KS3 Assessment using Steps

SEVA SCHOOL

An Introduction to our new KS3 Assessment Steps

Our Steps assessment framework:

- Builds on the new KS2 National Curriculum
- Allows for progression through the new KS3 National Curriculum
- Prepares students for the new KS4 curriculum
- Is written in language that is easily understood by students, parents and teachers
- Supports pupils to understand how to improve and helps teachers to plan for and assess this improvement

We believe all pupils are capable of making great progress and use assessment to support our pupils to achieve. In our Steps framework, student attainment will be assessed against descriptors. The descriptors for each subject discipline are found in this booklet.

Each 'Step' describes the skills, knowledge and understanding within the KS3 curriculum that students must master by the end of KS3, in order to be on track for a given GCSE grade by the end of Year 11. For example, if a student achieves Step 5 in Mathematics by the end of KS3, then the expectation is for a good pass, that is a GCSE grade 5, at the end of KS4.

KS3 Assessment Steps

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KS3 Assessment Steps - Art		
	Skills	**Understanding**
Step 9	• Highly developed ability to independently use all formal elements eg: • 2D (and some 3D*) skills are highly refined and consistent • Explores a broad range of ideas independently demonstrating an exceptionally high level of creativity and imagination • Able to skilfully experiment and discriminate purposefully with a range of media • Clear evidence of taking creative risks	• Able to independently analyse artists' work using sophisticated subject specialist vocabulary, demonstrating cultural understanding • Highly developed ability to evaluate own and others work using sophisticated subject specialist vocabulary • Can produce a meaningful and skilful personal response when realising intentions with clear visual and written links to development work
Step 8	• Highly developed ability to independently use all formal elements eg: • 2D (and some 3D*) skills are refined and consistent • Explores a broad range of ideas independently demonstrating a high level of creativity and imagination • Able to experiment and discriminate purposefully with a range of media demonstrating a high-level quality and accuracy • Have started to take creative risks	• Able to analyse artists' work using appropriate detailed subject specialist vocabulary, demonstrating cultural understanding • Ability to evaluate own and others work using appropriate subject specialist vocabulary and is communicated with fluency and accuracy • Can produce a skilful personal response with clear visual and written links to development work
Step 7	• Confident and consistent ability to use all formal elements to a high standard eg: 2D (and some 3D*) skills • Explores a broad range of ideas demonstrating a high level of creativity and imagination • Able to experiment purposefully with a wide range of media demonstrating quality and accuracy	• Able to analyse artists' work using appropriate detailed subject specialist vocabulary • Ability to evaluate own and others work using appropriate subject specialist vocabulary and is communicated with fluency and accuracy • Can produce a personal response with clear visual and written links to development work
Step 6	• Competent and consistent ability to use all formal elements eg: 2D skills • Explores a range of ideas demonstrating a good level of creativity and imagination • Able to experiment purposefully, demonstrating accuracy across media	• Able to analyse artists' work using appropriate subject specialist vocabulary • Ability to evaluate own and others work using appropriate subject specialist vocabulary • Can produce a personal response with clear visual and written links to development work
Step 5	• Competent and consistent ability to use most formal elements eg: 2D skills • Explores a range of ideas demonstrating a good level of creativity and imagination • Able to experiment purposefully with an (increasing*) range of media	• Able to analyse artists' work using some subject specialist vocabulary • Ability to evaluate own and others work using some subject specialist vocabulary • Can produce a personal response with clear links to development work
Step 4	• Competent ability to use most formal elements eg: 2D skills • Explores a range of ideas demonstrating some level of creativity and imagination Able to experiment with an (increasing *) range of media	• Able to explain artists' work using basic subject specialist vocabulary • Ability to evaluate own and others work using basic subject specialist vocabulary • Can produce a personal response with some links to development work
Step 3	• Some ability to use the formal elements eg: 2D skills • With support can explore a range of ideas demonstrating a limited level of creativity and imagination • Able to experiment with a limited range of media • Development work is inconsistent in ideas and/or quality	• Able to describe artists' work using basic key words • With support can evaluate own and others work using basic subject specialist vocabulary • Can produce a personal response with limited links to development work
Step 2	• Limited ability to use the formal elements eg: produce a basic line drawing and use basic flat colour • With support can explore some ideas demonstrating a limited level of skill • With support, able to use a limited range of media	• Able to identify elements of artists' work • With support can state a strength and weakness in their own and others work • Limited ability to produce a response
Step 1	• Minimal ability to use the formal elements eg: produce a basic line drawing and use basic flat colour • With support can explore some ideas demonstrating a minimal level of skill • Able to use a minimal range of media	• Able to identify basic elements of artists' work • With support can state a strength and weakness in their own work • Minimal ability to produce a response

KS3 Assessment Steps - Computing		
9	**Computer Science**	**Algorithms:** • The choice of an algorithm should be influenced by the data structure and data values that need to be manipulated • Understand standard searching algorithms - binary search, linear search • Understand standard sorting algorithms - bubble sort, merge sort, insertion sort **Visual Programming / Textual Programming:** • Manipulation of logical expressions, eg: truth tables and Boolean valued variables. Two-dimensional arrays (and higher) • Procedures that call procedures, to multiple levels. (Building one abstraction on top of another) • Programs that read and write persistent data in files **Abstractions:** • Develop and apply analytic, problem-solving, design, and computational thinking skills – abstraction, decomposition, algorithmic thinking **Binary & Data Representation:** • Understand how numbers can be represented in binary and be able to carry out simple operations on binary numbers, eg: binary addition, conversion between binary and decimal, binary shift **Hardware & Networks** • Understand the components that make up digital systems, how they communicate with one another and with other systems • Compare wired and wireless networks • Explain network topologies and protocols
8	**Computer Science**	**Algorithms:** • Know how to interpret, validate, test, correct or complete algorithms **Visual Programming / Textual Programming:** • Documenting programs helps explain how they work **Abstractions:** • Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems **Data Handling:** • Evaluate the effectiveness of a model
	Information Technology (IT Applications)	• Analyse ethical, legal, cultural and environmental concerns • Be discerning in evaluating digital content
	Digital Literacy (Online Safety)	• Explain how various computer laws influence the behaviour of individuals, organisations and society. • Explain the moral/social effect of ICT in society.
7	**Computer Science**	**Algorithms:** • Use logical reasoning to compare the utility of alternative algorithms for the same problem **Visual Programming / Textual Programming:** • Create, test and evaluate programs against user requirements **Abstractions:** • Use computational abstractions **Hardware & Networks:** • Understand how computer networks can provide multiple services, eg: email, instant messaging
	Information Technology (IT Applications)	• Analyse the impact of digital technology to the individual and to wider society • Provide detailed evaluation of digital content
	Digital Literacy (Online Safety)	• Explain the computer misuse act
	Computer Science	**Algorithms:** • Understand several key algorithms that reflect computational thinking **Visual Programming / Textual Programming:** • Design and develop more complex modular programs that use procedures or functions • Solve problems by decomposing them into smaller parts in a language • Make appropriate use of complex data structures, eg: arrays **Binary & Data Representation:**

6		• Understand how text, images and sound can be represented digitally in the form of binary numbers, eg: 2 bit image **Data Handling:** • Model a complex real-world system with feedback • Explain how protocols & connection components work together
	Information Technology (IT Applications)	• Can explain the moral/social effect of ICT in the community
	Digital Literacy (Online Safety)	• Undertake creative projects that include collecting and analysing data and meeting the needs of known users • Understand that digital technology affects wider society • Provide simple evaluation of digital content
5	**Computer Science**	**Algorithms:** • Understand that algorithms may be decomposed into component parts (procedures), each of which itself contains an algorithm • Use logical reasoning to explain how some simple algorithms work • Use logical reasoning to detect and correct errors in algorithms • Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems • Know how to produce algorithms using pseudocode **Visual Programming / Textual Programming:** • Use input and output, selection, variables and data types • Debug programs that accomplish specific goals • Use SQL to retrieve data from a table in a relational database **Boolean:** • Use logic gates to construct logic circuits, and associate these with logical operators and expressions **Hardware & Networks:** • Understand computer networks including the Internet, ie: data transfer **Data Handling:** • Model a simple real-world system with inputs and outputs • Compare wired to wireless connections and list examples of specific technologies currently used to implement both connections
	Information Technology (IT Applications)	• Analyse data and information • Select and combine a variety of software to accomplish given goals • Create, re-use, revise and re-purpose digital artefacts for a given audience • Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences
	Digital Literacy (Online Safety)	• Protect online identity and privacy Use search technologies effectively
4	**Computer Science**	**Algorithms:** • Understand that algorithms are implemented as programs on digital devices • Write algorithms with care and precision to avoid errors and ambiguity (flowcharts) • Recognise that different processes have different levels of efficiency **Visual Programming / Textual Programming:** • Design and create simple programs that accomplish specific goals • Make appropriate use of basic data structures, eg: lists, tables • Use various forms of input and output in a language • Design and apply programming constructs to solve a problem • Debug simple programs in a language **Web Development** • Explain what CSS is & how it is used to style static web pages **Boolean:** • Understand simple Boolean logic (eg: AND, OR and NOT) and some of its uses in circuits and programming **Binary & Data Representation:** • Know how numbers can be represented in binary and how this applies to computer circuitry **Hardware & Networks:** • Understand computer networks including the Internet • Understand how computer systems communicate with other systems • Describe how hardware components used in computing systems work together in order to execute programs

	Information Technology (IT Applications)	• Collect appropriate data • Choose appropriate layout of text, shapes and other media in documents or presentations. • Use functions to analyse data in a spreadsheet & automatically create charts from data • Solve a problem by implementing steps of the investigative cycle on a data set • Consider the trustworthiness, design and usability when designing a digital artefact
	Digital Literacy (Online Safety)	• Recognise inappropriate content, contact and conduct and know a range of ways to report concerns • Can highlight risks of data loss and measures to prevent it • Can suggest a range of precautions against cyberbullying • Understand how changes in technology affect safety • Can explain viruses/worms
3	**Computer Science**	**Algorithms:** • Understand that algorithms are a sequence of precise steps to solve a given problem/achieve goals • Understand that programs execute by following clear, precise instructions • Explain that algorithms can include selection (if) and repetition (loops) • Develop algorithms according to a plan and test them • Correct algorithms if they fail tests • Solve problems by decomposing them into smaller parts • Use sequence, selection, and repetition in programs **Visual Programming / Textual Programming:** • Identify inputs and outputs in a visual/textual language (Scratch) • Define a variable as a name that refers to data being stored by the computer • Decompose a larger problem into smaller subproblems • Apply appropriate construct to solve a problem **Web Development** • Describe what HTML is & how it is used to structure static web pages **Binary & Data Representation:** • Know how numbers can be represented in binary **Hardware & Networks:** • Know the hardware and software components that make up computer systems
	Information Technology (IT Applications)	• Understand the opportunities networks offer for communication and collaboration • Use software to accomplish given goals • Use basic formulas with cell references to perform calculations in a spreadsheet • Define the terms ‘correlation’ and ‘outliers’ in relation to data trends
	Digital Literacy (Online Safety)	• Understand a range of ways to use technology securely, eg: password strength, document protection • Analyse how search engines select and rank results when searches are made • Explain copyright law
2	**Computer Science**	• Understand algorithms can be represented symbolically (flowcharts) • Understand that algorithms can be represented in a clearly defined language • Use sequence and selection in programs • Work with various forms of input and output • Understand that steps can be repeated • Explain the difference between a general-purpose computing system and a purpose-built device (Embedded system)
	Information Technology (IT Applications)	• Create folders and organise files on the network • Collect data • Identify features of several software applications • Create appropriate charts in a spreadsheet • Explain how visualising data can help identify patterns and trends
	Digital Literacy (Online Safety)	• Recognise acceptable/unacceptable online behaviour • Use simple search technology • Can describe what copyright means
1	**Computer Science**	• Understand that a sequence is a set of steps • Understand computers need specific instructions • Know how to create a sequence of steps to do something • Describe everyday activities that can be followed by humans and by computers • Explain that computers need more precise instructions than humans do • Define decomposition as breaking a problem down into smaller, more manageable subproblems
	Information Technology (IT Applications)	• Recognise common uses of information technology beyond school, eg: digital devices, websites • Load and save files on the network • Identify columns, rows, cells, and cell references in a spreadsheet • Explain the difference between data and information

	Digital Literacy (Online Safety)	• Use technology safely, respectfully and responsibly • Understand the basic security measures, eg: not sharing passwords • Identify how to report concerns about content and contact and where to go for help, eg: CEOP, report abuse buttons, in-school support

KS3 Assessment Steps – English		
Step	**Reading Skills (Identify / Interpret / Explain)**	**Spelling, punctuation and grammar**
8-9	Sophisticated focus and approach to the task showing a perceptive understanding of texts. All of below sustained throughout. Makes a perceptive comment and writes in an academic fashion. Analyses and appreciate the writer's craft. Shows increasing originality in personal response to texts.	Virtually all spelling and punctuation is controlled and accurate. There is appropriate and effective use of vocabulary to create effect and to convey precise meaning.
6-7	There is evidence of a sustained focus on the task (this may not always be consistent). Makes perceptive comments and writes in an academic fashion. Ideas are clearly conveyed with a secure understanding of texts and assured selection of evidence. Increasingly confident analysing writer's use of language, structure and form.	Spelling is secure and a range of punctuation is used accurately. Vocabulary is ambitious and is used with precision.
	There is a clear focus on the task. Developed understanding and engagement with texts. Can comment on and begin to analyse writer's use of language. Confident selection of evidence to justify personal response.	Most spelling, including irregular verbs, is accurate. A range of punctuation is used accurately (full stops/ commas/ apostrophes).Vocabulary is varied and is used with accuracy.
4-5	Shows some focus on the task. Beginning to show a developed understanding and engagement with the text. Evidence used to justify personal response.	Spelling is usually correct. Beginning to use a range of punctuation to signal sentence control.
2-3	Shows some awareness on the task. Beginning to show an understanding of the text. Evidence (quotes) sometimes used to justify personal response.	Spelling is usually correct. Some control of punctuation (full stops).
0-1	An attempt was made to address the task. Does not always understand the text. Sometimes refers to the text to support points.	Some spelling is correct. Some attempt to use punctuation.

English Speaking and Listening	
STEP	Features
0	Nothing said.
1	• begins to express feelings/ideas/information • begins to talk in ways that are audible and intelligible to others • begins to show some awareness of the listener Listens to questions/feedback but unable to respond
2	• expresses feelings/ideas/information in a very simple manner • listener generally able to make sense of what is said • listens to questions/feedback and begins to provide a simple response
3	expresses feelings/ideas/information, sometimes straightforwardly • begins to make an attempt to meet the needs of the audience. • listens to questions/feedback and provides a simple response
4	• expresses straightforward ideas/information/feelings • makes an attempt to organise and structure the presentation • shows some awareness of appropriate vocabulary and begins to use non-verbal features • attempts to engage the audience and provides a straightforward response to questions/feedback
5	• begins to develop ideas/information/feelings • organises the talk to help the listener, with a clear overall structure • chooses words and uses non-verbal features that show awareness of different purposes and listeners • responds to questions/feedback in a clear manner with some development in answers provided
6	• expresses and explains relevant ideas/information/feelings with some elaboration • organises and structures presentation clearly and appropriately to meet the needs of the audience • adapts vocabulary, grammar, and nonverbal features to suit audiences, purpose, and context • listens to questions/feedback, responding appropriately and in some detail
7	• explores a wide range of ideas/information/feelings whilst demonstrating an ability to prioritise material • shapes talk in deliberate ways for clarity and effect to engage the listener • effectively adapts vocabulary, grammar and non-verbal features to suit audience, purpose and context • listens carefully to questions/feedback, responding with insight and detail
8	begins to express sophisticated ideas/information/feelings using precise vocabulary • begins to organise and structure presentation using an effective range of strategies to engage the listener • adapts grammar and non-verbal features to match context and purpose. Begins to develop a distinct personal style. • listens carefully to questions/feedback. Begins to respond perceptively and, if appropriate, elaborates with further ideas and information
9	All of 8 with consistent sophistication
10	All of 9 – assured and convincing style is sustained throughout.

KS3 Assessment Steps - Geography			
	Enquiry Skills	**Location & Place**	**Human & Physical Processes**
Step 9	• Carry out personalised geographical investigations independently at different scales (local, national, global) • Evaluate sources of evidence critically and present coherent arguments and effective, accurate and well-substantiated conclusions	Uses an extensive variety of locational knowledge to anticipate the potential causes, consequences and significance of events, making links between the local, national and global level	Consider and evaluate future options for the sustained management of our planet
Step 8	• Design own fieldwork question • Reflecting critically on knowledge gained and able to use this with different locations	Uses detailed locational knowledge to analyse the impact that global events have at a local, national and global level	Explain complex interactions within and between physical and human processes and show how these interactions help change places and environments
Step 7	• Reflecting critically on fieldwork data, methods used and conclusions drawn • Chose own methods to investigate fieldwork	Analysing the impact that global events have at a local, national and global level	Explain causes and consequences and explain how the interaction between people and environments can result in complex and unintended changes
Step 6	**Number:** • Draw informed conclusions from numerical data • Draw evidenced conclusions and summaries from fieldwork transcripts and data • Plan an appropriate investigation for a given fieldwork question	Explain the significance of connections between physical and human locations	Make predictions, linking knowledge of processes to detailed place-based exemplars at a variety of scales

Step 5	**Graphs:** • Interpret and extract information from different types of graphs and charts • Respond to geographical questions in detail using data	Explain connections between areas at the local, national and global level Explain physical and human features in detail and with named examples	Link knowledge of processes to local, national and global exemplars to make comparisons and draw conclusions Comparing outcomes of processes between HIC, LIC and MICs
Step 4	**Number:** • Design fieldwork data collection sheets and collect data • Use a wide range of sources, including aerial photos and images • Use appropriate geographical language to respond to questions • Understanding of the range of techniques and methods used in fieldwork, including observation and different kinds of measurement	Describe connections between areas at the local, national and global level, eg: infrastructure, trade	Describe how physical and human processes can lead to environments differing around the world Can explain processes using key terms
Step 3	**Cartography:** • Interpret cross sections and transects **Cartography:** • Use and understand gradient, contour and spot height on OS maps and other isoline maps • Follow simple instructions to complete a fieldwork investigation	Knowledge of the location of different counties and continents Describe physical and human features in basic terms	Describe processes using examples and key terms, eg: 'erosion' and 'plates subducted'
Step 2	**Graphs:** • Select and construct appropriate graphs and charts **Cartography:** • Use and understand coordinates, scale and distance Use common sources (maps, atlases and globes) Provide basic responses to geographical questions	Simple locational knowledge about town and countries in the UK Simple locational knowledge about the UK's location in the world	Can describe processes but with a lack of key terminology, eg: wears away instead of hydraulic
Step 1	**Graphs:** • Read data from graphs/charts and extract data **Investigate**: • Make basic observations and ask basic questions (WWWWH)	Simple locational knowledge about the local area, eg: location of school, house	Observe changes and make statements about these
	Locational Knowledge • Human and physical features of geography in spatial, cultural and political contexts **Physical Geography** • Geological timescales and plate tectonics • rocks, weathering and soils • weather and climate, including the change in climate from the Ice Age to the present • Glaciation, hydrology and coasts **Human Geography** • Population and urbanisation • International development • Economic activity in the primary, secondary, tertiary and quaternary sectors • The use of natural resources		

KS3 Assessment Steps - History			
	Cause and Consequences; Change and Continuity; Significance **(AO1, AO2)**	**Source Skills** Historical Evidence; Historical Interpretation; Historical perspectives **(AO3, AO4)**	**Communication**
Step 9	Causes, their consequences and relationships, are analysed. Intended and unintended outcomes analysed. Significance is shown to vary over time and from group to group. Some reasons for this are given. Understands that the past is made up of many lines of development that do not always follow the same line as other places.	Critical analysis of the provenance and content. Can see that value can change with question. Can see how history should be written with contrasting and supporting sources. Approach of author explained along with their viewpoint, their purpose and intended audience. Explanation of the evidence they have chosen to use. Detailed evidence-based inferences used to accurately reconstruct a range of beliefs, values and motivations.	Work is analytical. Links made between multiple pieces of evidence as well as between factors
Step 8	Relationships between causes are described and analysed. Convincing argument. Why a person is significant at a particular time can be explained. Able to analyse the type and pace of change within different periods of time.	Effectively uses own knowledge to test source value. Understanding that a source will reflect the views of its author. Can compare and contrast sources. Explains how and why different interpretations have arisen especially among secondary sources. Evidence used to come to conclusions about beliefs, values and motivations of past individuals and groups.	Argument flows and is convincing. Conclusions come to a judgement and weigh up evidence. Clear links back to the question in every paragraph.
Step 7	Intended and unintended consequences identified. Short and long-term causes explained. Why a person or event is seen as significant can be fully explained. Able to describe the type and pace of change within different periods of time.	Starting to use own knowledge to test the value of sources. Considers the origin and purpose of the evidence. Messages and main points of an interpretation are identified through reference to the interpretation itself. Can distinguish variety of diverse perspectives and experiences in the past, seeing that not all held the same views/beliefs.	Clear Structure. Links made between some of the factors and evidence used.
Step 6	Multiple causes are prioritised and explained. Begins to analyse. Unintended consequences identified. Appropriate criteria can be created, evidence can be matched and explained. Different types and pace of change identified within different periods of time.	Assesses provenance of range of sources. Able to judge and explain usefulness of a source. Assesses how and why different opinions have arisen. Aware that interpretations are not used for obtaining factual information. Understands that perspectives of people in the past have to be comprehensively explained with reference to the historical context.	Multiple evidence used to back up points made. Clear links back to the question. Evidence accurate and relevant.
Step 5	Multiple causes explained. Can rank and explain a range, using own valid criteria. Evidence can be matched to criteria and explained to a fair standard. Changes in different times are categorised according to type and pace.	Assess provenance of single sources. Able to Judge and explain usefulness of a source. Can take “info” from variety of sources but lacks linkage to their purpose. Explains how/why different opinions have arisen. Makes detailed explanation of life in the past, supported by evidence, but beliefs etc still imagined rather than inferred. Can describe how the historical context was different.	Formal structure with paragraphs used in formulaic fashion. Appropriate introduction and conclusion. Links to the question.
Step 4	Can explain and rank some reasons by simple criteria. Evidence can be matched to significance criteria instead of own choice. Can show change isn’t continuous and doesn’t always equate to progress. Changes are explained.	Makes inferences from sources and understands that all evidence is useful. Understands the role of context. Aware of different viewpoints but lacking in explanation. Accounts of the past are used uncritically. Can explain life of people in the past, supported by evidence – but beliefs still imagined rather than inferred. Understands historical context.	Some evidence used to back up arguments. Use of paragraphs but not necessarily correctly.
Step 3	Starts to briefly explain more than one reason for event. Adds significance to a person or event and explains but is based on own choice. Can explain short term impact of events. Examples of change and continuity between periods are explained.	Sees evidence as useful or not useful due to content and can explain. Can make judgements but are made without context. Can identify different views and is starting to suggest reasons why they have occurred. Can describe how a given past historical context was different from today.	Some valid sentences written and some undeveloped evidence supplied.
Step 2	Starting to identify more than one reason for events. Adds significance to a person or event but is based on personal view. Can see short-term impact of events. Examples of change and continuity between periods identified.	Sees evidence as useful or not useful according to type. Can use accounts of the past but they are seen as accurate versions of the past that contain mistakes. Can empathise with someone from the past but this is seen as an imaginative exercise.	Written several generalised sentences in answer to question, but no structure and no real evidence offered.
Step 1	Identifies a single cause for an event. adds significance to a person or event but it is based when or where they were born. Identifies examples of change between one period of time and another.	Some general comment about usefulness of a source. Can recognise differences between interpretations. Describes content, but assumes that beliefs/values in the past were the same as today.	Writes a single sentence in answer to a question.

KS3 Assessment Steps - Maths				
	Number, Ratio, Proportion & Rates of Change	**Algebra**	**Geometry**	**Probability & Statistics**
Step 9	Understand why surds are used, and use operations on surds including multiplication and division, addition and subtraction	Solve simultaneous equations in two variables where one equation is linear and the other is quadratic Use algebra to prove mathematical thinking	• Sketch the graphs of sine, cosine and tangent functions for any angle, and generate and interpret graphs based on these functions • Use sine, cosine and tangent of any angles	Interpret and construct histograms Understand the concept of conditional probability and apply it to two way tables and Venn diagrams
Step 8	• Determine the bounds of intervals • Use direct and indirect proportion including graphical and algebraic representations	In simplifying algebraic expressions, use rules of indices for negative and fractional values Solve problems using intersections and gradients of graphs (perpendicular lines)	• Calculate the surface area of cylinders and volumes of cones and spheres • Use Pythagoras' theorem when solving problems in 3D	Understand how different methods of sampling and different sample sizes may affect the reliability of conclusions drawn Use stratified sampling technique
Step 7	Solve problems involving calculating with powers, roots and numbers expressed in standard form	Factorise quadratic expressions including coefficients of x^2 Find the next term or nth term of a sequence where the rule is quadratic Use algebraic and graphical methods to solve simultaneous linear equations in two variables Rearrange complex real-world formula including SUVAT equations and cosine rules	• Use sine, cosine and tangent in right-angled triangles when solving problems in two dimensions • Convert between units of measure • Calculate lengths of circular arcs and areas of sectors	Interpret and construct cumulative frequency tables and diagrams Draw and compare box plots Estimate the median and interquartile range from cumulative frequency and use these to compare distributions Calculate the probability of a compound event and use this in solving problems with tree diagrams
Step 6	• In making estimates, round to one significant figure and multiply and divide mentally • Understand the effects of multiplying and dividing by numbers between 0 and 1 • Understand and use compound measures, such as speed • Calculate compound interest (repeat proportional change) and reverse percentages	Formulate and solve linear equations with unknowns on both sides with whole-number coefficients Factorise linear algebraic expressions Solve simple inequalities and express them on a number line Recognise geometric sequences and appreciate other sequences that arise Expand quadratic expressions Evaluate algebraic formulae, substituting fractions, decimals and negative numbers such as SUVAT equations Calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically Plot simple quadratic and cubic graphs	• Understand and apply Pythagoras' theorem • Calculate lengths, areas and volumes in plane shapes and right prisms including triangular prisms • Enlarge shapes by a fractional scale factor, and appreciate the similarity of the resulting shapes • Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon and calculate exterior and interior angles of polygons	Specify hypotheses and test them by designing and using appropriate methods that take account of bias Determine the modal class, estimate the mean, median and range of sets of grouped data Understand relative frequency as an estimate of probability and use this to compare outcomes of experiments

KS3 Assessment Steps - Maths				
	Number, Ratio, Proportion & Rates of Change	**Algebra**	**Geometry**	**Probability & Statistics**
Step 5	Order and round to a given decimal place Express one number as a fraction or percentage of another number Calculate percentage increases and decreases Use the equivalences between fractions, decimals and percentages Use the relationship between fractions and ratio Use all four operations with fractions including mixed numbers	• Find the nth term in linear sequences • Expand sets of brackets and simplify the following expressions • Solve two step equations with fractional coefficients, negative answers and decimals • Rearrange simple equations such as y=mx +c (make x the subject) • Draw linear graphs in the form y=mx+c	• Recall and use the properties of quadrilaterals in classifying different types of quadrilateral • Use standard ruler and compass construction techniques • Understand and use the relationship between parallel lines and alternate and corresponding angles • Recall and use appropriate formulae for finding circumferences and areas of circles • Calculate volumes and surface areas of cuboids • Be able to describe different transformations	Choose appropriate equal class intervals over a sensible range to create frequency tables Construct pie charts Draw and interpret scatter diagrams and have a basic understanding of correlation When dealing with a combination of two experiments, identify all the outcomes Use the knowledge that the total probability of all the mutually exclusive outcomes of an experiment is 1
Step 4	Order, add and subtract negative numbers in context Use all four operations with decimals to two decimal places Reduce a fraction to its simplest form by cancelling common factors Solve simple problems involving ratio and direct proportion Divide a quantity into a given ratio Calculate fractional or percentage parts of quantities Multiply any three-digit number by any two-digit number without a calculator Divide, giving a remainder in decimals Use prime factor decomposition for HCF and LCM	• Construct, express in symbolic form and use simple formulae involving one or two operations • Solve two step equations • Substitute values into simple expressions • Continue sequences and notice patterns from term to term	• Measure and draw angles to the nearest degree • Recall and use the angle sum of a triangle • Apply the properties of angles at a point on a straight line, vertically opposite angles • Understand and use the formula for the area of triangles, parallelograms and trapeziums • Enlarge shapes by a positive integer scale factors	Find and use the mean of discrete data Compare two simple distributions using the range and mode, median or mean Interpret graphs and diagrams, including pie charts, and draw conclusions Find and justify probabilities and approximations to these by selecting and using methods based on equally likely outcomes and experimental evidence, as appropriate Understand that different outcomes may result from repeating an experiment Arrange data into Venn diagrams and use basic notation
Step 3	Use place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 Recall multiplication facts up to 12 x 12 and corresponding division facts Use order of operations (BIDMAS) Multiply 2 by 2 digit numbers and divide by an integer using a method without remainder Find the HCF and LCM of two or more numbers. Be able to identify prime numbers	• Simplify like terms • Solve one-step equations • Use and interpret algebraic notation, including: ab in place of a×b, 3y in place of y+y+y and 3×y, a2 in place of a×a, etc	• Identify angles as obtuse, acute and reflex • Rotate, reflect and translate shapes • Understand and use the formula for the area of a rectangle	Collect discrete data and record them using a frequency table Understand and use the median, mode and range to describe small sets of data Group data, where appropriate, in equal class intervals, represent collected data in frequency diagrams and interpret such diagrams Construct and interpret simple line graphs Understand and use the probability scale from 0 to 1

KS3 Assessment Steps - Maths				
	Number, Ratio, Proportion & Rates of Change	**Algebra**	**Geometry**	**Probability & Statistics**
Step 2	Multiply and divide whole numbers by 10 and 100 Recall multiplication facts up to 12 x 12 Use efficient written methods of addition, subtraction and short multiplication Add and subtract decimals to two places and order decimals to three places Find factors and multiples of numbers	Use simple formulae expressed in words Consider the idea of letters being used as variables Work with coordinates in all four quadrants	• Make 3-D mathematical models by linking given faces or edges • Draw common 2-D shapes in different orientations on grids • Choose and use appropriate units and instruments, interpreting, with appropriate accuracy, numbers on a range of measuring instruments • Find perimeters of simple shapes and find areas by counting squares	Extract and interpret information presented in simple tables and lists Construct bar charts and pictograms and interpret information presented in these forms
Step 1	Show understanding of place value in numbers up to 1000 and use this to make approximations Use decimal notation and recognise negative numbers, in contexts such as money and temperature Add and subtract numbers with two digits mentally and numbers with three digits using written methods Recall the 2, 3, 4, 5, 10 multiplication tables and derive the associated division facts		• Use mathematical names for common 3-D and 2-D shapes and describe their properties, including numbers of sides and corners • Understand angle as a measurement of turn and recognise right angles in turns	Sort objects and classify them using more than one criterion Record results in simple lists, tables and block graphs, in order to communicate their findings

KS3 Assessment Steps – Modern Foreign Languages			
	Listening & Reading	**Speaking**	**Writing**
Step 9	Understand longer, varied texts on unfamiliar topics, in the case of listening spoken at near native speed	Confidently ask and answer a range of questions for 2-3 minutes giving more developed responses on a range of topics and showing the ability to cope with unexpected questions	• Write extended pieces of several paragraphs from memory, drawn from a variety of current and previous topics, using a range of more complex structures which may contain minor errors but with a high degree of accuracy • Translate more than one paragraph from English on a range of topics
Step 8	Understand longer passages containing a few unpredictable elements, including a range of structures and topics and can cope with some unfamiliar language in a variety of authentic texts	Take part in a continuous spontaneous exchange on familiar topics, including those covered in previous years, using a variety of structures and with less predictable interactions	• Write texts of several paragraphs from memory, using a variety of structures, manipulating known structures and combining with new elements to produce new meanings, which are almost always clear • Translate a longer paragraph from English on a range of topics
Step 7	Understand longer passages from fourfive topics including a range of structures, and can infer meaning in simple authentic texts	Interact confidently within familiar topics and in classroom talk without reference to notes, with some hesitation and/or inaccuracy but with increasing spontaneity	• Write from memory at greater length on one topic, using past, present and future tenses, recycling learnt language and combining with new elements to express own ideas • Translate short paragraphs from English on a range of topics
Step 6	Understand a longer passage on a range of topics, inferring meaning of some unfamiliar language in present, past and future tenses	Interact across three-four topics and in classroom talk, in past, present and future tenses, adapting and recombining pre-learnt language to produce exchanges with some spontaneity, including forming some questions with some pauses for thinking	• Write short paragraphs from memory on two-three topics with good accuracy, using past, present and future tenses, adapting known structures (with some inaccuracy) and add new, researched language with some success • Translate short paragraphs on 2-3 topics from English in the present, past and future tenses
Step 5	Understand (with repetition for listening), the details in a passage on more than 1 topic comprising simple sentences with mostly familiar language in present, past or future tenses	Ask and answer an increasing range of questions in topic-based and classroom interaction adapting language appropriately, and can give information confidently from twothree recent topics, using present and past or future tenses	• Write a paragraph from memory made up of short sentences using taught language on a few topics, with some errors, using past, present or future tenses • Translate short paragraphs from English in the present, past or future tenses
Step 4	Understand (with repetition where necessary in listening), a short passage made up of familiar words and basic sentences in present and past or future tenses	Ask and answer simple questions on a few familiar topics and in classroom talk including opinions with good pronunciation, expressing opinions and responding to those of others	• Write a short paragraph from memory using simple sentences, including present and past or future tenses, from one familiar topic with reasonable spelling • Translate short paragraphs from English
Step 3	Understand (with pauses and repetition where necessary in listening), the main points of a short passage made up of a few familiar words and sentence.	Ask and answer simple questions on the current topic and for classroom talk, producing short phrases, including opinions, from memory with secure pronunciation	• Write short phrases from memory in the present tense, with understandable spelling, and change some elements in sentences to create new meaning • Translate longer sentences from English.
Step 2	Understand, (with pauses and repetition where necessary in listening), a range of familiar words and short sentences	Can perform short role plays with several exchanges and reasonable pronunciation	• Write short phrases from memory on the current topic and substitute one element to vary meaning • Translate short sentences from English
Step 1	Understand, (with repetition for listening), some familiar words and short sentences.	• Say familiar words and phrases with understandable pronunciation • Can ask and answer simple pre-learnt questions from memory	• Write single words from memory with understandable spelling • Translate single words from English.

KS3 Assessment Steps – Religious Studies			
	Viewpoints & Argumentation	**Textual Understanding**	**Understanding of Religious Practices** **Beliefs, Stories, Places of Worship, Festivals, Artefacts**
Step 9	**Analyse**, in depth, a wide range on perspectives on questions of identity and belonging, meaning, truth and purpose. Express informed religious views using **literature**, and analyse religious beliefs making links between different religions and having **balanced conclusions**	Embed the most apt textual references so as to elucidate the subtlety of a belief, with accurate referencing	Evaluate the importance of religious practices within religions
Step 8	Analyse a range of viewpoints on identity, belonging, meaning, truth and purpose and fully **justify their own viewpoints** in a detailed evaluation of arguments	Embed the most apt textual references so as to elucidate the subtlety of a belief	Evaluate the importance of religious practices within religions
Step 7	Articulate **personal and critical responses** to questions of meaning, purpose and truth and ethical issues. **Evaluate** the significance of religious and other viewpoints	Include a range of suitable and accurately quoted textual reference to justify different beliefs	Critically analyse the significance of religious practices
Step 6	**Express different insights** into the relationship between questions of identity, belonging, meaning, truth and purpose within a religion. Consider challenges to belonging to a religion	Include more than one suitable textual reference to justify a belief or different beliefs	Explain different interpretations of religious practices
Step 5	**Explain** what inspires and influences them, expressing their own and others' views about religion	Include suitable textual references to justify a belief	Explain the significance of religious practices
Step 4	**Describe** what inspires and influences religious belief and non-religious belief	Paraphrase text to support a belief	Explain religious practices
Step 3	Make a l**ink** between belief and action. Students can respond to, and question, religious belief and practices	Paraphrase text that is relevant to the topic	Describe religious practices
Step 2	**Respond and begin to explain** questions about own and others' experiences and feelings	Refer to text in broad terms	State religious practices
Step 1	Give a **personal opinion** and talk about own experiences and feelings	Make no reference to text	Make no reference to religious practices

KS3 Assessment Steps - Science

	Biology	Chemistry	Physics	Scientific Methods
Step 9	**Gas exchange:** • Interpret data and evaluate impact of effects of exercise, asthma and smoking on the system **Inheritance:** • Discuss the roles of Watson, Crick, Franklin and Wilkins in discovering DNA's structure **Ecosystems:** • Evaluate impact of humans on other organisms, with reference to accumulation of toxic materials **Reproduction:** • Make links between menstrual cycle, fertilisation and fertility	**Atoms, elements compounds:** **Chemical reactions:** • Represent chemical reactions using balanced symbol equations **Materials:** **Energetics:** **Pure and impure substances:** • Suggest how the rate of diffusion may be affected **The Earth and the atmosphere:** • Link the formation of rocks together to describe and explain the rock cycle in detail **The particulate nature of matter:** **The Periodic Table**: • Link group number and electron structure to explain the patterns of reactivity for Group 1 and Group 7 in the Periodic Table	**Energy:** • Justify suggestions about suitability of energy resources. • Suggest how convection, conduction and radiation may be changed • Suggest why thermal insulators work. **Motion and forces:** • Apply Hooke's Law to force meters. • Apply knowledge to explain the work done and changes of energy on deformation. **Waves:** • Explain refraction with reference to particles and the speed of light. Link the equation for speed, to the application of sound waves. **Electricity and magnetism:** • Link electric current to the structure of atoms. • Explain why the geographical north pole of the Earth is actually a magnetic south pole. • Explain how electrostatic force attraction by the induction of charge **The particulate nature of matter:** • Apply knowledge of physical changes and particles in explaining Brownian motion	**Analysis and Evaluation:** • Evaluate the reliability of methods in detail. • Suggest further questions that may arise from results of investigations and data analysis and evaluation. **Experimental Skills and Investigation:** • I can suggest detailed improvements to methods where reliability may be a concern.
Step 8	**Cells:** • Suggest what affects rate of diffusion **Respiration:** • Evaluate implication for organisms of both based on reactants and products **Gas exchange:** • Explain how ventilation occurs with reference to pressure changes and lung volume **Inheritance:** • Apply knowledge of genetics to explain the role of gene banks **Nutrition:** • Calculate energy requirements of a healthy diet **Photosynthesis:** • Link importance of photosynthesis to atmospheric gases **Ecosystems:** • Discuss importance of insect pollination to human food security **Reproduction:** • Evaluate infertility treatments **Musculoskeletal:** • Suggest how artificial parts may affect an individual	**Atoms, elements compounds:** • Explain why mass is conserved during changes of state and chemical reactions **Chemical reactions:** • Explain how collisions are random and must be successful in order for a reaction to occur **Materials:** • Discuss and suggest methods that may be used to extract metals more reactive than carbon **Energetics:** **Pure and impure substances:** • Suggest some applications for making substances impure **The Earth and the atmosphere:** • Discuss the efficacy of recycling **The particulate nature of matter:** **The Periodic Table:** • Explain how metals and non-metals react with water using symbol equations, recognising the patterns and chemical forms which result in the solution being either acidic or alkaline	**Energy:** • Use scientific principles to suggest suitability of energy resources. Evaluate energy efficiency. • Discuss how all materials have a store of energy inside them. • Interpret block and Sankey diagrams. **Motion and forces:** • Calculate resultant moments. Calculate extension. • Interpret resultant forces to predict motion. **Waves**: • Explain how we see different colours in different coloured light. • Explain dispersion with reference to wave speed. • Explain why sound is a longitudinal wave, with reference to the direction of vibrations and energy. **Electricity and magnetism:** • Explain the difference and reason for electrical current and electron flow. • Suggest applications for materials of higher or lower resistance. • Explain attraction and repulsion in terms of the direction of field lines. • Describe rogue waves. **Pressure in Fluids:** • Use calculations of density to predict whether an object will float or sink. **Space Physics:** • Link knowledge to light waves to explain how light and heat energy travels to Earth from the Sun. • Apply knowledge of the seasons in the northern hemisphere to explain why the southern hemisphere experiences seasons differently	**Analysis and Evaluation:** • I can evaluate data, with reference to potential sources of random and systematic error. Evaluate the reliability of methods in detail. **Experimental Skills and Investigation:** • Make more complex and quantitative predictions using scientific knowledge and understanding **Scientific Attitudes:** • Evaluate risks and hazards to plan a safe scientific investigation.

Step 7	**Gas exchange:** • Link adaptations of the human gas exchange system to their functions **Respiration:** • Compare/contrast aerobic and anaerobic respiration **Health:** • Evaluate effects of recreational drugs **Inheritance:** • Explain how variation and environmental pressures lead to evolution **Nutrition:** • Discuss benefits of gut bacteria, and link adaptions and function of digestive organs **Photosynthesis:** • Explain leaf adaptations **Ecosystems:** • Explain how changes in numbers of one organism affect another, referencing competition and predation **Reproduction:** • Discuss impact of maternal lifestyle on the foetus	**Atoms, elements compounds:** **Chemical reactions:** • Explain the conditions and uses of neutralisation, combustion, thermal decomposition, oxidation, displacement and the reaction of metals and acids, as examples of chemical reactions **Materials:** • Explain how metals can be obtained from metal oxides using carbon, when given the reactivity series **Energetics:** • Explain changes of state with reference to the amounts of energy of particles and whether a chemical reaction is exothermic or endothermic **Pure and impure substances:** • Identify pure and impure substances from data. Describe dissolving, with reference to particles **The Earth and the atmosphere:** • Explain the factors that may affect the appearance and properties of these rocks **The particulate nature of matter:** • Explain how pressure in gases may change **The Periodic Table:** • Explain why Mendeleev made the changes he did when developing the modern Periodic Table	**Energy:** • Calculate electrical power and energy transferred • Explain expansion in terms of particles **Motion and forces:** • Interpret distance-time graphs to calculate speed • Calculate moments **Waves:** • Compare light waves and waves in matter Compare eyes and cameras. • Describe how sound waves to transfer information if converted to electrical signals. • Explain how colour blindness occurs, with reference to rod and cones **Electricity and magnetism**: • Calculate quantities by rearranging equations. • Discuss resistance in terms of conductors and insulators. Link conduction and insulation with atomic structure. • Describe how magnetic induction and motors. • Discuss applications of static electricity **Pressure In Fluids:** • Discuss applications of changing pressure **Space Physics:** • Explain how the different seasons occur with reference to the tilt of the Earth and proximity to the Sun. • Explain the difference between a calendar and a lunar month. • Explain light years **Particulate nature of matter:** • Compare solids, liquids and gases with reference to density difference	**Analysis and Evaluation:** • Write reasoned explanations of the conclusion based on the experimental data **Experimental Skills and Investigation:** • Can explain the importance of sampling techniques and control variables • Can accurately make and record observations and measurements using rounding and decimal points
Step 6	**Cells:** • Explain the adaptations of plant and animal cells, describe diffusion and the function of organelles **Respiration:** • Describe applications of respiration, such as fermentation and write word equations for both types **Gas exchange:** • Explain adaptations of structures in human gas exchange system **Health:** • Explain effects of recreational drug and substance misuse **Inheritance:** • Describe the roles of DNA, genes and chromosomes in heredity **Nutrition:**	**Atoms, elements compounds:** • Represent compounds using chemical formulae **Chemical reactions:** • Describe factors that affect reaction rate with reference to particles and collisions and represent chemical reactions using formulae and symbol equations **Materials:** • Explain the differences in properties of different materials with reference to their structure and link uses to their properties **Energetics:** • Explain changes of states with reference to energy changes **Pure and impure substances:** • Explain how simple techniques for separating mixtures work **The Earth and the atmosphere:** • Suggest methods to conserve resources reduce the level of carbon dioxide in the atmosphere **The particulate nature of matter:**	**Energy:** • Compare energy resources and efficiency. Calculate cost of electricity • Explain radiation in terms of waves and convection, in terms of particles **Motion and forces**: • Interpret distance-time graphs • Calculate resultant force • Explain how simple machines multiply force • Explain effects of opposite moments • Discuss applications of friction **Waves:** • Describe how pinhole cameras, eyes and convex lenses work • Describe colours of light in terms of frequency • Explain that light as a transverse EM wave • Describe the superposition • Explain how sound travels with reference to particles **Electricity and magnetism**: • Describe how a bar magnet inside an electromagnetic field moves • Find the shape of a magnetic field • Explain static electricity in terms of movement of electrons	**Experimental Skills and Investigation:** • Select and apply appropriate sampling techniques **Measurement:** • Explain the importance of SI units **Scientific Attitudes:** • Describe how to improve accuracy, precision, repeatability, reproducibility and objectivity

	• Explain the role of digestive enzymes and how plants gain their nutrition	• Describe gas pressure with reference to particles		
Step 6	**Photosynthesis:** • Explain why most life depends on photosynthesis **Reproduction:** • Quantitatively investigate seed dispersal mechanisms **Musculoskeletal:** • Explain how antagonistic muscle pairs work	**The Periodic Table:** Explain how metals and non-metals react with water using word equations and explain some of the properties of metals and non-metals with reference to their structure	**Pressure in Fluids:** • Explain how pressure in liquids results in up thrust, allowing some objects to float • Explain the effects of pressure in terms of particles **Space Physics:** • Explain that our Sun is a star, and that there are other stars and solar systems in our galaxy and other galaxies in the Universe • Calculate weight **Particulate nature of matter:** • Explain the effect of temperature on the motion and spacing of particles	
Step 5	**Cells:** • Identify adaptations of unicellular organisms, compare animal and plant cells **Respiration:** • State the difference between aerobic and anaerobic, in terms of oxygen requirements and reactants and products **Gas exchange:** • Describe the impact of exercise, asthma and smoking on the system, and the role of stomata in leaves **Inheritance:** • Explain how variation can be continuous or discontinuous and how competition can lead to extinction **Nutrition:** • Explain the consequences of unbalanced diet **Photosynthesis:** • Describe leaf adaptations including the role of stomata, and state the word equation for photosynthesis **Ecosystems:** • Explain how organisms are adapted to their environment, and construct and interpret food webs **Reproduction:** • Describe stages of menstrual cycle and explain role of gametes in fertilisation **Musculoskeletal:** • Explain how parts of the system work together	**Atoms, elements compounds:** • Explain the differences between atoms, elements and compounds **Chemical reactions:** • Describe neutralisation, combustion, thermal decomposition, oxidation, displacement and the reaction of metals and acids as examples of chemical reactions. Represent chemical reactions using word equations **Materials:** • Describe simple displacement reactions when given the order of metals and carbon in the reactivity series **Energetics:** • Describe changes of states with reference to energy changes **Pure and impure substances:** • Describe how to separate mixtures and describe how impurities may affect boiling and melting points of impure substances **The Earth and the atmosphere:** • Describe the carbon cycle and the impact of human activities on the carbon cycle • Describe the rock cycle and how different types of rock are formed **The particulate nature of matter:** • Explain the properties of the three states of matter with reference to the particle model **The Periodic Table** • Describe how metal oxides and non-metal oxides react with water Describe the changes that Mendeleev made when he developed the modern Periodic Table	**Energy**: • Calculate and compare energy values of food • Explain how almost all energy comes from the Sun. Calculate energy efficiency • Explain conduction in terms of particles, and convection, radiation **Motion and forces**: • Calculate average speed • Explain when a force is balanced or unbalanced • Describe levers • Explain ways to reduce or increase friction and air or water resistance **Waves**: • Describe how light behaves in relation to different materials, and how to make secondary colours of light • Describe traverse waves, with reference to oscillations and energy • Describe sonar, ultrasound and echolocation **Electricity and magnetism:** • Describe p.d. in a parallel circuit • Calculate current or resistance • Describe temporary and permanent magnets, and strength and distance of field lines • Describe how to make an electromagnet and increase its strength **Pressure In Fluids:** • Describe how floating or sinking is dependent on density • Explain some applications of changing pressure **Space:** • Describe how the seasons are caused • Describe factors affecting the size of gravity • Explain the existence of a leap year **Static electricity:** • Describe electrostatic forces as affecting objects inside the electric field of a charged object • Explain why objects attract or repel **The Particulate Nature Of Matter:** • Use the particle model to explain states and state changes, including: the arrangement of particles, shape and density and diffusion • Explain physical changes in terms of conservation of material, mass and reversibility	**Analysis and Evaluation:** • Explain random and systematic error. Interpret observations and data to identify more complex patterns **Experimental Skills and Investigation:** • Explain the importance of sampling techniques and control variables • Accurately make and record observations and measurements using rounding and decimal points **Measurement:** • Use simple equations to calculate new results from experimental data (for example energy efficiency, or work done)

Step 4	**Cells:** • State that diffusion moves substances in/out of cells and describe organisation of multicellular organisms **Respiration:** • State that respiration releases energy from food **Gas exchange:** • Describe what happens during breathing **Health:** • Describe effects of recreational drugs on behaviour, health and life **Inheritance:** • Describe how variation is caused and what a gene bank is **Nutrition:** • Describe how digestion happens **Photosynthesis:** • List reactants & products **Ecosystems:** • Describe how organisms can be affected by their environment **Reproduction:** • Describe plant reproduction and methods of seed dispersal **Musculoskeletal:** • Explain why some muscles need to be stronger than others, and how to measure forces from muscles	**Atoms, elements compounds:** • State that mass is conserved during changes of state and chemical reactions **Chemical reactions:** • State that during chemical reactions atoms are rearranged in order for reactants to become products and name some ways to speed up chemical reactions **Materials:** • Describe the reactivity series **Energetics:** • Describe that during chemical reactions, surroundings may increase or decrease in temperature **Pure and impure substances:** • Select appropriate simple techniques for separating given mixtures • Describe diffusion in terms of the particle model **The Earth and the atmosphere:** • Describe the composition and structure of the atmosphere and describe ways that human activities impact on the climate **The particulate nature of matter:** • Describe the properties of the three states of matter with reference to the particle model **The Periodic Table:** • Describe that elements with similar physical and chemical properties are grouped together • Describe the patterns of reactivity for Group 1 and Group 7 • Describe how the properties of metals and non-metals make them suitable for different uses	**Energy:** • Describe different energy resources • Explain the effect of a higher power rating on cost, and how to reduce energy waste • Describe conduction, convection, radiation and expansion **Motion and forces:** • Explain what affects an object's speed • Describe balanced and resultant forces, moments, the effects of air and water resistance, and Hooke's Law **Waves:** • Describe absorption, dispersion, reflection, refraction and how we see colours • Draw ray diagrams • Recognise superposition • Describe the reflection of an observed wave in water • Describe echoes and applications of absorbing sound. Label compressions and rarefactions **Electricity and magnetism:** • Describe current in parallel circuits • Describe how to connect a voltmeter • Describe the effects of increased resistance • Identify the direction of current flow • Show the direction of the field lines • Describe Earth and compasses as examples of magnets **Pressure In Fluids:** • Calculate pressure and density **Space Physics:** • Describe celestial bodies in order of size. Describe and calculate weight	**Analysis and Evaluation:** • Describe random and systematic error • Present experimental data using a scatter graph **Experimental Skills and Investigation:** • Identify variables (independent, dependent and control variables) in an investigation **Measurement:** • Conduct basic calculations on data such as mode, median, mean **Scientific Attitudes:** • Define accuracy, precision, repeatability, reproducibility and objectivity
Step 3	**Cells:** • Identify parts of cells from a diagram; draw cells viewed by light microscope **Respiration:** • Name the two types of respiration (aerobic and anaerobic) **Gas exchange:** • Label a diagram of the humans' gas exchange system **Health:** • List effects of recreational drugs **Inheritance:** • Simply describe heredity; recognise that variation allows some individuals to compete better	**Atoms, elements compounds:** • List examples of atoms, elements and compounds and label the subatomic particles of a simple atomic model **Chemical reactions:** • Describe the difference between chemical and physical changes and can simply describe different types of chemical reaction • Describe how to use Universal indicator to find the strength of an acid or an alkali **Materials:** • Describe some properties of different materials eg: ceramics, polymers and composites **Energetics:** • State that during chemical reactions, energy may be released or absorbed	**Energy:** • Describe what a higher power rating means • Describe situations where energy is transferred, wasted and dissipated • Recall forms of potential energy • Describe applications of thermal insulators **Motion and forces:** • Describe changes in relative motion • Describe the effects of forces and friction. Use force arrow • Identify if a force is contact or non-contact **Waves:** • Name some types of waves. State the law of reflection • Give some examples of when light is absorbed or reflected • State the functions of parts of the human eye • Recognise a longitudinal wave, frequency and auditory range	**Analysis and Evaluation:** • Present data using a bar graph **Experimental Skills and Investigation:** • Describe safety precautions and sampling techniques • Follow instructions to use appropriate techniques, apparatus and materials to conduct scientific investigations **Measurement:** • Accurately name some chemical products when given the reactants **Scientific Attitudes:** • Describe some safety precautions during scientific experiments

Step 3	**Nutrition:** • Describe role of food groups and the function of digestive organs **Photosynthesis:** • State that plants make glucose in leaves by photosynthesis **Ecosystems:** • Make and interpret simple food chains **Reproduction:** • Describe stages of pregnancy and birth in animals **Musculoskeletal:** • Describe functions of system parts	**Pure and impure substances:** • Simply describe how particles may move through a fluid by diffusion **The Earth and the atmosphere:** • Name the main elements in the atmosphere and Earth, including carbon-based compounds • describe that the Earth's resources are limited and identify the parts which make up the structure of the Earth **The particulate nature of matter:** • Describe how changes of states may occur **The Periodic Table:** • State that the modern Periodic Table was developed by Mendeleev and state that elements in the same group of the Periodic Table will have similar patterns in reactions	**Electricity and magnetism:** • State the effect of a higher p.d. on a bulb and that p.d. in series. Describe electrical current and how to connect an ammeter. Describe resistance and 'direct current' **Space Physics:** • Describe the solar system as the planets, asteroids and comets orbiting the Sun	
Step 2	**Cells:** • List the main parts of a cell, and name some tissues and organs **Gas exchange:** • Name some tissues involved **Inheritance:** • State that genetic information is inherited **Nutrition:** • Simply describe the function of digestive organs **Photosynthesis:** • State that most life depends on photosynthesis **Ecosystems:** • Describe how numbers of one organism can affect another **Reproduction:** • Simply describe functions of organs in the human and plant reproductive system **Musculoskeletal:** • Identify system parts	**Atoms, elements compounds:** • Can recognise an atomic model can represent elements using chemical symbols **Chemical reactions:** • State that during chemical reactions reactants become products **Materials:** • State that some materials (particularly metals) are more reactive than others **Energetics:** • State that during changes of state, there are energy changes **Pure and impure substances:** • Describe what a pure substance and a mixture is and identify simple techniques for separating mixtures **The Earth and the atmosphere:** • List human activities that impact on the climate • List the parts which make up the structure of the Earth and name the three different types of rocks • Name some resources that humans use from the Earth **The particulate nature of matter:** • Describe the properties of the three states and represent with particle diagrams **The Periodic Table:** • List the properties of metals and non-metals and identify where metals, non-metals, periods and groups can be found on the Periodic Table	**Energy:** • List energy resources and stores. Recognise that energy is conserved or transferred, and that heat is transferred by convection, conduction and radiation and insulators **Motion and forces:** • Describe simple changes in motion. List some forces and state what a moment is **Waves:** • State what waves can travel through • Recognise reflection, refraction, absorption, the light spectrum and what convex lenses do • Identify parts of the eye • State that sound waves are longitudinal **Electricity and magnetism:** • State what p.d. does, and that current in a series circuit does not change. Identify series and parallel circuits • Name component symbols • List uses of electromagnets and recognise how they work **Pressure In Fluids:** • Recognise the effect of changing pressure on an object, and when pressure increases or decreases **Space Physics:** • Identify what gravity does. State that the Earth is tilted on its axis and state what a days, and years are caused by	**Analysis and Evaluation:** • Perform simple calculations • Identify simple patterns and trends in data • Present observation in a simple table • State simple conclusions **Experimental Skills and Investigation:** • Conduct experiments to test predictions • Identify some hazards. Make and record simple observations in a table • Make predictions using scientific language and understanding **Measurement:** • Correctly use some SI units

Step 1	**Cells:** • State what cells are; name equipment used to view cells **Gas exchange:** • Name organs involved **Inheritance:** • State that there is variation within and between species **Nutrition:** • List the contents of a balanced diet and name digestive organs **Photosynthesis:** • State that plants gain nutrients and water from soil via roots **Ecosystems:** • Recognise that all organisms in an ecosystem may affect each other; are affected by their environment **Reproduction:** • Name organs of plant and human reproductive systems **Musculoskeletal:** • State that some muscles are stronger than others	**Atoms, elements compounds:** • Can recognise that all matter is made of atoms **Chemical reactions:** • Recognise that different acids and alkalis have different strengths and indicators are used to show this **Materials:** • Recognise that different materials have different properties **Pure and impure substances:** • List some mixtures **The Earth and the atmosphere:** • Humans use the Earth as a source of resources and these are limited, and that there are different types of rock **The particulate nature of matter:** • Name the three states of matter and list the changes of state **The Periodic Table:** • All elements currently known may be found listed in the Periodic Table	**Energy:** • Recognise what energy is and where it is stored, that appliances have power ratings (W, kW). Use a thermometer M**otion and Forces:** • **S**tate what speed is, name some forces and their effects **Waves:** • State that light moves at the speed of light; identify objects that form images. State how sound is produced, that it cannot travel through a vacuum **Electricity and electromagnetism:** • Recall that circuits must be complete; the units for current, resistance and potential difference; types of magnets; how poles behave; name the three magnetic materials **Space:** • State the length of a day, month and year, that gravity always pulls towards the centre of an object and list planets in and seasons in order	**Experimental Skills and Investigation:** • Ask questions based on behaviour of the world **Measurement:** • Name some chemicals, and some SI units **Scientific Attitudes:** • State some theories built on evidence