

Gatsby Benchmark 4

'Linking curriculum learning to careers'

Examples of the use of Mathematics

Curriculum area: **MATHEMATICS**

Year 7/8

Autumn term

Number skills

Factors, multiples, primes, powers & roots

Fractions, decimals and percentages

Ratio and proportion

Communication - Students develop this core skill as they interact during group/shared work

Confidence - developing Mathematical competence and numeracy will increase confidence

Problem solving - finding solutions to Mathematical problems given in context

Example activity linking curriculum learning to a career (how mechanics uses Maths)

Unfortunately Marty's fingers are too oily to press the buttons on his calculator!



Marty is trying to tell a customer how much further she can drive before her next service. The service must take place after the car has done 50000 miles and currently the odometer reads 49869.5 miles. How many more times can the customer make her commute of 0.9 miles before the service?

Spring term

Perimeter, area and volume

Angles

Averages and range

Representing data

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Presentation - presenting ideas for solutions to the rest of the group

Example activity linking curriculum learning to a career (how an interior designer uses Maths)

Her last seven jobs paid:

£4000
£2000
£1500
£5000
£4000
£3500



Ingrid has recorded how much she has been paid for her last seven jobs. She wants the lowest average price to quote on her new website to attract more customers. Should she use the mean, median or mode in order to do this?

Summer term

Probability

Algebra

Co-ordinates and straight line graphs

Problem solving - finding solutions to Mathematical problems given in context

Confidence - developing Mathematical competence will increase confidence

Resilience - recognising the common misconceptions in Mathematics and why they are logical

Example activity linking curriculum learning to a career (how crime investigators use Mathematics)

Reading a Crime Scene Sketch

Now you be the detective! The shield from a knight's suit of armor has been stolen from the history museum. Use the crime scene sketch above to answer the questions. Points on a grid are called coordinates. When you name coordinates, you say the location on the horizontal axis first, then the location on the vertical axis. For example, in the sketch above, the glove is at coordinates (3, C).

1. Name the coordinates that tell where the flashlight is located.
2. Name the coordinates for the hammer.
3. What object is at (4, D)?
4. Where did the detectives find the baseball hat? Name the coordinates.

Year 9

Autumn term

Working with integers

Collecting, interpreting and representing data

Analysing data

Properties of integers

Working with fractions

Communication - Students develop this core skill as they interact during group/shared work

Confidence - developing Mathematical competence and numeracy will increase confidence

Resilience - recognising the common misconceptions in Mathematics and why they are logical

Example activity linking curriculum learning to a career (how nurses use Mathematics)

Calculating the Right Dose

Often, the amount of medicine a child should take is lower than the amount that's right for an adult. Sometimes, a nurse practitioner has to do math to calculate the proper amount of medicine for a child. The nurse practitioner can use a formula to figure out the right dose. First, divide the child's weight by 150. Then, multiply the result by the adult dose. Here's an example. A child weighs 30 pounds. The adult dose is 30 milligrams. To calculate the child's dose:

$$30 \div 150 = \frac{1}{5}$$

$$\frac{1}{5} \times 30 = 6$$

The child's dose is 6 milligrams.

Maria is a 9-year-old girl. She weighs 60 pounds. The nurse practitioner wants to prescribe medicine for her. The medicine has an adult dose of 20 milligrams each day. What dose should the NP prescribe for Maria?

2

Spring term

Working with decimals

Basic algebra

Properties of polygons and 3D objects

Angles

Perimeter

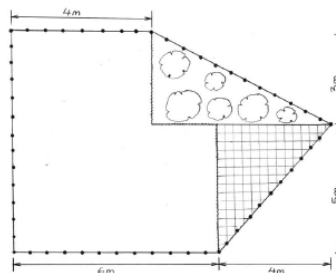
Area

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Problem solving - finding solutions to Mathematical problems given in context

Confidence - developing Mathematical competence will increase confidence

Example activity linking curriculum learning to a career (how gardeners use Mathematics to calculate costs)



Paving is £6 per square metre
Planting is £12 per square metre
Turf is £4 per square metre

Fencing is £6 per metre
Brick walls are £15 per metre

Summer term

Rounding and estimating

Percentages

Powers and roots

Standard Form

Further algebra

Communication - Students develop this core skill as they interact during group/shared work

Resilience - recognising the common misconceptions in Mathematics and why they are logical

Problem solving - finding solutions to Mathematical problems given in context

Example activity linking curriculum learning to a career (how dentists use Mathematics)

Extension: can you write this distance in nanometres?



Derek is producing a report which details the dimensions of the average human tooth. He reads that the average width of a nerve is 7×10^{-7} m, but isn't sure that his readers understand standard form. What would this distance be in ordinary form?

Year 10 - Foundation

Autumn term

Powers and roots
Standard form
Further algebra
Equations
Functions and sequences
Basic probability

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Problem solving - finding solutions to Mathematical problems given in context

Resilience - recognising the common misconceptions in Mathematics and why they are logical

Example activity linking curriculum learning to a career (how scientists use Mathematics)

The table shows the mass of the major planets in the Solar System.

The mass of the Sun is 1.989×10^{30} kg.

- a Which mass is not in standard form? Convert this mass to standard form.
- b About how many times bigger than the total mass of the planets is the Sun? Show your working.

Planet	Mass (kg)
Mercury	3.3×10^{23}
Venus	4.87×10^{24}
Earth	5.98×10^{24}
Mars	6.5×10^{23}
Jupiter	1.9×10^{27}
Saturn	5.7×10^{26}
Uranus	8.7×10^{25}
Neptune	100×10^{24}

3D objects
Units and measure
Formulae
Volume and surface area
Further probability

Communication - Students develop this core skill as they interact during group/shared work

Confidence - developing Mathematical competence and numeracy will increase confidence

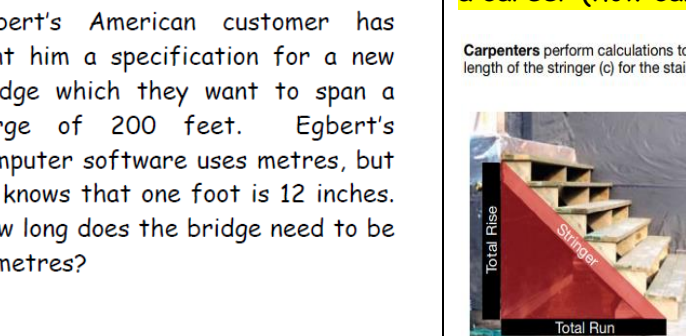
Resilience - recognising the common misconceptions in Mathematics and why they are logical

Example activity linking curriculum learning to a career (how engineers use Mathematics)

Conversion Factors:
 1 mile = 1.6 km
 1 pint = 0.568 litres
 1 inch = 2.54 cm
 1 kg = 2.2 lbs



Egbert's American customer has sent him a specification for a new bridge which they want to span a gorge of 200 feet. Egbert's computer software uses metres, but he knows that one foot is 12 inches. How long does the bridge need to be in metres?



Carpenters perform calculations to help them lay out and construct wooden stairs. Calculate the length of the stringer (c) for the stairs shown below.

Example activity linking curriculum learning to a career (how carpenters use Mathematics)

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Presentation - presenting ideas for solutions to the rest of the group

Example activity linking curriculum learning to a career (how carpenters use Mathematics)

Carpenters perform calculations to help them lay out and construct wooden stairs. Calculate the length of the stringer (c) for the stairs shown below.

Year 10 - Higher

Autumn term

Spring term

Summer term

Equations

Functions and sequences

Surds

Basic probability

3D objects

Units and measure

Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Communication - Students develop this core skill as they interact during group/shared work

Example activity linking curriculum learning to a career (how opticians use Mathematics)

Conversion Factors:
 1 mile = 1.6 km
 1 pint = 0.568 litres
 1 inch = 2.54 cm
 1 kg = 2.2 lbs



The height of the letters on Ollie's test chart, which has been used for decades, are measured in inches. Unfortunately, when he now sends in a patient's prescription he needs to report the smallest letters they can read in mm. His patient can only read letters which are 0.5 inches tall, so what should he report in mm in order to get the correct prescription?

Formulae

Volume and surface area

Further probability

Inequalities

Ratio

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Problem solving - finding solutions to Mathematical problems given in context

Resilience - preserving with problem solving questions

Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Example activity linking curriculum learning to a career (how financial advisors use Mathematics)

FV = Future value
 PV = Present value
 r = interest rate
 n = number of years invested

Florence uses the following formula to calculate the future value of her customers' investments. Rearrange the formula to calculate the interest rate a customer would need in order to ensure he had a definite future value.

$$FV = PV(1 + r)^n$$

Proportion

Graphs of linear functions

Interpreting graphs

Circles

Pythagoras' theorem

Trigonometry

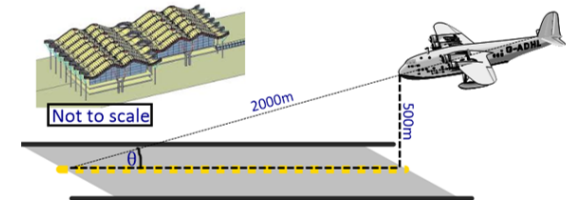
Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Problem solving - finding solutions to Mathematical problems given in context

Presentation - presenting ideas for solutions to the rest of the group

Example activity linking curriculum learning to a career (how pilots use Mathematics)

A passenger aeroplane flying into an airport and it's going to land. It needs to have an angle of elevation of between 13° and 17° (from horizontal flight) to ensure it lands safely on the runway. Does this plane need to make any adjustments to land safely?



Year 11

Autumn term

Interpreting graphs

Vector geometry

Transformations in a plane

Constructions and loci

Similarity

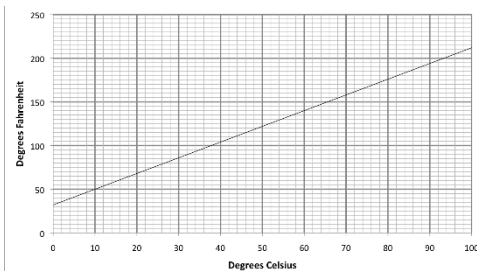
Congruence

Teamwork - Working together in search of solutions and accepting alternative methods as being valid

Presentation - presenting ideas for solutions to the rest of the group

Example activity linking curriculum learning to a career (how bakers use Mathematics)

Boris is an excellent baker, famed for his delicious buns. He has been hired to bake for an important charity event at a posh hotel in London. There is one issue. All his recipes are in degrees Fahrenheit but the hotel's oven works in degrees Celsius.



Spring term

Graphs of other functions and equations

Growth and decay

Transformations of curves

Problem solving - finding solutions to

Mathematical problems given in context

Resilience - preserving with problem solving questions

Initiative - Opportunities to exercise and develop initiative when applying Mathematical principles to solving problems

Presentation - presenting ideas for solutions to the rest of the group

Example activity linking curriculum learning to a career (how biologists use Mathematics)

Activity C

This activity brings ideas of how populations of organisms can grow according to an exponential rule. There are many examples of how exponential growth can occur in populations; bacteria growth is the obvious example. In this activity we look at rabbit populations and different models used to estimate the population growth.

There are initially 10 rabbits in a field. A number of models are proposed to model their growth which learners are going to investigate.

Summer term

