Autumn Learning Journey for Maths
Year 8H Unit 1 Factors and Powers

How does this unit link to prior learning?

Multiples, factors and prime numbers

Prior Knowledge Check

1) Write down all the factors of a) 48 b) 100 c) 17

2) Find the first 4 multiples of a) 3 b) 9 c) 12

3) Write down the first 10 prime numbers?

What will you be learning about?	How does this link to the wider curriculum?
• Use prime numbers, factors, multiples, calculate with roots, and with integer indices. • Round numbers and measures to an appropriate degree of accuracy.	• The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

	RAG		RAG
1. **Prime factor decomposition** • Write the prime factor decomposition of a number. • Use prime factor decomposition to find the HCF of two numbers.		**2. Laws of indices** • Work out the laws of indices for positive powers. • Show that any number to the power of zero is 1. • Use the laws of indices for multiplying and dividing.	
3. STEM: Powers of 10 • Use and understand powers of 10. • Use the prefixes associated with powers of 10. • Understand the effect of multiplying and dividing by any integer power of 10. •		**4 Calculating and estimating** • Use prime factor decomposition to find the LCM of two numbers. • Estimate numbers using significant figure rounding	
5. Revision Lesson • Select topics you feel the class need to revise. • Classroom based or Mathswatch.		**6. Assessment Lesson** • Do 10-minute top up and go through answers together, students self-assess. • Open book assessment done in silence	
7. Feedback Lesson • Student to highlight their traffic light sheet. • Teacher to go through test and students to self-assess in green. • Students to complete the NOW section of the WOW-HOW-NOW sheet.			

Key Vocabulary						
multiple	prime	factor	highest common factor (HCF)	integer	square	significant figures
divisible	prime factor	common factor	lowest common multiple (LCM)	index	cube	approximate

How will this help you in the future?

KS4

1. Factors and Multiples

- Used to find HCF and LCM through prime factor decomposition.
- Supports factorising expressions and simplifying algebraic fractions.
- Helps simplify surds by identifying square factors.

2. Powers and Indices

- Forms the basis of GCSE laws of indices, including negative and fractional powers.
- Essential for standard form and scientific notation.
- Applied in compound interest, growth, and decay problems.

3. Estimation and Approximation

- Helps check whether answers are reasonable in exams.
- Required for rounding to significant figures.
- Leads to upper and lower bounds calculations for measurements and error intervals.

Beyond LHS

Estimation

A key everyday skill that helps people make quick, accurate decisions.

- **Shopping and Budgeting:** Estimate totals, discounts, and expenses to avoid overspending.
- **Checking Costs:** Spot billing errors, unreasonable quotes, or financial mistakes.
- **Planning:** Estimate time, materials, and costs for projects, travel, and home improvements.

Powers (Indices)

Essential for understanding finance and technology.

- **Compound Interest:** Explains how savings, investments, and pensions grow over time.
- **Debt Management:** Helps people understand how loans and credit card interest increase.
- **Digital Technology:** Used in computer storage, data sizes, and computing systems.

Factors

Important for organising, dividing, and solving problems efficiently.

- **Everyday Organisation:** Used when sharing resources, arranging schedules, or dividing quantities.
- **Technology Careers:** Underpin coding, algorithms, and cybersecurity.
- **Trades and Engineering:** Help with scaling plans, measuring materials, and reducing waste.

Autumn Learning Journey for Maths
Year 8H Unit 2 Working with algebra

How does this unit link to prior learning?
• Repeated multiplication, powers of 10, square and cube numbers and roots, inverse operations.

Prior Knowledge Check

1. Calculate a) $3^3 \times 3^2 =$ b) $2^5 \div 2^2 =$ c) $64^{1/2} =$
2. Simplify the expressions: a) 3x +4 + 2x + 2 b) 5x – 1 - 3x + 4
3. Expand: a) 3(x + 2) b) 4x (x + 1)
4. Factorise: a) 5x + 10 b) 4x + 6
5. Solve the following equations a) x + 3 = 10 b) 4x = 20

What will you be learning about?	How does this link to the wider curriculum?
• Expand and factorise expressions. • Understand and use the laws of indices when applied to algebra. • Simplify algebraic expressions. • Solve multi-step equations.	• The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

1. Simplifying expressions	RAG	2. More simplifying	RAG
• Simplify expressions involving powers and brackets. • Understand the meaning of an identity.		• Use the index laws in algebraic calculations and expressions. • Simplify expressions with powers.	
3. Expanding and simplifying • Write and simplify expressions involving brackets and powers. • Factorise an algebraic expression.		**4. Substituting** • Substitute integers into expressions. • Substitute integers (including negatives) into expressions and solve simple equations.	
5. Consolidation Lesson • Select topics you feel the class need to revise. Classroom based or Mathswatch.		**6. Using Number Machines to solve equations** • Solve one-step equations using number machines • Solve multi-step-step equations using number machines	

7. Using Balancing to solve equations • Solve one-step equations using balancing • Solve multi-step equations using balancing • Solving equations with unknowns on both sides		**8. Formula** • Recognise similarities and differences between equations and formulae • Use substitution in formulae	
9. Revision Lesson • Select topics you feel the class need to revise. • Classroom based or Mathswatch.		**10. Assessment Lesson** • Do 10-minute top up and go through answers together, students self-assess. • Open book assessment done in silence	
11. Feedback Lesson • Student to highlight their traffic light sheet. • Teacher to go through test and students to self-assess in green. • Students to complete the NOW section of the WOW-HOW-NOW sheet.			

Key Vocabulary

Expression	equation	indices	base	power	expanding	factorising,
simplifying	substitution	formula				

How will this help you in the future?

KS4

Simplifying Expressions
- Develops the ability to simplify algebraic expressions, a key skill used throughout GCSE Maths.

Expanding and Simplifying
- Teaches students to expand brackets and collect like terms, fundamental GCSE algebra skills.
- Introduces factorising, which is needed for solving equations and higher-level algebra.

Substituting
- Develops confidence in substituting positive and negative numbers into expressions.
- Prepares students for evaluating formulae and solving algebraic problems at GCSE.

Using Number Machines to Solve Equations
- Introduces solving equations using inverse operations, a core GCSE skill.
- Builds understanding of how equations work before using formal algebraic methods.

Using Balancing to Solve Equations
- Develops formal methods for solving one-step and multi-step equations.
- Prepares students to solve equations with unknowns on both sides, a common GCSE topic.

Formulae
- Develops confidence in substituting values into formulae accurately.
- Builds understanding of equations and formulae, preparing students for GCSE algebra and science.

Beyond LHS

Simplifying Expressions
- Develops logical thinking and problem-solving skills that are useful in many careers.
- Builds confidence in working with patterns and rules used in science, engineering and technology.

Expanding and Simplifying
- Encourages systematic problem-solving by breaking complex tasks into manageable steps.
- Develops reasoning skills that support careers involving data, engineering and computing.

Substituting
- Builds confidence in using formulae to calculate values in real-life situations.
- Supports practical skills used in subjects such as science, technology and business.

Using Number Machines to Solve Equations
- Strengthens problem-solving skills used in everyday decision-making and many careers.

Using Balancing to Solve Equations
- Encourages careful, methodical thinking when solving problems.
- Develops perseverance and accuracy, which are valued in the workplace.

Formulae
- Builds confidence in using formulae to solve practical problems, such as calculating costs, measurements or distances.
- Prepares students for further study and careers that involve mathematical, scientific or technical calculations.

Autumn Learning Journey for Maths
Year 8H Unit 3 2D and 3D Shapes

How does this unit link to prior learning?

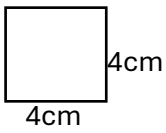
- **Nets of shapes**
  Links to lesson 3 on surface area of prisms
- **Know area formulae for basic shapes**
  Links lessons 2 and 3 on area and surface area
- **Calculating with powers and roots**
  Links to lessons 9 and 10 on Pythagoras' Theorem

Prior Knowledge Check

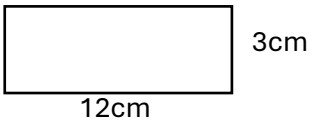
1. Draw a net that when folded will make a cube

2. Find the area:

a)



b)



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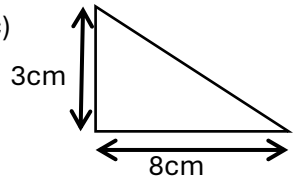

3. Calculate:
   a) $6^2 \times 4 =$ b) $2^2 \times 3 =$ c) $\sqrt{81} =$

What will you be learning about?

- Calculate surface area and volume of prisms.
- Find the area and circumference of circles.
- Know and use Pythagoras theorem.

How does this link to the wider curriculum?

- The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

	RAG		RAG
1. Plans and Elevations • Use 2D representations of 3D solids.		**2. Recap lesson on Area of 2D shapes** • Area of a rectangle, triangle, parallelogram and trapezium. • Area of compound shapes.	
3. Surface Area of Prisms • Sketch nets of 3D solids. • Calculate the surface area of prisms.		**4. Volume of Prims** • Calculate the volume of right prisms	
5. Consolidation Lesson • Select topics you feel the class need to revise. • Classroom based or Mathswatch.		**6. Circumference of a circle** • Name the different parts of a circle. • Calculate the circumference. • Calculate the radius or diameter when you know the circumference.	

7. Area of a circle • Calculate the area of a circle. • Calculate the radius or diameter when you know the area.		**8. Cylinders** • Calculate the volume and surface area of a cylinder.	
9. Pythagoras' Theorem 1 • Use Pythagoras' theorem in right-angled triangles. • Finding the hypotenuse. • Problem solving.		**10. Pythagoras' Theorem 2** • Use Pythagoras' theorem in right-angled triangles. • Finding a short side. • Problem solving.	
11. Revision Lesson • Select topics you feel the class need to revise. • Classroom based or Mathswatch.		**12. Assessment Lesson** • Do 10-minute top up and go through answers together, students self-assess. • Open book assessment done in silence	
13. Feedback Lesson • Student to highlight their traffic light sheet. • Teacher to go through test and students to self-assess in green. • Students to complete the NOW section of the WOW-HOW-NOW sheet.			

Key Vocabulary

Elevation	Plan	Net	Prism	Area	Face	Volume

How will this help you in the future?

KS4

Plans and Elevations
- Develops spatial reasoning by interpreting 2D representations of 3D objects, a key GCSE geometry skill.
- Prepares students for GCSE questions involving plans, elevations and 3D shapes.

Prisms
- Develops understanding of nets and 3D shapes, supporting GCSE geometry topics.
- Prepares students to calculate the surface area and volume of prisms accurately in exam questions.

Circles and Cylinders
- Develops confidence in using the circumference area and volume formulae, a key GCSE geometry skill.
- Strengthens understanding of the relationship between radius, diameter and circumference.

Pythagoras' Theorem
- Develops problem-solving skills needed for GCSE geometry and trigonometry.
- Prepares students for multi-step GCSE problems involving right-angled triangles and coordinate

Beyond LHS

- **1. Plans and Elevations**
- Develops spatial awareness used in careers such as architecture, engineering and construction.
- Builds the ability to interpret technical drawings and plans used in many workplaces.

Prisms
- Helps calculate the amount of material needed to make or cover 3D objects.
- Supports careers in manufacturing, engineering, design and construction.

Circles and Cylinders
- Builds practical measurement skills used when working with circular objects such as wheels, pipes and machinery.
- Helps calculate the capacity and surface area of everyday objects such as tanks, cans and pipes.
- Supports careers in engineering, manufacturing and construction.

Pythagoras' Theorem
- Develops problem-solving skills used to calculate distances and measurements accurately.
- Supports careers in construction, surveying, engineering and design.