AQA
Questions matter

STRIDE Maths

STRIDE INTO *THE FUTURE* OF ASSESSMENT

Teacher Companion Guide

Graphs

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Overview

Stride is a new offering from AQA which is designed to empower students and quickly identify and close their knowledge gaps in mathematics. Designed to help students starting their GCSEs – either for the first time or as a resit – the tests are accessible for all and adapt to students' knowledge, delivering the right amount of challenge.

Our new maths tests will allow teachers to pinpoint gaps in their students' conceptual knowledge - saving them time and empowering students, who will understand how to improve. They're fully funded for schools and colleges, easy to use for teachers and engaging for students.

The five short tests, created with the Key Stage 1 and 2 and Key Stage 3 guidance in mind, focus on key areas of maths that experts have identified as the most impactful for GCSE success. They come with personalised learning and next steps to allow students to develop in both knowledge and confidence.

Rationale

We know that maths is a hierarchical subject, with knowledge being built upon foundational maths which underpins the new concept. We have analysed data from hundreds of thousands of exam questions and found that even though content is first encountered in the early stages of a learner's schooling, a significant proportion of learners answer questions on the foundations of maths incorrectly.

With this in mind, we want to empower teachers to take control of their classrooms and provide a nurturing environment in which gaps within key prerequisite understanding are identified and corrective instruction is deployed, filling the gaps and ensuring that more complex content can be taught, safe in the knowledge that learners have the underlying knowledge required to be successful in their lessons, and thrive in the GCSE examinations.

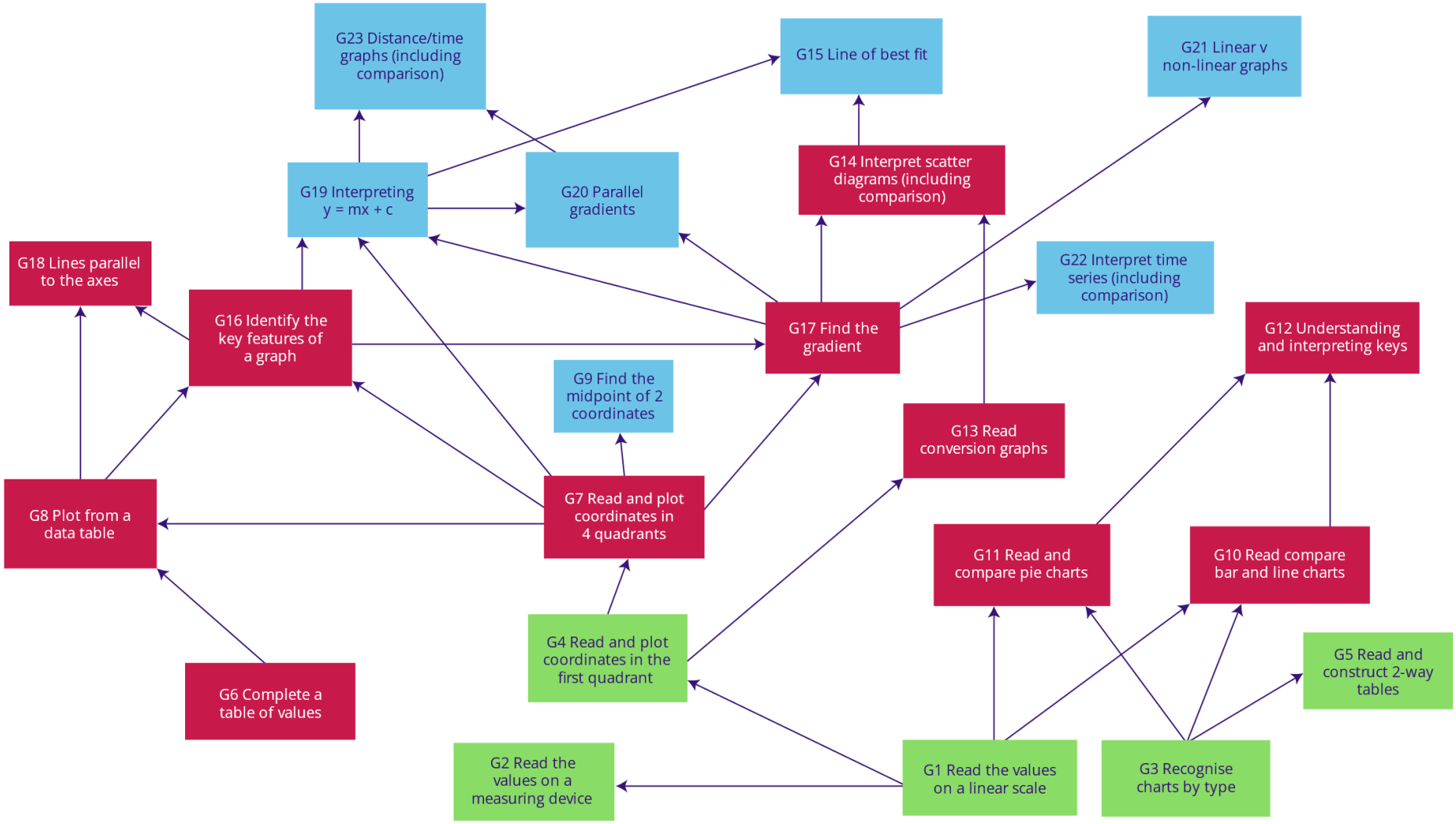
Key features

The Concept Map, shown on the next page, shows that the key foundational knowledge for success with Graphs is the ability to read and plot coordinates in all four quadrants of the Cartesian plane, as well the ability to interpret scales in a variety of graduations, finding values which aren't provided on the scales.

It can also be seen that the gatekeeper to greater success is G17 Find the Gradient, which is a predecessor to five other areas including G19 Interpreting $y = mx + c$ and G21 Linear v Non-linear Graphs. Understanding the concept of gradient is a key development to success with the Higher tier of GCSE mathematics.

Concept Map

4. Graphs



G1 Read the values on a linear scale

What is being tested	Learners are being tested on their understanding of the number line and reading scales given with different graduations.
Learning Objectives	G1.1 Input the missing values on the number line (decimals tenths) G1.2 Input the missing values on the number line (decimals hundredths) G1.3 Read an integer scale on a line G1.4 Read an integer scale on a vertical line G1.5 Read a decimal scale on a line G1.6 Input the numbers on a number line (integers)
Predecessors	None
Successors	G2 Read the values on a measuring device G4 Read and plot coordinates in the first quadrant G10 Read compare bar and line charts G11 Read and compare pie charts
KS2 & KS3 Guidance	Learners are introduced to the number line in Year 1 (page 18, KS1 and KS2 guidance) and improve their understanding through KS1 and KS2.
AQA GCSE Specification Reference	The ability to read values on a linear scale in a variety of graduations is key to success across the GCSE specification.

G2 Read the values on a measuring device

What is being tested	Learners are being tested on their ability to read values from different scales.
Learning Objectives	G2.1 Recognise the correct value displayed on speedometer G2.2 Recognise the correct value displayed on the weighing scale G2.3 Recognise the correct value displayed on thermometer
Predecessors	G1 Read the values on a linear scale
Successors	None
KS2 & KS3 Guidance	Learners begin to read values from measuring devices in Year 3 (page 91, KS1 and KS2 guidance).
AQA GCSE Specification Reference	The ability to read values on a linear scale in a variety of graduations is key to success across the GCSE specification.

G3 Recognise charts by type

What is being tested	Learners are being tested on their ability to recognise different types of charts.
Learning Objectives	G3.1 Identify a pictogram G3.2 Identify a bar chart G3.3 Identify a pie chart G3.4 Identify a line graph
Predecessors	None
Successors	G5 Read and construct 2-way tables G10 Read compare bar and line charts G11 Read and compare pie charts
KS2 & KS3 Guidance	Learners begin to encounter basic charts in Year 2 (page 53, KS1 and KS2 guidance).
AQA GCSE Specification Reference	S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use

G4 Read and plot coordinates in the first quadrant

What is being tested	Learners are being tested on their ability to describe positions in the first quadrant of the Cartesian plane using coordinate notation.
Learning Objectives	G4.1 Plot coordinates in the first quadrant (integers) G4.2 Plot coordinates in the first quadrant (decimals) G4.3 Identify coordinates in the first quadrant (integers) G4.4 Identify coordinates in the first quadrant (decimals) G4.5 Plot coordinates when axes are spaced differently G4.6 Plot 2 variables (x, y) on scatter graph G4.7 Plot a point with coordinates in the first quadrant G4.8 Identify coordinates of a given point in the first quadrant
Predecessors	G1 Read the values on a linear scale
Successors	G7 Read and plot coordinates in four quadrants G13 Read conversion graphs
KS2 & KS3 Guidance	Learners begin to use coordinate notation to describe positions in Year 4 (page 193, KS1 and KS2 guidance).
AQA GCSE Specification Reference	A8 work with coordinates in all four quadrants

G5 Read and construct 2-way tables

What is being tested	Learners are being tested on their ability to interpret and construct two-way tables..
Learning Objectives	G5.1 Categorise data using a Carroll diagram G5.2 Interpret Carroll diagrams G5.3 Interpret 2-way tables G5.4 Complete a 2-way table using existing values G5.5 Construct a 2-way table from a set of data G5.6 Construct a simple frequency table for a discrete data set
Predecessors	G3 Recognise charts by type
Successors	None
KS2 & KS3 Guidance	2-way tables are a method for sorting information which learners begin to use in Key Stage 2.
AQA GCSE Specification Reference	Representing and interpreting data in two-way tables appears across the GCSE specification

G6 Complete a table of values

What is being tested	Learners are being tested on their ability to construct a table of values to identify coordinates which lie on a specified graph, drawing on their understanding of substitution.
Learning Objectives	G6.1 Construct a table of values for x and y G6.2 Construct a table of values for x and y for $y = x^2$ including negative values of x G6.3 Construct a table of values for x and y for $y = x^2 + c$ including negative values of x
Predecessors	None
Successors	G8 Plot from a data table
KS2 & KS3 Guidance	Learners begin to plot linear graphs in Year 8 (page 137, KS3 guidance).
AQA GCSE Specification Reference	A9 plot graphs of equations that correspond to straight-line graphs in the coordinate plane

G7 Read and plot coordinates in four quadrants

What is being tested	Learners are being tested on their ability to describe positions in all four quadrants of the Cartesian plane using coordinate notation.
Learning Objectives	G7.1 Plot coordinates in four quadrants (integers) G7.2 Plot coordinates in four quadrants (decimals) G7.3 Identify coordinates in the fourth quadrant (integers) G7.4 Identify coordinates in the third quadrant (integers) G7.5 Identify coordinates in the second quadrant (decimals) G7.6 Identify coordinates in the fourth quadrant (decimals)
Predecessors	G4 Read and plot coordinates in the first quadrant
Successors	G8 Plot from a data table G9 Find the midpoint of 2 coordinates G16 Identify the key features of a graph G17 Find the gradient G19 Interpreting y=mx+c
KS2 & KS3 Guidance	Learners begin to use coordinate notation to describe positions in Year 4 (page 193, KS1 and KS2 guidance).
AQA GCSE Specification Reference	A8 work with coordinates in all four quadrants

G8 Plot from a data table

What is being tested	Learners are being tested on their understanding that pairs of numbers from a table of values represent coordinates, plotting these points to construct the graph of a specified equation.
Learning Objectives	G8.1 Plot (x,y) values on a graph from a table G8.2 Plot (x,y) values for $y = x^2$ on a graph from a table G8.3 Plot (x,y) values for $y = ax^2 + bx + c$ on a graph from a table
Predecessors	G6 Complete a table of values G7 Read and plot coordinates in four quadrants
Successors	G16 Identify the key features of a graph G18 Lines parallel to the axes
KS2 & KS3 Guidance	Learners begin to plot non-linear graphs in Year 8 (page 258, KS3 guidance).
AQA GCSE Specification Reference	A12 recognise, sketch and interpret graphs of linear functions and quadratic functions

G9 Find the midpoint of 2 coordinates

What is being tested	Learners are being tested on their ability to find the midpoint of two coordinates on the Cartesian plane.
Learning Objectives	G9.1 Identify the midpoint of a line segment with two coordinates in the first quadrant G9.2 Find the midpoint of a line segment with two coordinates in the first quadrant G9.3 Find the midpoint of a line segment with coordinates in the first and third quadrant
Predecessors	G7 Read and plot coordinates in four quadrants
Successors	None
KS2 & KS3 Guidance	Learners begin to use coordinate notation to describe positions in Year 4 (page 193, KS1 and KS2 guidance).
AQA GCSE Specification Reference	G11 solve geometrical problems on coordinate axes

G10 Read and compare bar and line charts

What is being tested	Learners are being tested on their ability to interpret data represented in bar and line charts.
Learning Objectives	G10.1 Match discrete data to bar charts G10.2 Interpret data displayed in a bar chart G10.3 Compare data displayed in 2 bar charts
Predecessors	G1 Read the values on a linear scale G3 Recognise charts by type
Successors	G12 Understanding and interpreting keys
KS2 & KS3 Guidance	Learners begin to encounter basic charts in Year 2 (page 53, KS1 and KS2 guidance).
AQA GCSE Specification Reference	S2 interpret and construct tables, charts and diagrams, including bar charts for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use

G11 Read and compare pie charts

What is being tested	Learners are being tested on their ability to interpret data represented in pie charts.
Learning Objectives	G11.1 Compare 2 pie charts G11.2 Describe the data presented on a pie chart G11.3 Compare data displayed in 2 pie charts G11.4 Compare 2 pie charts (different population size)
Predecessors	G1 Read the values on a linear scale G3 Recognise charts by type
Successors	G12 Understanding and interpreting keys
KS2 & KS3 Guidance	Learners encounter pie charts in KS2 and build upon this knowledge in Year 8 (page 160, KS3 guidance).
AQA GCSE Specification Reference	S2 interpret and construct tables, charts and diagrams, including pie charts for categorical data, and know their appropriate use

G12 Understanding and interpreting keys

What is being tested	Learners are being tested on their ability to interpret data represented in various charts.
Learning Objectives	G12.1 Describe a pictogram based on its key G12.2 Describe the data presented on a bar graph G12.3 Describe the data presented on a line graph
Predecessors	G10 Read compare bar and line charts G11 Read and compare pie charts
Successors	None
KS2 & KS3 Guidance	Learners begin to encounter basic charts in Year 2 (page 53, KS1 and KS2 guidance).
AQA GCSE Specification Reference	S2 interpret and construct tables, charts and diagrams, including pictograms for categorical data, and know their appropriate use

G13 Read conversion graphs

What is being tested	Learners are being tested on their ability to interpret a linear graph, converting between units of measure.
Learning Objectives	G13.1 Estimate an x-value for a corresponding y-value using a graph representing linear rates of change G13.2 Estimate a y-value for a corresponding x-value using a graph representing linear rates of change G13.3 Estimate an x-value for a corresponding y-value using a graph representing non-linear rates of change G13.4 Estimate a y-value for a corresponding x-value using a graph representing non-linear rates of change
Predecessors	G4 Read and plot coordinates in the first quadrant
Successors	G14 Interpret scatter diagrams (including comparison)
KS2 & KS3 Guidance	Learners encounter linear graphs for conversion in Year 7 as part of their study of multiplicative relationships (KS3, page 104).
AQA GCSE Specification Reference	A14 plot and interpret graphs, and graphs of non-standard functions in real contexts, to find approximate solutions to problems

G14 Interpret scatter diagrams (including comparison)

What is being tested	Learners are being tested on their ability to identify a relationship between two variables using a scatter diagram.
Learning Objectives	G14.1 Describe the relationship that a linear graph shows G14.2 Categorise graphs based on the strength of their linear relationship G14.3 Match scenarios to their descriptions G14.4 Categorise scatter diagrams based on the correlation of their points
Predecessors	G13 Read conversion graphs G17 Find the gradient
Successors	G15 Line of best fit
KS2 & KS3 Guidance	Learners encounter scatter diagrams for the first time in Year 8 (page 167, KS3 guidance).
AQA GCSE Specification Reference	S6 use and interpret scatter graphs of bivariate data recognise correlation

G15 Line of best fit

What is being tested	Learners are being tested on their ability to describe a relationship between two variables on a scatter diagram using a straight line.
Learning Objectives	G15.1 Match scatter diagrams to their lines of best fit G15.2 Draw a line of best fit G15.3 Identify the correct line of best fit of given data in a scatter plot (positive) G15.4 Identify the correct line of best fit of given data in a scatter plot (negative)
Predecessors	G14 Interpret scatter diagrams (including comparison) G19 Interpreting y = mx + c
Successors	none
KS2 & KS3 Guidance	Learners encounter scatter diagrams for the first time in Year 8 (page 167, KS3 guidance).
AQA GCSE Specification Reference	S6 draw estimated lines of best fit make predictions

G16 Identify the key features of a graph

What is being tested	Learners are being tested on their understanding of the gradient of a graph and the point that it intercepts the axes.
Learning Objectives	G16.1 Identify the y-intercept G16.2 Identify the x-intercept G16.3 Recognise a gradient in a coordinate system G16.4 Match graphs to their equations G16.5 Label the x and y axes, the intercepts and the line
Predecessors	G7 Read and plot coordinates in four quadrants G8 Plot from a data table
Successors	G17 Find the gradient G18 Lines parallel to the axes G19 Interpreting y = mx + c
KS2 & KS3 Guidance	Learners explore graphs in Year 8 (page 141, KS3 guidance).
AQA GCSE Specification Reference	A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically

G17 Find the gradient

What is being tested	Learners are being tested on their understanding of gradient, and their ability to calculate the gradient of a straight line.
Learning Objectives	G17.1 Recall that gradient of a straight line is constant G17.2 Recall that gradient is change in y/change in x G17.3 Identify a straight line with a given gradient G17.4 Calculate a positive gradient from 2 points (first quadrant) with diagram G17.5 Calculate a negative gradient from 2 points (first quadrant) without diagram
Predecessors	G7 Read and plot coordinates in four quadrants G16 Identify the key features of a graph
Successors	G14 Interpret scatter diagrams (including comparison) G19 Interpreting y = mx + c G20 Parallel gradients G21 Linear v non-linear graphs G22 Interpret time series (including comparison)
KS2 & KS3 Guidance	Learners explore graphs in Year 8 (page 141, KS3 guidance).
AQA GCSE Specification Reference	A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically

G18 Lines parallel to the axes

What is being tested	Learners are being tested on their ability to recognise graphs of straight lines which are parallel to the axes in the Cartesian plane.
Learning Objectives	G18.1 Recognise a vertical line in a coordinate system G18.2 Recognise a horizontal line in a coordinate system G18.3 Identify straight lines of x = 0 G18.4 Identify straight lines of x = a where a, b are integers constant G18.5 Identify straight lines of y = b where a, b are integers constant G18.6 Identify straight lines of y = 0
Predecessors	G8 Plot from a data table G16 Identify the key features of a graph
Successors	None
KS2 & KS3 Guidance	Learners investigate the graphs of lines parallel to the axes in Year 7 (page 67, KS3 guidance).
AQA GCSE Specification Reference	The graphs of horizontal and vertical lines represents foundational knowledge for working with graphs algebraically

G19 Interpreting y = mx + c

What is being tested	Learners are being tested on their understanding of the general form of a linear graph, drawing on their knowledge of the gradient..
Learning Objectives	G19.1 Match straight line graphs with their equations G19.2 Identify the gradient in y = mx + c G19.3 Know that m is the gradient in y = mx + c G19.4 Identify the intercept in y = mx + c G19.5 Categorise lines with positive and negative gradients given in the form y = mx + c G19.6 Identify the y intercept of a straight line
Predecessors	G7 Read and plot coordinates in four quadrants G16 Identify the key features of a graph G17 Find the gradient
Successors	G15 Line of best fit G20 Parallel gradients G23 Distance/time graphs (including comparison)
KS2 & KS3 Guidance	Learners explore graphs in Year 8 (page 141, KS3 guidance).
AQA GCSE Specification Reference	A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically

G20 Parallel gradients

What is being tested	Learners are being tested on their understanding of the relationship between the gradients of two parallel lines.
Learning Objectives	G20.1 Recognise parallel lines in a coordinate system G20.2 Identify parallel lines from their equations G20.3 Match parallel lines from their equations G20.4 Know that parallel lines have the same gradient
Predecessors	G17 Find the gradient G19 Interpreting y = mx + c
Successors	G23 Distance/time graphs (including comparison)
KS2 & KS3 Guidance	Learners explore the gradient of parallel lines in Year 8 (page 145, KS3 guidance).
AQA GCSE Specification Reference	A9 use the form y = mx + c to identify parallel lines

G21 Linear v non-linear graphs

What is being tested	Learners are being tested on their ability to distinguish between linear, and non-linear, graphs.
Learning Objectives	G21.1 Categorise linear and non-linear graphs G21.2 Identify diagrams that represent linear rates of change G21.3 Identify diagrams that represent non-linear rates of change G21.4 Match graphs to scenarios
Predecessors	G17 Find the gradient
Successors	None
KS2 & KS3 Guidance	Learners begin to distinguish between linear and non-linear rates of change in Year 9 as part of their study of real-world graphs (KS3, page 258).
AQA GCSE Specification Reference	R14 interpret the gradient of a straight-line graph as a rate of change R15 interpret the gradient at a point on a curve as the instantaneous rate of change

G22 Interpret time series (including comparison)

What is being tested	Learners are being tested on their ability to interpret data represented as a time series graph.
Learning Objectives	G22.1 Estimate a y-value for a corresponding x-value using a trend line on a time series graph G22.2 Estimate a x-value for a corresponding y-value using a trend line on a time series graph G22.3 Estimate a y-value for a corresponding x-value not displayed using a trend line on a time series graph (extrapolation) G22.4 Use a trend line to estimate y-values, given an x-value G22.5 Compare 2 time series graphs G22.6 Interpret the features of a time series graph
Predecessors	G17 Find the gradient
Successors	None
KS2 & KS3 Guidance	Learners begin to work with non-linear graphs in Year 8 (page 258, KS3 guidance).
AQA GCSE Specification Reference	S2 interpret and construct tables, charts and diagrams, including tables and line graphs for time series data

G23 Distance/time graphs (including comparison)

What is being tested	Learners are being tested on their ability to interpret data represented as a distance-time graph, as well as calculating speed from a specified graph.
Learning Objectives	G23.1 Know that a horizontal line on a distance/time graph represents zero speed G23.2 Know that the gradient of a distance/time graph represents speed G23.3 Compare 2 distance/time graphs G23.4 Interpret distance/time graphs G23.5 Calculate the speed from a distance/time graph
Predecessors	G19 Interpreting y = mx + c G20 Parallel gradients
Successors	None
KS2 & KS3 Guidance	Learners work with distance-time graphs in Year 9 (page 258, KS3 guidance).
AQA GCSE Specification Reference	A14 plot and interpret graphs, and graphs of non-standard functions in real contexts, to find approximate solutions to problems involving distance, speed and acceleration

Contributors

AQA

We're an independent education charity, providing high quality assessments that are fair, reliable, and support students in their educational journey.

Our qualifications expertise dates back to 1903, when our predecessor boards were founded by five leading universities. Today, we're the largest provider of academic qualifications taught in schools and colleges.

We set and mark the papers for over half of all GCSEs and A-levels taken every year. But exams are only part of the story – we also make sure the content of our qualifications support great teaching.

Our qualifications are designed to suit a range of abilities and include GCSEs, AS and A-levels, the Extended Project Qualification and Technical Awards. Our qualifications are internationally recognised and taught in more than 40 countries around the world and they're highly valued by employers and universities.

We're led by our Executive Team and governed by a Board of Trustees drawn from schools, colleges, higher education, children's services and the business community.

Our charitable purpose

We have over a century of qualifications expertise dating back to 1903 when our predecessor boards were founded by five leading universities. These public exam boards came into existence to provide an opportunity for young people from a range of backgrounds to access education and make the most of their potential.

This commitment to social mobility remains at the heart of AQA's charitable purpose, which is to advance education by enabling teachers and students to realise their potential.

We demonstrate this by providing qualifications that enable students to progress, and reinvesting any surplus we make in:

- research – through the expertise of our Assessment Research and Innovation teams, we ensure that we are able to continuously improve the quality and reliability of our assessments and contribute to the development of assessment policy and practice, both in the UK and around the world
- offering a broad range of qualifications because we believe they have educational value – and not offering qualifications that could be profitable, but we don't think would help students progress
- directly funding activities such as our AQA Unlocking Potential programme, which helps develop and inspire young people facing challenges in life.
- improving social mobility through education, by sponsoring groups of teachers from areas with low student attainment, to attend residential leadership courses with The PTI (Prince's Teaching Institute).