Putteridge
High
School

Extended Learning

Maths

Years 7 & 8

Maths

Year 7 - Autumn Term

Extended Learning Opportunities

Subject: Mathematics

Year: 7

Term: Autumn 1

Unit 1: Using numbers

Learning Objectives

- To be able to add and subtract negative numbers.
- To be able to multiply negative numbers.
- To be able to use < and > symbols.
- To be able to complete and read tables.

Unit 2: Sequences

Learning Objectives

- To be able to use function machines to generate inputs and outputs.
- To be able to find missing terms in a sequence.
- To be able to find the nth term of a linear sequence.
- To be able to recognise and produce sequences for square and triangular numbers.

Unit 3 : Perimeter, Area and Volume

Learning Objectives

- To be able to calculate the area and perimeter of 2D shapes.
- To be able to find the area of compound shapes.
- To be able to find volume of a cuboid.
- To be able to find surface area of a cuboid.

Extended Learning Opportunities

- **Create poster on everything you know about different shapes –** develop it further with additional facts you learn through research

- **Watch the documentary: The Story of 1 –** history of numbers presented by Terry Jones, directed by Nick Murphy.

- **Attempt some puzzle/activities from NRICH** https://nrich.maths.org/13706
  -https://nrich.maths.org/5947
  -https://nrich.maths.org/5868
  -https://nrich.maths.org/8739
  -https://nrich.maths.org/9732

- **Watch the movie based on mathematician Alan Turing's involvement in code breaking of Enigma** - 'The Imitation Game'.

- **Read the biography of Fibonnac**i - http://www-history.mcs.st-and.ac.uk/Biographies/Fibonacci.html

- **Listen/Watch TED talk of Arthur Benjamin** on 'The magic of Fibonnaci numbers'.

Half-term: Visit the Zaha Hadid Architects' Mathematics gallery at the London Science Museum.

https://www.dezeen.com/2016/12/07/zaha-hadid-architects-mathematics-winton-gallery-london-science-museum/

Putteridge High School

Extended Learning Opportunities

Subject: Mathematics	
Year: 7	
Term: Autumn 2	

Unit 4: Decimal numbers

Learning Objectives

- To be able to order decimals by size.
- To be able to multiply and divide decimals by 10, 100 and 1000.
- To be able to multiply and divide decimals by any whole number.
- To be able to multiply and divide decimals by decimals.

Unit 5: Working with numbers

Learning Objectives

- To be able to calculate square roots.
- To be able to carry out long multiplication and long division.
- To be able to use order of operations.
- To be able to round to correct degree of accuracy.

Unit 6: Statistics

Learning Objectives

- To be able to calculate the range, mode, median and mean of a data set.
- To be able to use tally charts and frequency tables to collate data.
- To be able to create data collection forms and questionnaires.
- To be able to draw simple conclusions from data.

Extended Learning Opportunities

- **Further reading 'The Everything Kids: Maths Puzzle Book',** by Meg Clements - Puzzles, games and trivia;find how to make maths fun and entertaining.

- **Science Museum – MathsGallery** - visit newly open section of Science Museum involving various aspects of Maths http://www.sciencemuseum.org.uk /visitmuseum/plan_your_visit/exhib itions/mathematics?keywords=mat hematics

- **Create poster on everything you know about decimal numbers –** develop it further with additional facts you learn through research.

- **The invention of the decimal point** - https://www.youtube.com/watch?v=qCLzF4qdbCc

- **Attempt some puzzle/activities from NRICH** https://nrich.maths.org/13706

- M,M and M https://nrich.maths.org/6267
- Searching for Mean(ing) https://nrich.maths.org/6345
- What's the weather like https://nrich.maths.org/10470

- **Listen/Watch the TED talk, 'The beauty of Data visualization'** by David McCandless

Christmas Break:

- **Visit the Science Museum – Maths Gallery**
  Visit newly open section of Science Museum involving various aspects of Maths.
  https://www.sciencemuseum.org.uk/visit-us

- **Watch biography based drama on Srinivasa Ramanujan Indian Mathematician in Trinity College, England – 'The man who knew Infinity'** directed by Matthew Brown.

- Attend a Christmas Lectures at The Royal Institute - http://www.rigb.org/christmas-lectures

- **Research a famous mathematicians and find out all his/her contributions to modern mathematics.** Create a poster or information booklet.

Maths

Year 7 - Spring Term

Extended Learning Opportunities

Subject: Mathematics

Year: 7

Term: Spring 1

Unit 7: Fraction, Percentages and Decimals

Learning Objectives

- To add and subtract fractions.
- To multiply and divide two fractions giving the answer in its simplest form.
- To order fractions by writing them with a common denominator or by converting them to decimals.
- To change simple fractions to decimals and percentages and vice versa e.g. ¾ , 2/5 , 7/10
- To find fractions of amounts
- To find percentages of amounts mentally e.g. 25% , 10% , 35%
- To find the outcome of a given percentage increase or decrease.
- To find the percentage profit or loss.

Unit 8: Angles

Learning Objectives

- To know the sum of angles at a point, on a straight line, in a triangle and in a quadrilateral.
- To construct triangles (ASA, SAS and SSS) and quadrilaterals from sketches.
- To explore the properties in angles made when a line cuts a pair of parallel lines.
- To use a protractor to measure & draw angles, including reflex angles, to the nearest degree.
- To find the sum of the interior angles of polygons.
- To find the exterior angle of regular polygons.

Unit 9 : Probability

Learning Objectives

- To use vocabulary and ideas of probability.
- To understand the probability scale from 0 to 1.
- To use sample space diagrams to calculate the theoretical probability.
- To compare experimental and theoretical probabilities for e.g. throwing two dice.
- To understand bias and its effect on equally likely outcomes. For example a loaded dice or unequal spinner.

Extended Learning Opportunities

- **Adding and subtracting fractions/Fractions/Pre-Algebra/ Khan Academy** - Online tutor on adding and subtracting fraction https://www.youtube.co m/watch?v=52ZlXsFJULI

- **Attempt some puzzle/activities from NRICH** https://nrich.maths.org/13706
  - Matching Fractions,Decimals and Percentages https://nrich.maths.org/1249
  - Peaches today, peaches tomorrow https://nrich.maths.org/2312
  - Fractions and Percentages card Games https://nrich.maths.org/2739
  - What does random looks like https://nrich.maths.org/7250
  - Do you feel lucky https://nrich.maths.org/7222

- **Research on different types of angles.** Was angle always measured in degrees? - Further reading -*History of angle measurement - International Federation of Surveyors*

- Watch the HRMC Junior Tax Fact - https://www.youtube.com/watch?v=C3_VwZ-Cmac

- How to teach your children about loans and credit linking money to percentages - https://www.peachy.co.uk/blog/teach-children-loans-credit/

Half-term:

- **Bletchley Park -** Visit Bletchley Park and explore the world of coding and maths. https://bletchleypark.org.uk/visit-us

- **Listen to the podcast - A brief History of Mathematics, by Marcus du Sautoy** - podcast - 10 episodes BBC4 Radio - http://www.bbc.co.uk/programmes/b00srz5b

Extended Learning Opportunities

Subject: Mathematics

Year: 7

Term: Spring 2

Unit 10: Algebraic manipulation

Learning Objectives

- To simplify linear algebraic expressions by collecting like terms.
- To use simple formulae from mathematics and other subjects.
- To substitute integers into simple formulae.
- To simplify expressions by grouping like terms including negative terms.
- To factorise algebraic expressions.
- To expand and simplify expressions.

Unit 11: Ratio and proportion

Learning Objectives

- To understand and use ratio notation.
- To simplify ratios.
- To solve problems involving proportion using a unitary method.
- To divide a quantity into two or more parts in a given ratio.
- To solve problems involving recipes, unit pricing (best buy), exchange rates, speed and other contexts.

Extended Learning Opportunities

- **Create a song or rhyme** to help you remember your formulae.
- **Watch the documentary:** top 10 equations that changed the world - https://www.youtube.com/watch?v=MB83QH0XZEI
- Life of Fred Maths, by Stanley F.Schmidt – Series of stories based on 5 year maths genius Fred Gauss.
- Legoland – Imagination Centre – Lego Education featuring Mindstorms – Visit maths and programming workshop in Legoland. https://www.legoland.co.uk/explore-the-resort/attractions/
- **Attempt some puzzles/activities from *NRICH*** https://nrich.maths.org/13706
    - Mixing lemonade https://nrich.maths.org/6870
    - Areas and ratio https://nrich.maths.org/309
    - Ratio and proportion short problems https://nrich.maths.org/9256
- **Algebra foundation - Khan Academy** https://www.khanacademy.org/math/algebra/introduction-to-algebra

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Maths

Year 7 - Summer Term

Extended Learning Opportunities

Subject: Mathematics **Year: 7** **Term: Summer 1**
Unit 12: Linear Graphs
Learning Objectives • To identify coordinates of points on a given straight line. • To find the midpoint of a given line segment. • To draw and label lines parallel to the x and y axis. • To plot linear graphs in the form y = nx + n • To use graphs to find the value of y given x and vice versa. • To read and interpret real life travel and conversion graphs. • To show an awareness of how gradient and intercept affect the graph.
Unit 13: Construct and solve equations
Learning Objectives • To solve simple one step equations by informal methods. • To construct equations for and solve 'think of a number' problems. • To solve equations that require two operations. • To solve equations that lead to a negative answer. • To use equations to solve real life problems.
Unit 14: 3D shapes
Learning Objectives • To recognise 3D shapes and their names. • To draw 3D shapes on isometric paper. • To draw the net of a 3D shape. • To construct a 3D shape. • To know the relationship between faces, edges and vertices of 3D shapes.
Revision: • www.mymaths.co.uk • https://www.bbc.com/education/subjects/zqhs34j • https://vle.mathswatch.co.uk/vle/ • https://mathsmadeeasy.co.uk/ks3-revision/

Extended Learning Opportunities

- Wild **Maths** – explore, imagine, experiment, create! – try and explore one of the games from the NRICH site: http://wild.maths.org/
- **King's College London** – visit KCL site and attempt one of the weekly challenge competitions https://www.kcl.ac.uk/mathsschool/Weekl-Maths-Challenge/Weekly-maths-challenge.aspx
- **Create revision cards /Quiz** or get together with friends to revise.
- 3D printing and how it works - watch how to change 2D image to 3D models. https://www.youtube.com/watch?v=Vx0Z6LplaMU
- http://passyworldofmathematics.com/gradient-and-slope/ - The world only bike lift in Norway uses gradient.

Extended Learning Opportunities

Subject: Mathematics **Year: 7** **Term: Summer 2**

Unit 12: Linear Graphs

Learning Objectives • To identify co ordinates of points on a given straight line. • To find the midpoint of a given line segment. • To draw and label lines parallel to the x and y axis. • To plot linear graphs in the form y = nx + n • To use graphs to find the value of y given x and vice versa. • To read and interpret real life travel and conversion graphs. • To show an awareness of how gradient and intercept affect the graph.

Unit 13: Construct and solve equations

Learning Objectives • To solve simple one step equations by informal methods. • To construct equations for and solve 'think of a number' problems. • To solve equations that require two operations. • To solve equations that lead to a negative answer. • To use equations to solve real life problems.

Revision: • www.mymaths.co.uk • https://www.bbc.com/education/subjects/zqhs34j • https://vle.mathswatch.co.uk/vle/ • https://mathsmadeeasy.co.uk/ks3-revision/

Extended Learning Opportunities • **Wild Maths** – explore, imagine, experiment, create! – try and explore one of the games from the NRICH site: http://wild.maths.org/ • **King's College London** – visit KCL site and attempt one of the weekly challenge competitions – https://www.kcl.ac.uk/mathsschool/Weekl-Maths-Challenge/Weekly-maths-challenge.aspx • **Listen to Travels in a Mathematical World podcast**, by Peter Rowlett – featuring mathematicians talking about their work as well as features on maths history and maths news; http://www.travelsinamathematicalworld.co.uk • **Watch** biography based drama on Srinivasa Ramanujan indian Mathematician in Trinity College, England – 'The man who knew infinity' directed by Matthew Brown. • BBC Universe Documentary The Great Math Mystery BBC Documentary 2015 – https://www.youtube.com/watch?v=JiH7IMGW60A

- **Research Pythagoras** and the maths he explored – find out all his contributions to modern Mathematics.
- **Create revision cards /Quiz** or get together with friends to revise.

Maths

Year 8 – Extended learning opportunities

Autumn Term

Putteridge High School

Extended Learning Opportunities

Subject: Mathematics

Year: 8

Term: Autumn 2

Unit 4: Percentages

Learning Objectives

- To write one value as a percentage of another value.
- To use a multiplier to calculate a percentage increase or decrease.
- To write a change of value as a percentage increase or decrease.
- To use percentage to compare two quantities.

Unit 5: Sequences

Learning Objectives

- To use flow diagrams to generate sequences.
- To use the nth term for sequences.
- To work out the nth term of a sequence.
- To use the special sequence of Fibonnaci numbers

Unit 6: Area of 2D and 3D shapes

Learning Objectives

- To work out the area of triangles, parallelogram and trapezia.
- To work out the areas of compound shapes.
- To work out the surface areas of cuboids.

Extended Learning Opportunities

- **Attempt some puzzle/activities from NRICH**: https://nrich.maths.org/
- To find real-life applications of percentages, look at the following financial link: http://www.pfeg.org/
- **Research the Fibonacci Sequence** and how it occurs in nature. This could be a starting point http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html
- **Watch youtube video** how to write a Fibonacci poem https://www.youtube.com/watch?v=yLR7uGJCWKk
- **Watch youtube videos** Doodling in maths, spirals, Fibonacci and plant 1,2 & 3
    Part 1 https://www.youtube.com/watch?v=ahXIMUkSXX0
    Part 2: http://youtu.be/lOIP_Z_-0Hs
    Part 3: http://youtu.be/14-NdQwKz9w

- **Collins connect online platform** : Feeling the cold Wonder of Maths
- **Kings College London** – visit KCL site and attempt one of the weekly challenge competitions- https://www.kcl.ac.uk/mathsschool/Weekly-Maths-Challenge/Weekly-maths-challenge.aspx

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Maths

Year 8 – Spring Term

Extended Learning Opportunities

Subject: Mathematics
Year: 8
Term: Spring 1

Unit 7: Graphs

Learning Objectives • To draw graphs of linear equations. • To work out the gradient of a linear graph • To work out an equation of the form y = mx +c from its graph. • To draw graphs of simple quadratic equations. • To draw graphs to illustrate real-life situation.

Unit 8: Simplifying numbers

Learning Objectives • To multiply and divide by powers of 10 • To round numbers to a specific number of significant figures • To write large numbers in standard form. • To multiply numbers in standard form.

Unit 9: Interpreting data

Learning Objectives • To interpret pie charts by the angle size of each sector. • To use the scaling method to construct pie charts. • To use scatter graphs. • To construct scatter graphs.

Extended Learning Opportunities
 	
• **Attempt some puzzle/activities from NRICH**: https://nrich.maths.org/
   - How steep is the slope   https://nrich.maths.org/6603
   - Parabolic patterns   https://nrich.maths.org/773
   - Picturing the world https://nrich.maths.org/10464
   - https://nrich.maths.org/stemnrich

- **Collins connect online platform** : Skiing Wonder of Maths, Understanding standard form, Pyramids from the Wonder of Maths.
- **Watch the YouTube video** – Man and the rise of Civilisation episode 1 – 'The Beginnings of Numbers'.
- **Visit the Science Museum in London** – Visit the London Science museum which involves various aspects of maths – http://www.sciencemuseum.org.uk/visitmuseum/plan_yourvisit.exhibitions/mathemathematics?ke
- **Watch biography based drama on Srinivasa Ramanujan Indian Mathematician in Trinity College, England – 'The man who knew Infinity'** directed by Matthew Brown.
- http://passyworldofmathematics.com/gradient-and-slope/ - The world only bike lift in Norway uses gradient.

Extended Learning Opportunities

Subject: Mathematics

Year: 8

Term: Spring 2

Unit 10: Algebra

Learning Objectives

- To write and simplify expressions involving all four operations.
- To simplify expressions that have a number of terms.
- To multiply out brackets in algebraic expressions.
- To identify equivalent expressions.
- To write algebraic expressions involving powers.

Unit 11: Congruence and scaling

Learning Objectives

- To recognise congruent shapes.
- To enlarge a shape by a scale factor.
- To use shape and ratio.
- To use scales in drawings and maps.

Revision:

- www.mymaths.co.uk
- https://www.bbc.com/education/subjects/zqhs34j
- https://vle.mathswatch.co.uk/vle/
- https://mathsmadeeasy.co.uk/ks3-revision/

Extended Learning Opportunities

- **Attempt some puzzle/activities from NRICH**: https://nrich.maths.org/
    - Perimeter Expressions https://nrich.maths.org/7283
    - Number Pyramids https://nrich.maths.org/2281
    - More Number Pyramids https://nrich.maths.org/2282
    - Quadratic patterns https://nrich.maths.org/11011
    - Attractive tablecloths https://nrich.maths.org/900
    - Growing Rectangles https://nrich.maths.org/6923

- **Collins connect online platform**: Human Tower Wonder of Maths, Construction views and Large bike Wonder of Maths.
- **The colossal Book of short Puzzles and Problems,** by Martin Gardner – a collection of short inventive problems by popular mathematics and science writer.
- **Watch the Beautiful Equations (2010) –** BBC documentary featuring Stephen Hawkins and Mathew Collins (maths and art together)
- **Watch the documentary : top 10 equations that changed the world -** https://www.youtube.com/watch?v=MB83QH0XZEI

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Maths

Year 8 – Summer Term

Extended Learning Opportunities

Subject: Mathematics

Year: 8

Term: Summer 1

Unit 12: Fractions and decimals

Learning Objectives

- To add and subtract fractions and mixed numbers.
- To multiply a fraction and an integer.
- To divide a fraction or a mixed number by an integer.
- To divide an integer by a unit fraction.
- To multiply with combinations of large and small numbers mentally.
- To divide combinations of large and small numbers mentally.

Unit 13: Proportion

Learning Objectives

- To understand the meaning of direct proportion.
- To find missing values in problems involving proportion.
- To represent direct proportion graphically and algebraically.
- To understand what inverse proportion is.
- To use graphical and algebraic representations of inverse proportion.
- To recognise direct and inverse proportion and work out missing values.

Unit 14: Circles

Learning Objectives

- To know the definition of a circle and the names of its parts.
- To work out the relationship between the circumference and the diameter of the circle.
- To calculate the circumference of a circle.
- To calculate the area of a circle.

Revision:

- www.mymaths.co.uk
- https://www.bbc.com/education/subjects/zqhs34j
- https://vle.mathswatch.co.uk/vle/
- https://mathsmadeeasy.co.uk/ks3-revision/

Extended Learning Opportunities

- **Attempt some puzzle/activities from NRICH**: https://nrich.maths.org/
  - The greedy Algorithm https://nrich.maths.org/6541
  - Egyptians fractions https://nrich.maths.org/1173
  - Triathlon and fitness https://nrich.maths.org/7586
  - Triangles in circles https://nrich.maths.org/2844

- **Collins connect online platform** : Understanding inverse proportion, Usain Bolt Wonder of Maths and Clocks and Trapeze artists.
- **Research the origins of Pi and how to derive it.   How many decimal places can you remember it to?**
- **https://www.youtube.com/watch?v=mZ4CP0vTgEE – Some facts on Pi**

Putteridge High School

Extended Learning Opportunities

Subject: Mathematics **Year: 8** **Term: Summer 2**
Unit 15: Equations and formulae
Learning Objectives • To solve equations involving brackets. • To solve equations with variables on both sides. • To solve equations with fractional coefficients. • To solve equations with brackets and fractions. • To change the subject of formula.
Unit 16: Comparing data
Learning Objectives • To create grouped frequency table from raw table. • To interpret frequency diagrams. • To draw a frequency diagram from a grouped frequency table. • To use mean and range to compare data from two sources.
Revision: • www.mymaths.co.uk • https://www.bbc.com/education/subjects/zqhs34j • https://vle.mathswatch.co.uk/vle/ • https://mathsmadeeasy.co.uk/ks3-revision/
Extended Learning Opportunities • Attempt some puzzle/activities from NRICH: https://nrich.maths.org/ 　　- Perception versus reality https://nrich.maths.org/10466 　　- Picturing the world https://nrich.maths.org/10464 　　- Reaction timer https://nrich.maths.org/6044 　　-shape products https://nrich.maths.org/13079 • Collins connect online platform: Stadium Wonder of Maths, From pastime to sport. • Research about quadratic equations.