the values in-between have no meaning: for example, a dice does not show the number 2.5.


Use, read and write, spelling correctly, the vocabulary from the previous year, and extend to:
statistics, average, distribution… median, mean…

Test a hypothesis by drawing and discussing a **bar chart where (discrete) data are grouped**: for example, to check predictions of the most common number of:
* lengths that will be swum in a sponsored swim;
* peas in a pod;
* scores in a tables test…

We think that most of the class will get more than 30 marks in the test.

Marks in test taken by Class 5 and Class 6
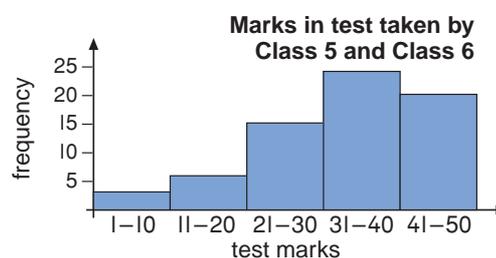
Discuss questions such as:
* What was the most common score in the test?
* How many children took the test? Estimate how many of them got fewer than half marks.
* The children who took the tables test practise recalling their tables each day for a week.
  They then take the same test again.
  Sketch a graph showing how you think the marks in the second test will be distributed.

Know that for grouped discrete data the bars may be labelled with the range that they represent but not the divisions between the bars.

Begin to interpret **simple pie charts**, such as those showing the data in a computer database.

Ages of the population of Ham village

- 60 or over
- Between 16 and 60
- 16 or under
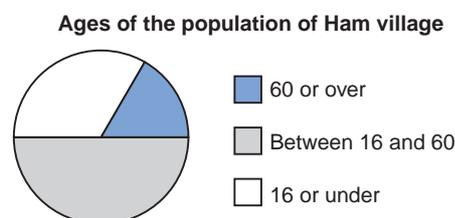
Answer questions such as:
* What fraction (percentage) of the population of Ham is 16 or under? 60 or over?
* Why do you think there are more people aged 16 or under than aged 60 or over living in Ham?

**Solve a problem by collecting, organising, representing, extracting and interpreting data in tables, graphs and charts (continued)**

Use **sorting diagrams** such as two-way Venn and Carroll diagrams to display information about shapes or numbers.

For example:

• This **Venn diagram** records how some number cards were sorted.

numbers with 3 tens   even numbers
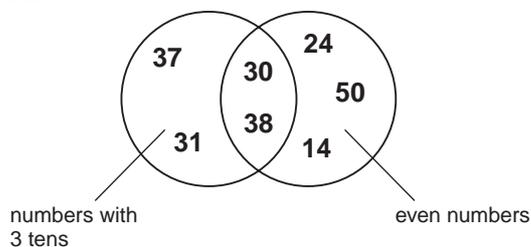
Put these numbers on the diagram: 8, 33, 36, 41.
Choose some other numbers. Add them to the diagram.

• This **Carroll diagram** records how some of the whole numbers from 20 to 39 were sorted.

	odd	not odd (even)
numbers that have 3 tens	37 31	38 30
numbers that do not have 3 tens	23 25	26 20

Add these numbers to the diagram: 24, 35.

As outcomes, Year 5 pupils should, for example:	As outcomes, Year 6 pupils should, for example:

Develop understanding of the **mode** (most common item) and the range (difference between greatest and least) of a set of data.

Test a prediction such as:
Most of our class will get 9 out of 10 questions right in a mental test and 8 out of 10 right in a spelling test.

Discuss questions like:
• How can we find out if this is true?
• What information shall we collect?
• How shall we organise it?

Make a simple **database on paper**. For example:

Scores for 10 spelling and 10 mental answers

| Name	Mental test score	Spelling test score
Danny	8	9
Elizabeth	10	7
Anil	7	9

Find the most common score in each test (mode). Put the scores for one of the tests in order to find the maximum and minimum score, and the difference between them (range). Repeat for the other test. Discuss outcomes, and the extent to which the prediction was true.

Draw and interpret a **line graph**. Understand that intermediate points may or may not have meaning. For example:

• In science, investigate room temperature. For example, use an IT sensor to collect, store and retrieve room temperature in a classroom. (Points in the resulting graph are joined to show trends.)

Room temperature on 19 May
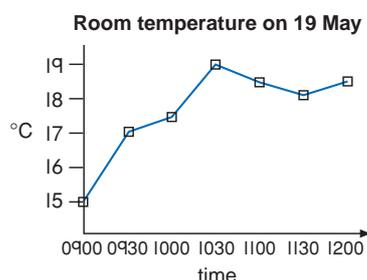
• This graph shows the level of water in a rain barrel during the month of April. Explain it by describing the pattern of rainfall throughout the month.

Level of water during April
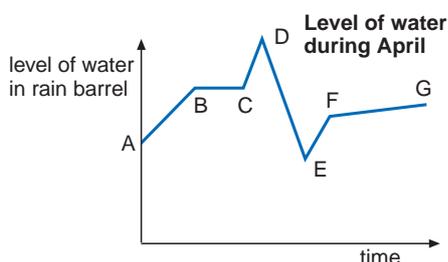
Find the **mode** and range of a simple set of data in a computer database. Begin to find the **mean** and **median**.

For example, make a simple **computer database**. Transfer the results of a spelling test and a mental test to it and then use its facilities to find out, for example:

• Who scored more than 7?
• What were the frequencies of scores of 10, 9, 8…?
• What was the most common score (the mode)?
• What was the difference between the greatest and least scores (the range)?
• What was the middle score (the median)?
• What was the mean score (the sum of all the scores divided by the total number of scores)?

In other subjects, test hypotheses by interrogating data in a **prepared computer database**, such as census data or data on road safety. For example:

Do people live longer today than 100 years ago?
*Do most accidents occur when it is dark?*

Use the facilities of the database to compare and contrast the presentation of data in different charts or graphs, deciding which is best for its purpose. Discuss the efficiency of a computer database compared with searching and sorting a paper database.

Begin to draw and interpret a **line graph, in which intermediate values have meaning**. For example:

• This road sign is in miles. Use the conversion graph to rewrite the road sign in kilometres.

Darlington	15
Durham	35
Newcastle	45
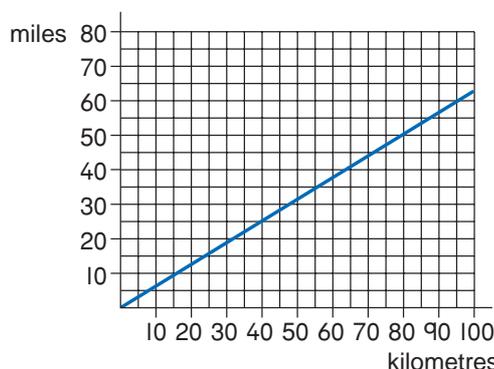
• The tourist rate for South Korea is 2000 won to £1. Construct a graph to convert pounds to won. Use the graph to find out what you get when you exchange:
£5,   £8.50,   9000 won,   13 125 won.

• Draw and use a '3 times-table' graph.