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## Guidance: Amplification of Functional Skills mathematics standards

The aim of the maths Functional Skills standards is to develop and recognise the ability of learners to apply and transfer skills in the ways that are appropriate to their situation. These skills can be applied in educational, personal and workplace settings.

The process skills apply at all levels. These are:

- **Representing - identifying the problem and selecting the mathematics and information to model the situation**
- **Analysing - processing and using mathematics and checking the results**
- **Interpreting - communicating the results of the analysis.**

These process skills form the basis of the functional mathematics standards at all levels.



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## Guidance: Amplification of Functional Skills mathematics standards

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## Guidance: Amplification of Functional Skills mathematics standards

### Entry Level 3

### Skill standards

#### Representing:

1. Understand practical problems in familiar contexts and situations
2. Begin to develop own strategies for solving simple problems
3. Select mathematics to obtain answers to simple given practical problems that are clear and routine.

#### Analysing:

4. Apply mathematics to obtain answers to simple given practical problems that are clear and routine
5. Use simple checking procedures.

#### Interpreting:

6. Communicate solutions to practical problems in familiar contexts and situations.

Skill standards	Coverage and range	What does this mean?	Example	
<b>Representing</b>  <b>1. Understand practical problems in familiar contexts and situations</b>  <b>2. Begin to develop own strategies for solving simple problems</b>	a	Add and subtract using 3-digit numbers	Use column addition and subtraction or partitioning to add and subtract whole numbers less than 1,000	A customer has £175 worth of vouchers. She wants to use them to buy a new pond pump. The pump costs £200. How much money will the customer need to add to the vouchers to pay for the pump?
<b>3. Select mathematics to obtain answers to simple given practical problems that are clear and routine</b>	b	Solve practical problems involving multiplication and division by 2, 3, 4, 5 and 10	While calculators are allowed for the tasks, strategies should be understood (eg to multiply by 10 move the digits one place to the left. To multiply by 5, first multiply by 10 and then halve)	You need £1 worth of 5p coins in your till at the beginning of the day. How many 5p coins is this?

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## Guidance: Amplification of Functional Skills mathematics standards

### Entry Level 3 - continued

Skill standards	Coverage and range	What does this mean?	Example
<b>Analysing</b>  <b>4. Apply mathematics to obtain answers to simple given practical problems that are clear and routine</b>  <b>5. Use simple checking procedures</b>	<b>c</b> Round to the nearest 10 or 100	Understand place value for units, tens and hundreds  Round numbers less than 1,000 to the nearest 10 and 100  Estimate answers to calculations using rounding	You need to order 27 new tablecloths for the restaurant you work in. If they come in packs of 10, how many will you need to order?  A shop reports its sales to the nearest 10 items. One week the shop sells 167 magazines. What number would this be reported as?
	<b>d</b> Understand and use simple fractions	Read and write common fractions (eg halves, quarters, thirds, tenths)  Understand that the top number is the number of equal parts there are and the bottom number is the number of parts something has been divided into  Understand that equivalent fractions look different but have the same value	A cake has been divided in 8 equal pieces. If 4 of the pieces have been eaten, what fraction of the cake is left?
	<b>e</b> Understand, estimate, measure and compare length, capacity, weight and temperature	Read scales on measuring instruments. Know common units and which to use when	Find the coldest day from a set of temperatures
	<b>f</b> Understand decimals to 2 decimal places in practical contexts	Understand that the decimal point separates pounds and pence, metres and centimetres	Given the height of some visitors to a theme park, work out who can go on a ride where the minimum height allowed is 1.5m
	<b>g</b> Recognise and describe number patterns	Recognise patterns with repeated addition or multiplication such as doubling	Solve a delivery problem with house numbers where the even house numbers are on one side of the road and the odd ones are on the other side



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## Guidance: Amplification of Functional Skills mathematics standards

### Entry Level 3 - continued

Skill standards	Coverage and range	What does this mean?	Example
<b>Interpreting</b>  <b>6. Communicate solutions to practical problems in familiar contexts and situations</b>	<b>h</b>  Complete simple calculations involving money and measures	Work with money amounts in pounds and pence, and measures with both whole numbers and numbers including one decimal place	Jane is overdrawn by £50. She puts a cheque for £70 into her account. How much does she now have in her account?  You spend £2.95 on a magazine. How much change should you get from a £5 note?
	<b>i</b>  Recognise and name simple 2D and 3D shapes and their properties	Recognise 2D shapes: circle, rectangle, square, triangle. 3D shapes: cube, cuboid, sphere, cylinder, cone	When shown a picture, match the shapes with the correct name  Know that a cube has square faces whereas a cuboid has some rectangular faces
	<b>j</b>  Use metric units in everyday situations	Know that length is measured in millimetres, centimetres, metres and kilometres; weight in milligrams, grams and kilograms and capacity in millilitres and litres	Calculate how much flour will be left in a 1kg bag after baking a batch of cookies that needs 400g flour
	<b>k</b>  Extract, use and compare information from lists, tables, simple charts and simple graphs	Read information from bar charts, pictograms, simple pie charts and tables  Understand the importance of titles, labels and keys	Use a price list to work out how much a 40lb bag of compost costs  Transfer data from a tally chart into a table



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 1

#### Skill standards

##### Representing:

1. Understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine
2. Identify and obtain necessary information to tackle the problem
3. Select mathematics in an organised way to find solutions.

##### Analysing:

4. Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes
5. Use appropriate checking procedures at each stage.

##### Interpreting:

6. Communicate solutions to practical problems, drawing simple conclusions and giving explanations.

Skill standards	Coverage and range	What does this mean?	Example
<b>Representing</b>  <b>1. Understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine</b>  <b>2. Identify and obtain necessary information to tackle the problem</b>	a	Understand and use whole numbers and understand negative numbers in practical contexts  Read, write, order and compare numbers, including large numbers  Recognise negative numbers in the context of temperature  Work to the given level of accuracy, for example nearest whole number or nearest 10	Be able to read meters with large numbers such as gas and electricity meters  Work out how much a temperature needs to be reduced to get it down to a safe temperature for storing frozen food  Work out how much to leave in a restaurant when you want to include a 10% tip and round the answer to the nearest pound
	b	Add, subtract, multiply and divide whole numbers using a range of strategies  Use a range of calculation strategies, including mental methods, formal and informal written methods and use of a calculator	Calculate the daily takings in a hair salon, given the bills for that day
<b>3. Select mathematics in an organised way to find solutions</b>			



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 1 - continued

Skill standards	Coverage and range	What does this mean?	Example
<b>Analysing</b>  <b>4. Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes</b>	<b>c</b> Understand and use equivalences between common fractions, decimals and percentages	Read, write, order and compare common fractions, including mixed numbers, decimals with up to 3 decimal places and percentages	Be able to calculate 50% of the cost of an order by knowing that 50% is equal to a half
	<b>d</b> Add and subtract decimals up to 2 decimal places	Add and subtract monetary amounts	Calculate the daily takings in a hair salon, given the bills for that day
<b>5. Use appropriate checking procedures at each stage</b>  <b>Interpreting</b>  <b>6. Communicate solutions to practical problems drawing simple conclusions and giving explanations</b>	<b>e</b> Solve simple problems involving ratio, where one number is a multiple of the other	Understand simple ratio as the number of parts, for example 3 parts to 1 part	A drink is made from juice and water in the ratio of 1:5. How many litres of drink can I make from 2 litres of juice?
		Understand direct proportion as the same rate of increase or decrease, for example double, half, etc	Scale up amounts of food for 3 times the number of people. Put items in piles with twice as many items in one pile as in the other
	<b>f</b> Use simple formulae expressed in words for 1- or 2-step operations	Know how to use a simple scale to estimate distance on a road map	Calculate how far it is between 2 towns given a copy of a road map and the scale of the map
		Solve a problem that is given in words that includes a rule. NB. There is no need to be able to generate an algebraic formula	A chicken takes 40 minutes per kilogram to cook plus an extra 20 minutes. How long will it take to cook a 4kg chicken?

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## Guidance: Amplification of Functional Skills mathematics standards

### Level 1 - continued

Skill standards	Coverage and range	What does this mean?	Example
<b>g</b>	Solve problems requiring calculation with common measures, including money, time, length, weight, capacity and temperature	<p>Add, subtract, multiply, divide and record sums of money</p> <p>Read, measure and record time using both the 12-hour and 24-hour clock and add and subtract times in hours and minutes</p> <p>Read timetables correctly</p> <p>Read, estimate, measure, compare and calculate length, distance, weight, capacity, and temperature</p> <p>Understand and use a mileage chart</p>	<p>Complete an expenses sheet including mileage costs, meal costs and parking</p> <p>Calculate how long an office is open for by using the opening and closing times displayed on a sign</p> <p>Look at a bus timetable and work out which bus you need to catch to arrive at an interview by 10am</p> <p>Calculate the amount of wallpaper needed to wallpaper a room given the room dimensions and the size of a roll of wallpaper</p> <p>Work out the shortest distance for a delivery driver when given the distances between each town in a mileage chart</p>
<b>h</b>	Convert units of measure in the same system	Understand the metric system and be able to convert between metric units for length, weight and capacity	Convert someone's height from centimetres to metres for an application form, convert grams to kilograms when baking



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 1 - continued

Skill standards		Coverage and range	What does this mean?	Example
	<b>i</b>	Work out areas and perimeters in practical situations	<p>Know that the perimeter is the boundary of a shape and is measured in units of length</p> <p>Know that area is a measure of 2D space measured in square units and that the area of a rectangle = length <math>\times</math> width</p> <p>Know that volume is a measure of 3D space measured in cubic units and that the volume of a cuboid = length <math>\times</math> width <math>\times</math> height</p> <p>Know that measurements must be in the same units before calculating</p>	<p>Calculate the amount of fencing needed to go around a play area</p> <p>Calculate the amount of turf needed for a garden</p> <p>Calculate the amount of water in a swimming pool</p> <p>Calculate the area of a door when the height is given in metres but the width is given in centimetres</p>
	<b>j</b>	Construct geometric diagrams, models and shapes	Construct models, draw shapes	Draw the net (grid to calculate area) of a packaging box
	<b>k</b>	Extract and interpret information from tables, diagrams, charts and graphs	<p>Understand that titles, labels, and keys provide information</p> <p>Know how to read a scale on an axis</p> <p>Know how to use a simple scale such as 1cm to 1m, 20mm to 1m</p> <p>Get information from tables such as timetables or price lists, and charts such as pictograms, simple pie charts or bar charts, or single line graphs</p>	<p>Given a graph of sales, write a comment as to whether the sales have increased or decreased</p> <p>Find distances on a map or be able to plan out a room given room dimensions and furniture sizes</p> <p>Work out the attendance at a museum by reading the information from a bar chart</p>



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 1 - continued

Skill standards	Coverage and range	What does this mean?	Example
l	Collect and record discrete data and organise and represent information in different ways	<p>Collect (including by making accurate observations) and record discrete data in a tally chart</p> <p>Organise discrete data in a table</p> <p>Represent discrete data in pictograms, bar charts and line graphs</p> <p>Know how to choose a sensible scale and to label charts, graphs and diagrams</p> <p>Represent the results of calculations to show the purpose of the task</p>	<p>Be able to draw a table to be used for collecting the sandwich order in an office</p> <p>Draw a graph to show your bank manager your weekly takings</p> <p>Identify that more staff are needed to handle enquiries between 12:30pm and 1:30pm because a graph shows that this is the busiest time</p>
	Find mean and range	<p>Calculate the mean average by adding all the values then dividing by the number of items</p> <p>Understand that the range measures the spread of a set of data and is calculated by finding the difference between the largest and smallest value</p>	<p>200 people donate some money to a charity. The total raised is £470. What is the mean average donation?</p> <p>Identify the most consistent runner, given a table with some runners and their last 4 lap times</p>
n	Use data to assess the likelihood of an outcome	<p>Understand that some events are impossible, some events are unlikely to occur, some events are likely to occur and some events are certain</p> <p>Know that the chance or probability of something happening can be calculated, but understand that having 2 outcomes does not mean each is equally likely</p>	<p>Know that if a shop is closed on a Sunday, it is impossible that someone can buy a sandwich there on a Sunday</p> <p>Realise that when crossing the road, you will either get to the other side safely or not, but it is not equally likely that both events occur</p>

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## Guidance: Amplification of Functional Skills mathematics standards

### Level 2

#### Skill standards

##### Representing:

1. Understand routine and non-routine problems in familiar and unfamiliar contexts and situations
2. Identify the situations and problems and identify the mathematical methods needed to solve them
3. Choose from a range of mathematics to find solutions.

##### Analysing:

4. Apply a range of mathematics to find solutions
5. Use appropriate checking procedures and evaluate their effectiveness at each stage.

##### Interpreting:

6. Communicate solutions to multi-stage practical problems in familiar and unfamiliar contexts and situations
7. Draw conclusions and provide mathematical justifications.

Skill standards	Coverage and range	What does this mean?	Example
<b>Representing</b> <b>1. Understand routine and nonroutine problems in familiar and unfamiliar contexts and situations</b> <b>2. Identify the situations and problems and identify the mathematical methods needed to solve them</b> <b>3. Choose from a range of mathematics to find solutions</b>	a	Understand and use positive and negative numbers of any size in practical contexts  Understand the meaning of negative numbers in a practical context	Find the lowest temperature from a chart where some numbers are positive and some are negative (minus)  Use a bank statement to work out if you need to ask for an overdraft



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 2 - continued

Skill standards		Coverage and range	What does this mean?	Example
<p><b>Analysing</b></p> <p><b>4. Apply a range of mathematics to find solutions</b></p>	b	Collect and record discrete data and organise and represent information in different ways	<p>Add, subtract, multiply and divide numbers up to 2 decimal places. Use column addition and subtraction</p> <p>Use short and long multiplication and division and chunking</p> <p>Work out calculations mentally with jottings, and with a calculator. Interpret money and time amounts on a calculator</p> <p>Estimate answers to calculations. Nearest hundred, ten, unit, tenth, hundredth, nearest pound. Use estimation to work out distance and time. Use the calculator to check answers</p>	<p>Work out the cost of a holiday for 4, with flights, hotel, transfers. Compare with an alternative holiday to find the cheapest</p> <p>Work out the cost of building an extension to a house, given the cost of items and the quantities</p> <p>Work out times and distances to compare types of transport</p> <p>Work out the weekly budget of a family. Estimate the cost for a month and a year</p>
<p><b>5. Use appropriate checking procedures and evaluate their effectiveness at each stage</b></p>	c	Understand, use and calculate ratio and proportion, including problems involving scale	<p>Write a ratio in its simplest form. 6:4 = 3:2. Recognise when a ratio is used</p> <p>Divide an amount into a given ratio</p> <p>Use scales in both maps and diagrams</p> <p>Scale quantities up or down</p>	<p>Work out the materials used in construction eg ratio of cement to ballast when mixing concrete</p> <p>The total cost for a job is £200. If the ratio between labour and materials is 5:3, how much was the labour?</p> <p>Calculate the distance of a journey from a map</p> <p>Work out how to present a drawing with a scale of 1:20 (eg if a room is 9m by 7m, what are the dimensions, in cm, on the plan?)</p> <p>Scale up recipes when cooking (eg if you need 200g of flour for 12 cakes, how much would you need for 24?)</p>



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## Guidance: Amplification of Functional Skills mathematics standards

### Level 2 - continued

Skill standards		Coverage and range	What does this mean?	Example
<p><b>Interpreting</b></p> <p><b>6. Communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations</b></p> <p><b>7. Draw conclusions and provide mathematical justifications</b></p>	d	Understand and use equivalences between fractions, decimals and percentages	<p>Simplify fractions. Cancel fractions to their simplest form, eg <math>12/100 = 3/25</math></p> <p>Find fractions of a quantity</p> <p>Improper and mixed numbers</p> <p>Work out percentages of a quantity. Work out percentage increase and decrease</p> <p>Convert between fractions, decimals and percentages (eg 37% as a fraction and a decimal)</p> <p>Order fractions, decimals and percentages</p> <p>Write one number as a fraction of another</p>	<p>Compare overtime rates</p> <p>Find <math>1/4</math> of a restaurant bill</p> <p>Show <math>34/10</math> as a mixed number</p> <p>Write fractions of an hour as decimals on a time sheet</p> <p>Work out the discount on goods for increased quantities</p> <p>Work out which is the better value: 25% off or <math>1/3</math> off?</p> <p>Calculate a percentage pay increase and decrease</p> <p>Write mixed forms from smallest to largest, eg 0.23, <math>1/5</math>, 27%, <math>1/4</math>, 0.029</p> <p>Work out what fraction of gym members are males if there are 300 men and 550 women</p>
	e	Understand and use simple formulae and equations involving 1- or 2-step operations	<p>Substitute numbers into a formula and derive a formula in words</p> <p>Understand the order of operations</p>	<p>Calculate the speed when a car travels 8 miles in 10 minutes using the formula <math>s = d \div t</math></p> <p>Work out the cooking time for a joint of meat which can be calculated as 35 minutes per 500g plus an extra 35 minutes. Calculate how long a 2.2 kg joint would take</p> <p>Add brackets to make this calculation correct: <math>7 \times 5 + 2 = 49</math></p>

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## Guidance: Amplification of Functional Skills mathematics standards

### Level 2 - continued

Skill standards	Coverage and range	What does this mean?	Example
<b>f</b>	Recognise and use 2D representations of 3D objects	<p>Sketch 3D solids and draw them accurately on isometric grids</p> <p>Use of nets to calculate area</p> <p>Use plans, elevations</p>	<p>Given a shape made from 4 cubes, draw the shape on isometric paper</p> <p>Draw the net of a packaging box</p> <p>Given a 3D representation of a house, draw the front and top view</p>
<b>g</b>	Find area, perimeter and volume of common shapes	<p>Calculate perimeter and area of triangles and rectangles</p> <p>Calculate circumference and areas. Understand the symbol for pi and know its approximate value</p> <p>Calculate volume of cuboids and cylinders</p>	<p>Calculate the area of a compound shape made up of rectangles and triangles, for example a plot of land</p> <p>Calculate how much edging strip would be required for a circular pond with a diameter of 10m</p> <p>Calculate the volume of water in a pond that is 3m by 2m and 60cm deep</p>
<b>h</b>	Use, convert and calculate using metric and, where appropriate, imperial measures	<p>Conversion-graphs</p> <p>Convert between metric units and use mixed units of measure within the same system, for example m and cm, giving answer in m</p> <p>Convert between metric and imperial units</p>	<p>Use a conversion graph to calculate how many Euros you would get for £100</p> <p>Calculate the total length of skirting board if you have 3 strips which are 1.2m, 1.7m and 67cm long</p> <p>If you want to bake a cake which needs 8oz flour and you have a 500g bag, is that sufficient?</p>

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## Guidance: Amplification of Functional Skills mathematics standards

### Level 2 - continued

Skill standards	Coverage and range	What does this mean?	Example
i	Collect and represent discrete and continuous data, using ICT where appropriate	Collect data in tally charts Represent data in frequency tables, pie charts, bar charts, line graphs, scatter graphs	Get relevant information from different sources or first-hand by measuring or observing  Understand how to use scales in diagrams, charts and graphs. Know how to choose a suitable format and scale to fit the data and ensure all charts, graphs and diagrams are labelled
j	Use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using ICT where appropriate	N/A	Know how to extract discrete and continuous data from tables, spreadsheets, bar charts, pie charts and line graphs  Draw a conclusion from a scatter diagram
k	Use statistical methods to investigate situations	Comparison of 2 groups using measures of average and range or by comparing proportions in a pie chart	Find the mean, median and mode and understand that each average is useful for different purposes  Use the range to describe the spread within a set of data, for example sales results
l	Use probability to assess the likelihood of an outcome	Calculate theoretical probabilities and compare probabilities	Explain why the probability of choosing a red card from a pack of cards is $\frac{26}{52} = \frac{1}{2}$ , a club $\frac{13}{52} = \frac{1}{4}$ , and an ace $\frac{4}{52} = \frac{1}{13}$  A bag of 10 balls contains 6 red balls. A spinner divided into 5 equal sections has 2 red sections. In which situation is red most likely?

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## Guidance: Amplification of Functional Skills mathematics standards

### This is a typical mathematics question at Level 2

The manager of a theme park believes that offering reduced prices for online booking will increase visitor numbers and needs to work out if this is correct.

The table below shows the impact of introducing online booking on ticket sales and costs.

	Sales and costs for one week from tickets bought on the day	Impact on sales and costs for one week with online ticket sales
Attendance	87,000	Up 11%
Ticket prices	Average price £34 per person	60% of tickets bought on the day at £34 per person 40% of tickets bought online at 20% discount
Cost of ticket sales staff	35 staff each paid £360 per week	Reduction of staff by 40%

Students are asked to:

- calculate the overall weekly loss or gain from the change in prices and the savings on wages (5 marks)
- decide what factors should be considered, as well as reducing ticket staff by 40%, if discounted online booking is introduced.

Students are expected to plan their work and show all calculations.

**BOOK ONLINE...**  
and save ?% on family-of-4 tickets compared with individual on-the-day prices!



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## Guidance: Amplification of Functional Skills mathematics standards

### Sample Level 2 mathematics question

Marks will be awarded as follows:

Using the standards	Calculations	Acceptable answers	Marks awarded
<b>Representing:</b> Work out what to do to solve the problem	There will be saving on staff costs	$0.4 \times 35 \times 360 = \text{£}5,040$	1 mark for the correct process for working out the answer
Work out how much revenue there would be from the increased business	Cost of new visitor numbers On-the-day sales Online sales Total sales	$87,000 \times 1.11 = 96,570$ $0.6 \times 96,570 \times 34 = \text{£}1,970,028$ $0.4 \times 96,570 \times 27.2 = \text{£}1,050,681.60$ $\text{£}3,020,709.60$	1 mark for selecting the correct method for working out the answer
<b>Analysing:</b> Calculate the existing prices	Previous on-the-day revenue	$87,000 \times 34 = \text{£}2,958,000$	1 mark for getting the calculation right
Calculate the new prices	Price for online tickets Increased revenue Add staff saving	$0.8 \times 34 = \text{£}27.20$ (or $34 - 0.2 \times 34$ ) $\text{£}3,020,709.60 - \text{£}2,958,000 = \text{£}62,709.60$ $\text{£}62,709.60 + \text{£}5,040 = \text{£}67,749.60$	1 mark for getting the calculation right
<b>Interpreting:</b> Work out if there is an increase in revenue	Weekly gain	$\text{£}67,749.60$	1 mark for recognising that the theme park will make a gain if it implements its plans
What does this mean?		There are a number of suitable answers to this question, such as extra visitor numbers might mean more staff are needed at the park	1 mark for drawing a conclusion and justifying an answer