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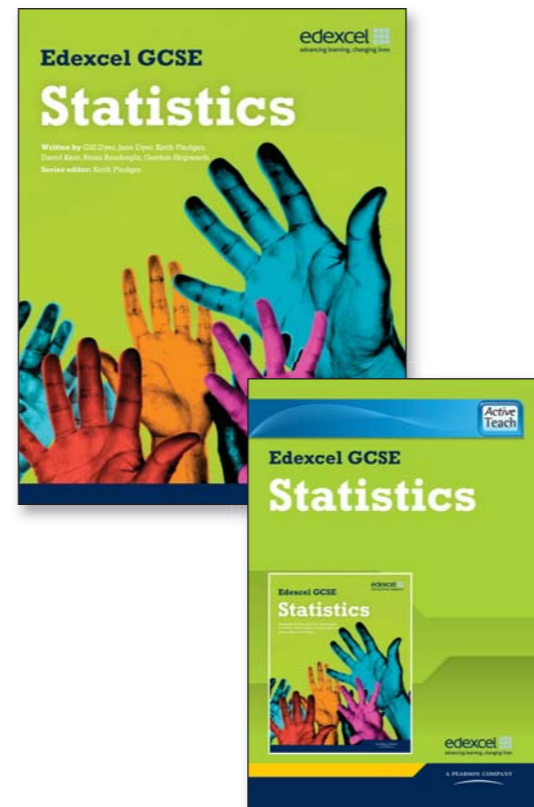
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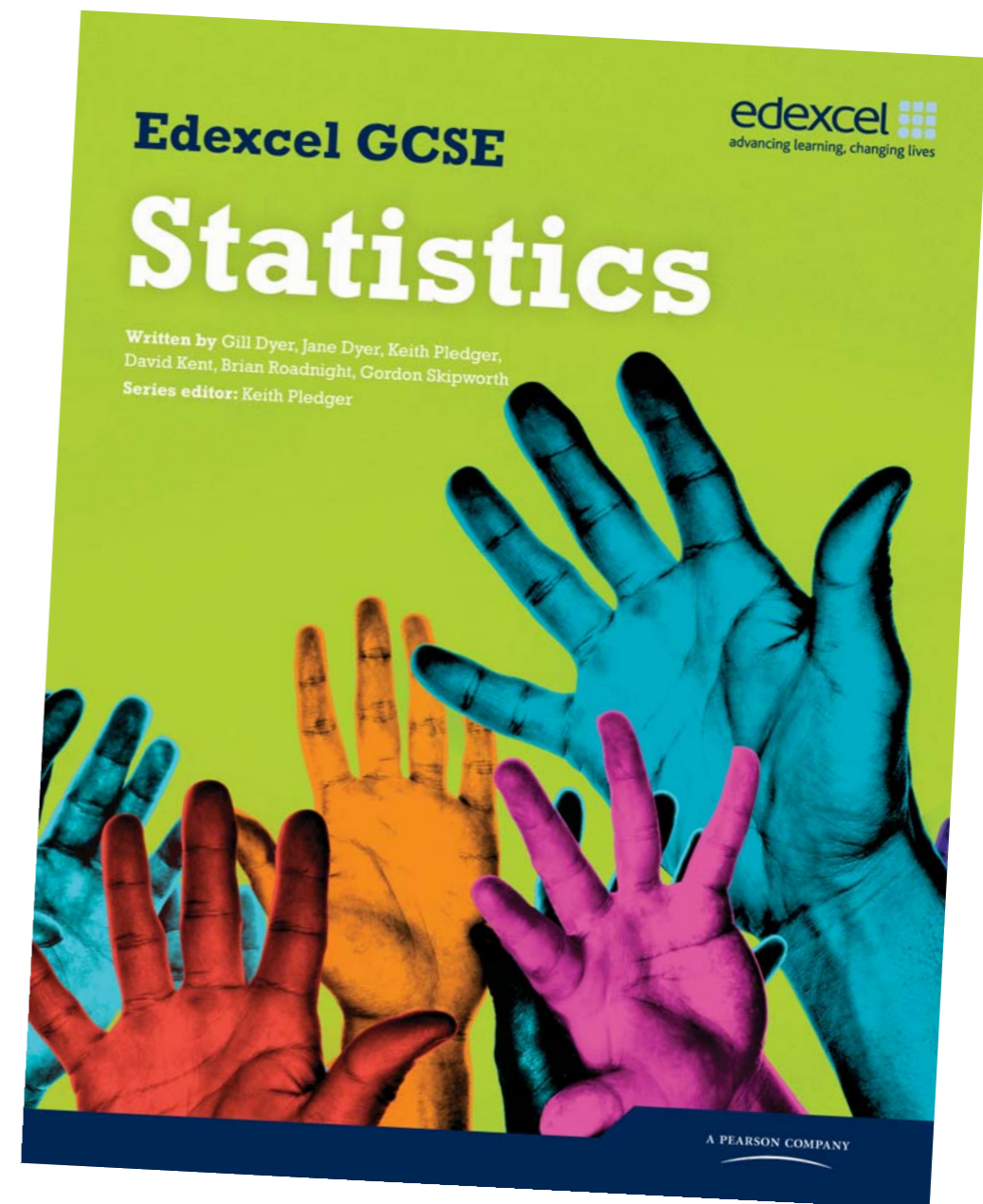
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Edexcel GCSE Statistics

Our own resources for the new GCSE 2009 Statistics specification



Our new GCSE Statistics specification

- Coursework replaced by controlled assessment
- Complementary to GCSE Maths specification
- Developed in consultation with teachers
- Core content has been retained

Our own resources for our new specification

To support your move to the new specification, we are publishing our own dedicated suite of resources for the new GCSE 2009 Statistics qualification. Tailored to the new specification and building on the free material already provided, our own resources are written by Edexcel Chief Examiners to ensure you have all the support you need to deliver the new GCSE Statistics specification with confidence.

- ✓ **Raises attainment**
- ✓ **Motivates students**
- ✓ **Provides complete planning and teaching support**

Raises attainment

We've combined **ResultsPlus** exam performance data with useful examiner insight to give more tips and guidance on achieving exam success.

Along with **examzone** – our revision and exam preparation feature – students now have all the support they need to succeed.

Motivates students

Engaging, motivating lessons are made easy using dynamic ActiveTeach technology. This powerful, market-leading software gives you access to a wide range of resources at your fingertips – great for whole-class teaching.

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Following the clear structure of the specification, the *ActiveTeach CD-ROM* provides everything you need to plan and deliver your lessons, in one place.

With Schemes of Work, lesson plans, unparalleled support for controlled assessment and a range of teaching resources, you have everything you need to plan with confidence.

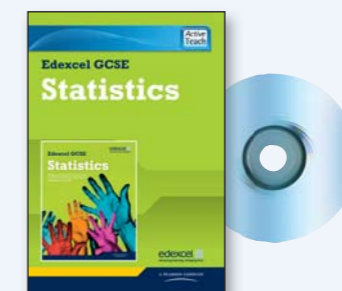
Course Structure

Student Book (see pages 4 and 5)



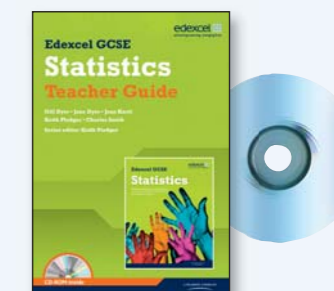
- Clear explanations
- Lots of practice questions
- Past exam papers, one for Foundation and one for the Higher tier
- Review exercise at the end of each chapter, with level of demand clearly shown for each question
- Chapter summaries with 'Test yourself' questions
- **examzone** – for revision and exam preparation – in the *Student Book* and on *ActiveTeach*

ActiveTeach CD-ROM (see pages 6 and 7)



- *Student Book* and *Teacher Guide* on disc to view on screen
- PowerPoint presentations linked to lesson plans
- Revision exercises to consolidate learning on groups of topics
- Write-on versions of past exam paper questions
- Games and quizzes
- ICT section - tutorials on using ICT for drawing graphs, charts etc., plus demonstration videos and worksheets for practice
- **ResultsPlus** (see page 10)
- **examzone** (see pages 10 and 11) including two extra exam practice papers (one Foundation and one Higher)
- Glossary

Teacher Guide with CD-ROM (see pages 8 and 9)



- Lesson plans
- Worksheets
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Everything a student needs to ensure exam success

- Written by Chief examiners and experienced teachers.
- Revised and enhanced following user feedback on the 2001 Heinemann edition.
- Practice exam papers for foundation and higher, exactly matched to the new specification.
- examzone** section gives tips, tests and techniques for exam preparation and the new controlled assessment. (see pages 10 and 11 for more details)

Chapter 6: Time series

Objectives listed for each chapter.

After completing this chapter you should be able to

- draw line graphs
- plot points as a time series graph
- draw a trend line by eye
- use a trend line to make a prediction
- calculate and plot appropriate moving averages
- identify seasonal variations by eye
- work out mean seasonal variations
- draw a trend line based on moving averages
- recognise seasonal effects at a given point and mean seasonal effect
- interpret time series graphs

6.1 Line graphs

Graphs that look like this are often shown in magazines and newspapers.

This is an example of a **line graph**.

No reliable information can be found from the graph for values lying between the points plotted. For example, on this graph, there could be a tea break at 11.30 reducing the production to zero for a short time.

A straight, dotted line is therefore used to join the points.

A line graph is used to display data when the two variables are not related by an equation and it is uncertain what happens between the plotted points.

It is important to choose scales that fit the graph paper being used when plotting a graph.

Example 1

This table shows the monthly rainfall at a seaside town last year.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (cm)	18	21	12	16	11	9	6	10	7	15	18	23

Plot these data on a line graph and comment on it.

Choose a suitable scale for each axis and label them clearly. Plot the points given in the table. Join the points with a dotted line.

Look to see the highest and lowest values and if there is any pattern.

Edexcel Examiner's Tip
The trend line often needs to be extended beyond the plotted values in order to make a prediction.

ResultsPlus Build Better Answers

Question: The time series graph shows the values, to the nearest £1000 million of the Total Exports from the United Kingdom between 1997 and 2003.

Basic 1-2 marks
Draw a trend line on the graph by eye, using a ruler placed so that the areas of the graph enclosed either side of the ruler are equal. Describe the trend, 'rising' and refer back to the context of the problem, for example, 'the trend was for Exports to rise between 1997 and 2003'.

Good 3-4 marks
Draw the trend line and describe what shows in parts a) and b). In part c) make sure your trend line extends to 2004 and read off the predicted value. In part e) identify that the figure does not follow the overall trend.

Excellent 5-6 marks
Complete parts a) to c) accurately. In part d) comment that predicting into the future is inaccurate, as the past does not necessarily affect the future. You could use the word 'extrapolation', which means extending the trend line outside the plotted values to make predictions. In part e) identify that the figure does not follow the overall trend and for full marks explain why (is it higher or lower than expected?).

Higher tier topics are clearly indicated.

Examiners' tips and comments.

ResultsPlus Build Better Answers, based on past exam data and examiners' reports.

Clear explanations and worked examples.

Sample pages* from Edexcel GCSE Statistics

*This is a sample page and is subject to final approval.

Chapter summary with 'Test yourself' – for revision and for students to check their progress.

Chapter 1 summary

Data

- Statistics** are ways to answer questions using information. The information has to be observed or collected, ordered, represented and then analysed.
- A **hypothesis** is an assumption made as a starting point for an investigation. It may or may not be true.
- Quantitative variables** are numerical observations or measurements. **Qualitative variables** are non-numerical observations.
- Continuous data** can take any value on a continuous numerical scale. **Discrete data** can only take particular values on a continuous numerical scale.
- A set of data is **categorical** if values or observations belonging to it can be sorted into different categories.
- Ranked data** has values/observations that can be ranked (put in order) or have a rating scale attached. Ranked data can be counted and ordered, but not measured.
- Bivariate data** are pairs of related variables.
- A measurement given correct to the nearest whole unit can be inaccurate by up to $\pm \frac{1}{2}$ unit.

Sampling

- A **population** is everything or everybody that could possibly be involved in an investigation.
- Census data** contains information about every member of the population.
- A **sample** contains information about only some members of the population. The **sampling frame** is a list of all the members of the population.
- A **random sample** is chosen from the population at random.
- Primary data** is collected by the investigator. **Secondary data** has been collected by someone else.

Surveys

- A **survey** is the collection of information about a particular issue.
- A **pilot survey** is conducted on a small group of people to test the survey.
- A **questionnaire** is a set of questions to be answered by the respondents.
- An **open question** is one that allows the respondent to give any answer.
- A **closed question** has a set of possible answers.

Chapter 1: Collecting data

Test yourself

- continuous discrete quantitative qualitative primary secondary
Which of the above words can be used to describe the following data?
a Height b Colour
c Number of aunts d Time
e Census information on a website f A tally you make of car types.
- Give **two** advantages and **two** disadvantages of using:
a primary data b secondary data.
- Describe briefly the meaning of:
a population b census.
- Write **two** advantages of using a sample rather than a census.
- What is the name given to a sample that allows everyone or everything to have an equal chance of selection?
- Is this a closed or an open question?
"What do you think about the new hall?"
Give a reason for your answer.
- Explain **two** ways of selecting a set of random numbers.
- Write **two** advantages of using a pilot survey.
- Explain what is meant by a 'control group'.
- Write the name of the sampling method for each of these.
a Maeve forms her sample by picking boys and girls from her class in proportion to the numbers of boys and girls.
b Jack has a list of 50 students. He uses every 5th student to form a sample.

Chapter 4: Summarising data: measures of central tendency and dispersion

10 The table gives information about the mean price, to the nearest £1000, of terraced houses in the East Midlands in 1997 and in 2000.

Year	1997	2000
Price (£)	70 000	86 000

Source: Nationwide

- Using 1997 as the base year, work out the index number for the mean price of terraced houses in the East Midlands in 2000. Give your answer to the nearest whole number.
- Using 1997 as the base year, the index number of the mean price of terraced houses for 2003 was 214.
 - By what percentage has the mean price of terraced houses changed between 1997 and 2003?
 - Work out the mean price of terraced houses in 2003.

11 John just passed his examination, scoring 52%. He sat three papers which were weighted 40% : 40% : 20%. His marks were 48, 50 and x. Work out x.

12 The price of a camera in 2008 was £320 and in 2009 it was £350.
a Find the simple index number for the value of the camera in 2009 based on the year 2008.
In 2009 the simple index number for a particular laptop was 96. The base year was 2008.
b Work out the percentage change in the price of the laptop between 2008 and 2009.

13 The value of a motorbike is given in this table.

Age in years	0	1	2	3	4
Value	£12 000	£10 050	£8400	£6800	£5100

Find the chain base index numbers for each year.

14 Calculate the mean and standard deviation for the variable x given that $\Sigma x^2 = 3000$, $\Sigma x = 240$, $n = 20$.

Sample pages* from Edexcel GCSE Statistics

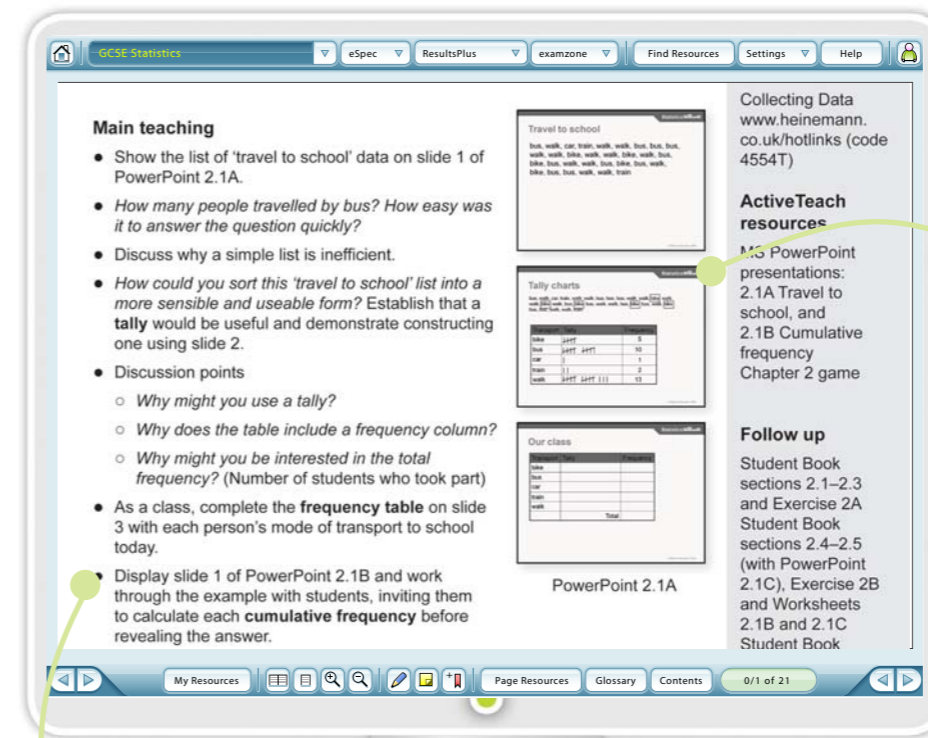
Review exercise at the end of each chapter, with challenge level shown for each question.

Lots of past exam questions.

A wealth of digital resources at your fingertips!



- Motivate your students using our unique ActiveTeach technology.
- Interactive versions of the *Student Book* and *Teacher Guide* let you zoom into any part of the page to focus attention – great for whole-class teaching.
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- ICT section containing tutorials, demonstration videos and practice worksheets on drawing graphs and charts using Excel and Autograph
- Interactive **examzone** and **ResultsPlus** features ensure exam success.
- Revision exercises to consolidate learning on groups of topics.

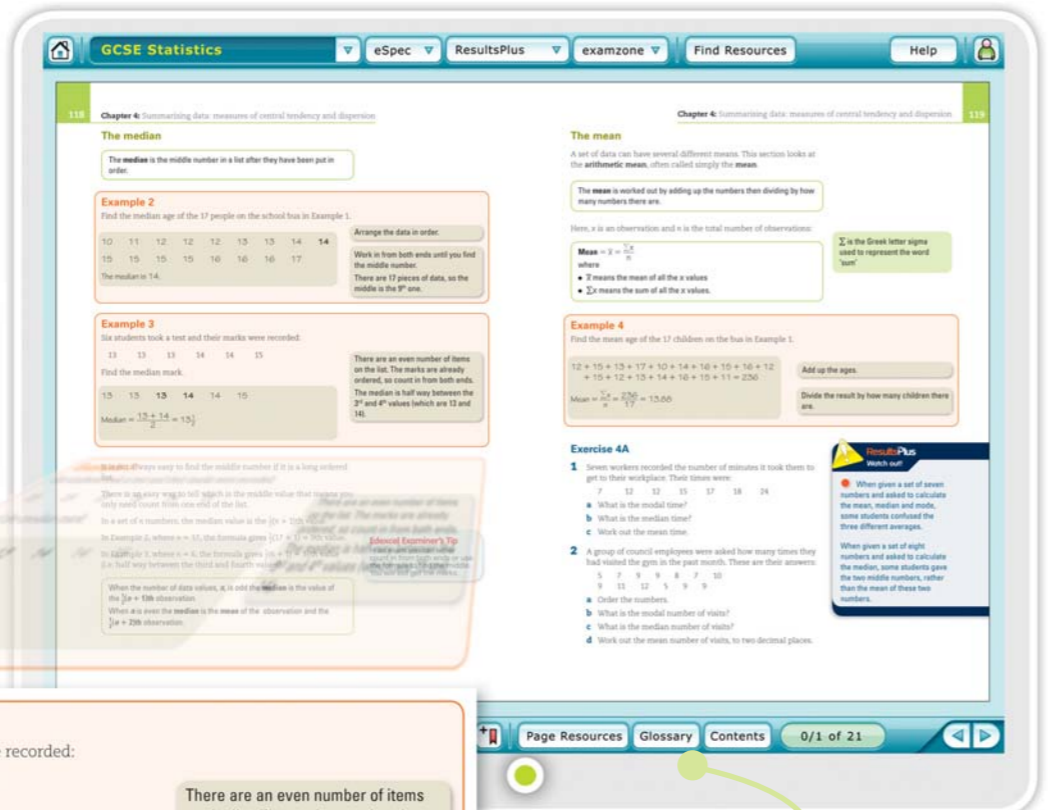


PowerPoint presentations allow you to plot and discuss graphs and key concepts one step at a time.

Lesson plans linked to topics in the Student Book, all in one place for easy planning.

Sample screen* from Edexcel GCSE Statistics: ActiveTeach

Interactive version of the Student Book that lets you zoom in to any part of the page.



Example 3

Six students took a test and their marks were recorded:

13 13 13 14 14 15

Find the median mark.

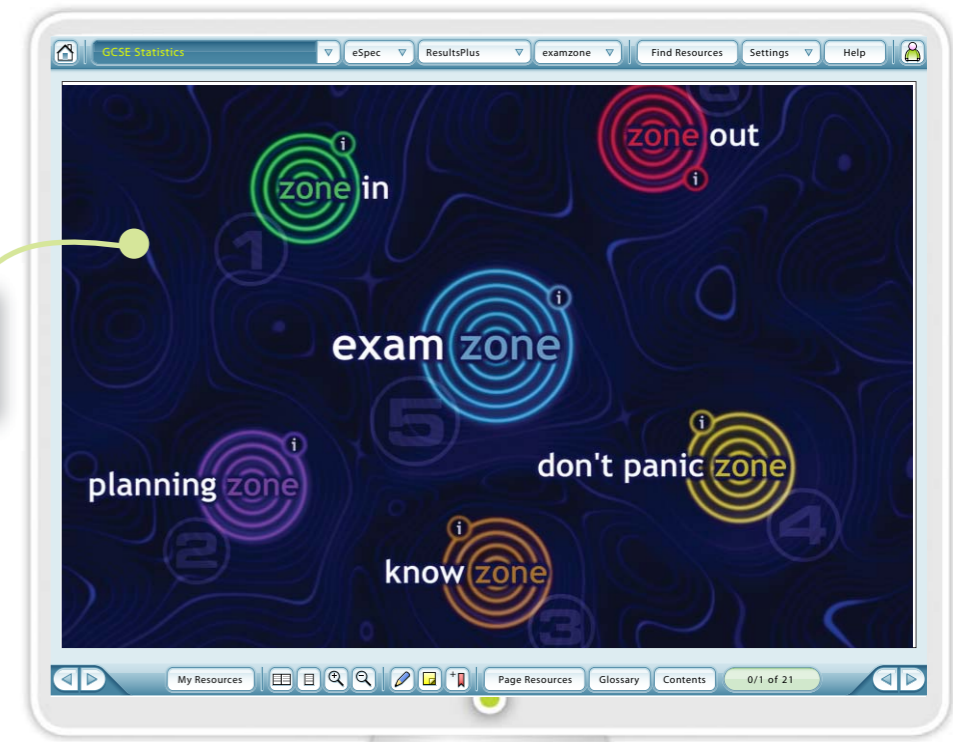
13 13 13 14 14 15

Median = $\frac{13 + 14}{2} = 13\frac{1}{2}$

There are an even number of items on the list. The marks are already ordered, so count in from both ends. The median is half way between the 3rd and 4th values (which are 13 and 14).

Glossary of key terms.

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Interactive examzone supports students' revision and exam preparation.

Sample screen* from Edexcel GCSE Statistics: ActiveTeach

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Exceptional teacher support

- Straightforward, easy-to-follow lesson plans support your teaching.
- Includes worksheets and Schemes of Work.
- End of chapter tests are provided to monitor progression.
- All available as editable Word files on the CD-ROM.

Designed for skim reading to save you time.

2.1 Tally charts and frequency tables

Objectives

- Tally raw data using a standard tally chart
- Construct frequency tables

Key words

Tally chart
Frequency table
Cumulative frequency

Starter

Ask each student how they travelled to school and record the data as a list on the board.

Main teaching

- Show the list of 'travel to school' data on slide 1 of PowerPoint 2.1A.
- How many people travelled by bus? How easy was it to answer the question quickly?
- Discuss why a simple list is inefficient.
- How could you sort this 'travel to school' list into a more sensible and useable form? Establish that a tally would be useful and demonstrate constructing one using slide 2.
- Discussion points
 - Why might you use a tally?
 - Why does the table include a frequency column?
 - Why might you be interested in the total frequency? (Number of students who took part)
- As a class, complete the frequency table on slide 3 with each person's mode of transport to school today.
- Display slide 1 of PowerPoint 2.1B and work through the example with students, inviting them to calculate each cumulative frequency before revealing the answer.
- Tell students they will be working in pairs to construct a data collection sheet to record numbers of brothers and sisters.
- Collect data from the whole class with students using their own data collection sheets.
- Students then complete a cumulative frequency table.
- What information can the cumulative frequency table give which is not easily seen using the frequency table?

Links

Collecting Data
www.heinemann.co.uk/hotlinks (code 4554T)

ActiveTeach resources

MS PowerPoint presentations: 2.1A Travel to school, and 2.1B Cumulative frequency Chapter 2 game

Follow up

Student Book sections 2.1–2.3 and Exercise 2A Student Book sections 2.4–2.5 (with PowerPoint 2.1C), Exercise 2B and Worksheets 2.1B and 2.1C Student Book section 2.6 and Exercise 2C

Extra practice

Worksheet 2.1A (answers on page 160)

Student Book

Sections 2.1–2.6

15

PowerPoint 2.1C Two-way tables

Two-way tables

Sometimes data is collected about two related categories.

For instance, observe pairs of people sitting in a café that has tables with four seats.

- Do they sit opposite each other?
- Or do they sit next to each other?
- Do they chat to each other?
- Or are they silent?

Two-way tables

There are two categories:

- opposite/next to each other
- chatting/not chatting

The frequency with which each of the four combinations occur can be shown using a two-way table.

	Chatting	Silent	Total
Opposite	6	9	15
Next to each other	12	3	15
Total	18	12	30

Two-way tables

You can see from the two-way table that:

- There are 30 tables.
- There were 18 tables with people chatting and 12 tables with people who were silent.
- 15 tables had people sitting opposite. Of these, 6 had people chatting and 9 had people who were silent.
- 15 tables had people sitting next to each other. Of these, 12 had people chatting and 3 had people who were silent.

Suggested links and follow-up work.

Linked to PowerPoint presentations on ActiveTeach.

Sample pages* from Edexcel GCSE Statistics Teacher Guide

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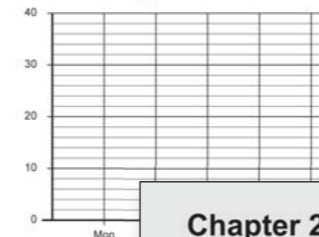
Quick Test 2A

- Which diagram can be used to process raw data making it easier to spot patterns?
- Name two types of diagram that you can use to show how data are divided into categories.
- The lowest mark in the class is 2% the highest is 98% and the rest of the marks lie between these values. Suggest a suitable method of grouping the data in order to draw a frequency table.
- The table shows the number of boys and girls in Years 10 and 11 at a school.

	Year 10	Year 11	Total
Boys	56		104
Girls	63	54	117
Total	119		221

Copy and complete the table.

- A toy shop sells 23 games on Monday, 15 on Tuesday, 6 on Wednesday, 32 on Thursday and 24 on Friday. Draw a vertical line graph to show this information.



36

Quick test for each chapter to check students' understanding - or to be used for revision.

Worksheets for consolidation and practice.

Worksheet 2.1A Tally charts and frequency tables

- This list table below gives the ages of 24 children who attended auditions for a children's TV show.
5 6 7 9 8 8 6 8 7 6 8 8
9 7 6 8 7 5 8 9 8 8 7 6
Design and complete a frequency table for these data.
- This list shows the results of a survey to find out the types of pets owned by some children.
cat cat dog dog dog fish fish horse
bird cat dog dog fish fish fish rabbit
bird bird cat dog dog dog fish rabbit
bird cat cat dog fish horse rabbit
bird cat dog dog dog dog fish fish horse
a) Design and complete a frequency table for these data.
b) Write down the name of the pet that was most popular.
- The table shows the numbers of telephone calls received per hour by a call centre over a 24-hour period.

Student Book sections 2.1–2.3

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Chapter 2 Test Foundation

- The table shows the number of lessons people required before passing their driving test.

17	18	7	19	10	9	10	17	17	18
11	19	11	13	18	19	17	9	29	12
23	10	27	11	19	17	12	20	15	14

- Copy and complete the frequency table to show the number of lessons required to pass the test.

Number of lessons	Tally	Frequency
6–10		
11–15		
16–20		
21–25		
26–30		

- Write down the most common class. Draw a bar chart for these data.

(8)

- The table shows the number of free range eggs sold by a small poultry farmer in six months of a year.

Month	Number of eggs (dozens)
January	8
February	6
March	16
April	12
May	18
June	20

- Choose a sensible scale and draw a pictogram to display these data. Use an ellipse as the picture.

(4)

- A survey asked how many DVDs were owned by a group of people. The data collected are shown in the stem and leaf diagram.

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

Key 1 | 3 means 13

- Write down the number of people involved in the survey.
- Write down the least number of DVDs owned.
- Write down the most number of DVDs owned.
- Write down the number that occurred most often.

(4)

38

End of chapter test with exam-style questions for summative assessment.

43, 38, 24, 22, 35, 37, 28, 24, 15, 6, 3, 1
frequency table for these data. Use class
to your table.
the centre received less than 10 calls.
the centre received more than 20 calls.
awarded the following scores to competitors.
2.7 3.5 2.4 4.8 2.5
2.7 3.4 3.7 3.6 4.1
frequency table for these data.
9, 4–4 and so on.
to your table.
ers who scored more than 4.4.

17

ResultsPlus

ResultsPlus, our FREE online results service for teachers and students, provides valuable detailed feedback on students' exam results, helping raise attainment.

We have created unique **ResultsPlus** features in our resources by combining this genuine exam performance data with valuable examiner insight to ensure exam success.

The **ResultsPlus** features offer important guidance on achieving better results by highlighting where students have struggled or succeeded in the past, and how to build answers for maximum marks.

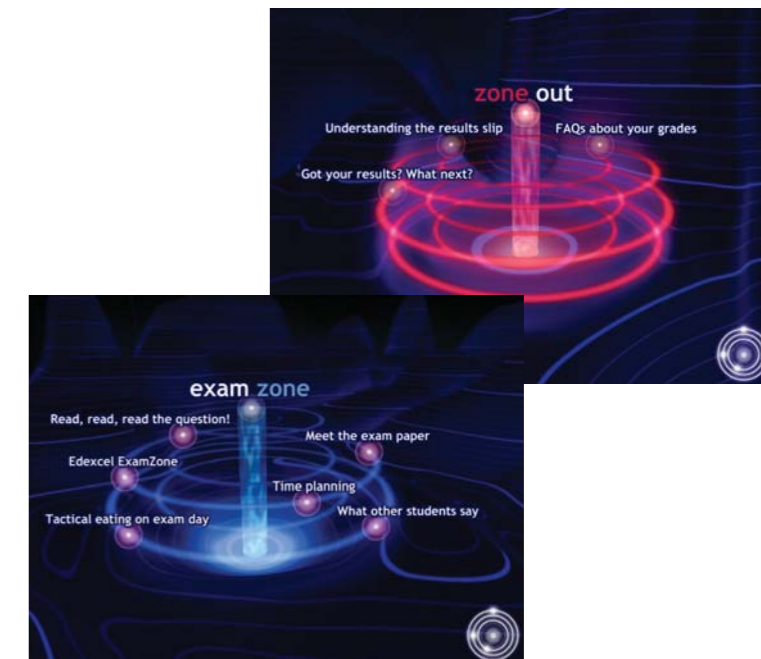


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examzone

Our dedicated suite of revision materials in the Student Book and ActiveTeach, coupled with useful revision lesson plans, help you support students to revise effectively for complete exam success. Each zone focuses revision on a particular area so you can customise your lessons to your students' needs.

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