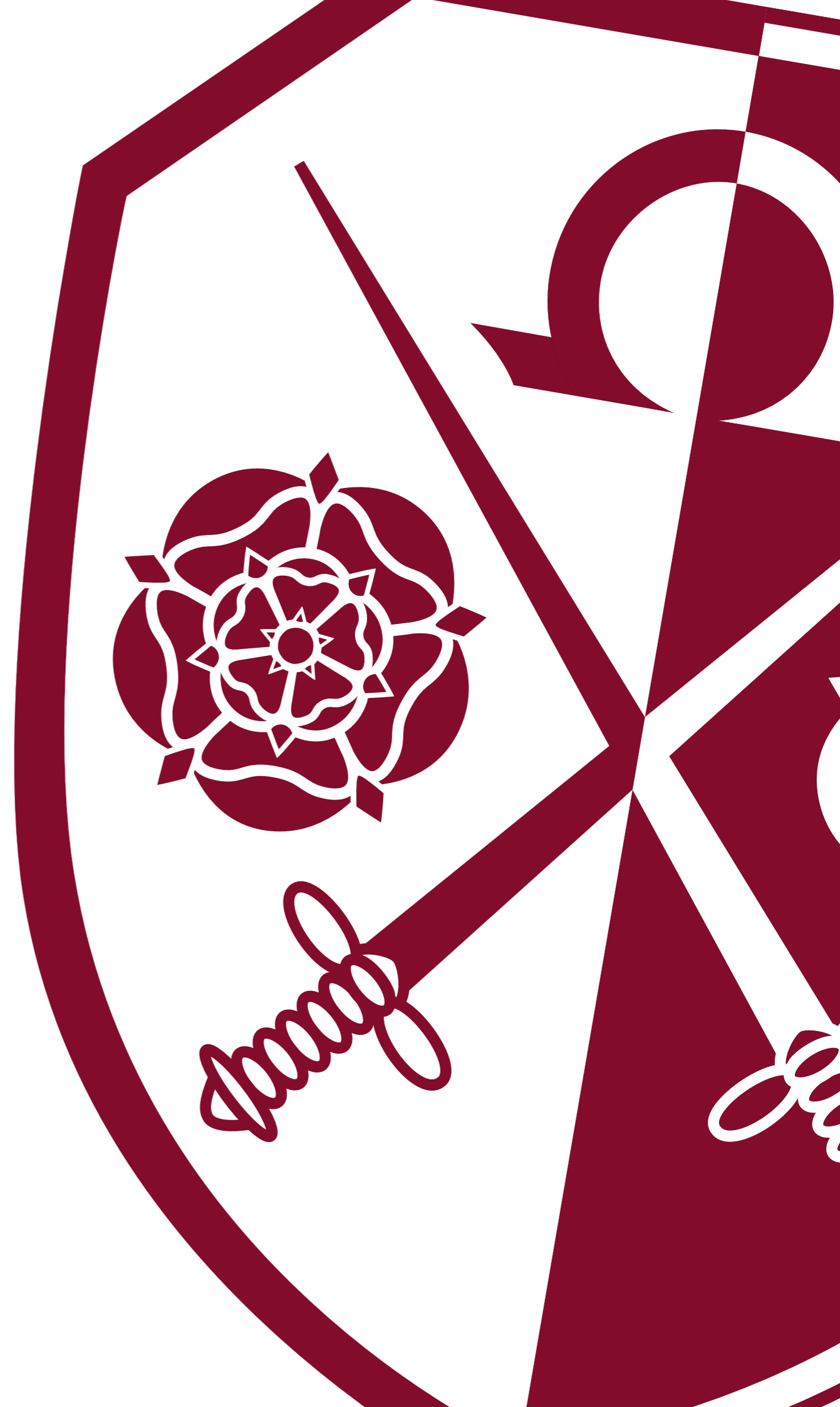


# SCIENCE

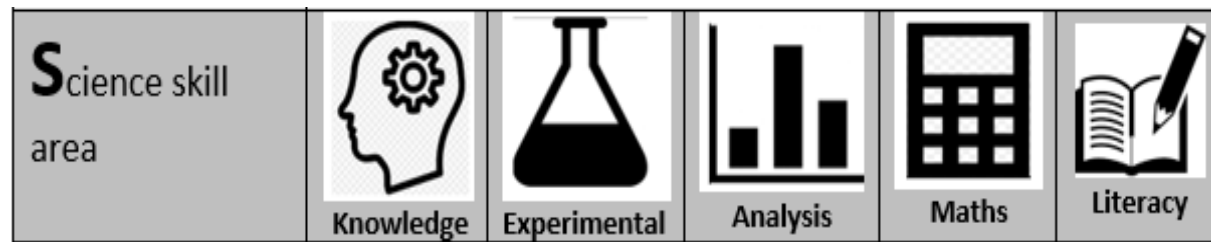
## Learning Ladder



# Rationale:






The ladder focuses on **5 core skill areas** that need to be developed in order to succeed in the subject. The success criteria are a combination of ideas proposed in the National Curriculum and discussion within the Science faculty.

The ladder depicted is intended to be used as a framework that informs lesson and assessment planning. Students are given opportunities throughout the course to develop their expertise in each of the skill areas. The ladder is a tool that the teachers use to generate a dialogue with the students in order to maximise learning. Sometimes the students may be judged as ‘Developing’, ‘Secure’ or ‘Extending’ (which roughly match the schools reporting systems, ‘Foundation’, ‘Expected’, ‘Higher’). The headings are not intended to be the focus of the feedback, but a gauge of performance against the ladder. Best feedback will focus on strategies for improvement and will be lesson specific.



Skill Area	Science Assessment Strands		
	Developing Science Skills	Secure Science Skills	Extending Science Skills
<b>1. Knowledge, understanding of Science</b> 	<ul style="list-style-type: none"> <li>Recall and communicate some knowledge of the scientific concepts and processes related to the topic.</li> <li>Beginning to apply a given principal of the topic to material presented in familiar or closely related contexts</li> </ul>	<ul style="list-style-type: none"> <li>Recall, select and communicate knowledge and understanding of scientific concepts and processes related to the topic.</li> <li>Apply principles and concepts of the topic in familiar and unfamiliar contexts (with some guidance).</li> </ul>	<ul style="list-style-type: none"> <li>Recall, select and communicate precise knowledge and detailed understanding of scientific concepts and processes related to the topic.</li> <li>Apply principles and concepts of the topic in unfamiliar contexts</li> <li>Can use abstract ideas, models and theories to explain why things happen.</li> <li>Can link together appropriate facts, principles and concepts from different areas of the curriculum to provide a scientific explanation</li> </ul>
<b>Detail is topic specific – see student checklists</b>			
<b>2. Experimental and investigation skills</b> 	<ul style="list-style-type: none"> <li>With guidance can write a simple hypothesis or develop a line of enquiry based on observations and prior knowledge</li> <li>Follow instructions accurately to carry out investigations / or with guidance devise and plan an experiment that leads to meaningful results.</li> <li>Can manipulate apparatus and make accurate measurements</li> <li>Demonstrate safe practical techniques.</li> <li>Identify variables</li> </ul>	<ul style="list-style-type: none"> <li>Uses simple scientific theory and explanation to develop a testable hypotheses</li> <li>With minimal assistance or prompting, devise and plan an experiment leading to meaningful results.</li> <li>Demonstrate skilful practical techniques, paying attention to accuracy, precision and repeatability.</li> <li>Demonstrates safe practical techniques with regard to health and safety</li> <li>Identify and understand variables(e.g. IV,DV,CV)</li> <li>Can evaluate methods and come up with justified improvements</li> </ul>	<ul style="list-style-type: none"> <li>Uses theories and explanations to independently write and justify a testable hypotheses</li> <li>Can independently and systematically design an appropriate experiment / investigation, which leads to valid and meaningful results.</li> <li>Consistently demonstrate skilful practical techniques, paying attention to accuracy, precision and repeatability.</li> <li>Demonstrate safe practical techniques paying attention to health and safety. Can write and understand a risk assessment.</li> <li>In the context of the investigation identify the Independent, and dependant variables and explain how and why control variables are kept constant. Appreciate that this is not always possible and the significance of this on the results</li> <li>Systematically evaluates methods identifying and justifying improvements that feed directly into their planning of further experiments.</li> </ul>
<b>3. Analysis and evaluation of data</b> 	<ul style="list-style-type: none"> <li>With guidance, represent data and observations using appropriate graphs and charts.</li> <li>With guidance, analyse data with simple mathematical method</li> <li>Can describe simple patterns presented in tabular or graphical form.</li> <li>Can draw logical conclusions from data</li> <li>Can identify anomalous results in data.</li> </ul>	<ul style="list-style-type: none"> <li>Represent data using appropriate graphs and charts.</li> <li>Interpret and analyse data using a given mathematical / simple statistical method.</li> <li>Describe trends and patterns shown by data presented in tabular or graphical form.</li> <li>Use scientific knowledge and understanding to explain data.</li> <li>Evaluate quantitative and qualitative data acquired through practical work and experimental observations.</li> <li>With guidance evaluate data in terms of accuracy, precision, repeatability and reproducibility.</li> <li>Use evidence to evaluate scientific theories and models.</li> </ul>	<ul style="list-style-type: none"> <li>Represent complex data using appropriate graphs and charts.</li> <li>Interpret and analyse data using the appropriately selected mathematical / statistical method.</li> <li>Describe significant trends and patterns shown by complex data presented in tabular or graphical form.</li> <li>Select and communicate precise scientific knowledge to explain patterns and trends in data.</li> <li>Evaluate complex quantitative and qualitative data acquired through practical work and experimental observations.</li> <li>Systematically evaluates this data in terms of accuracy, precision, repeatability and reproducibility.</li> <li>Identify and quantify systematic and random errors in data and suggest methods to reduce their effect.</li> <li>Use evidence to evaluate complex scientific theories and models and suggest further investigation.</li> </ul>
<b>4. Maths</b> 	<ul style="list-style-type: none"> <li>Can use some scientific terminology and basic symbolic conventions appropriate to the topic / Key stage</li> <li>With guidance can use and derive simple equations and carry out calculations</li> </ul>	<ul style="list-style-type: none"> <li>Use terminology and symbolic conventions appropriately</li> <li>Can interconvert units</li> <li>Use and derive simple equations and carry out appropriate calculations</li> </ul>	<ul style="list-style-type: none"> <li>Confidently uses terminology and symbolic conventions appropriately and consistently (e.g. SI units, chemical nomenclature, prefixes (tera, giga, mega, kilo, giga, nano, micro, pico) and powers of 10 for orders of magnitude (e.g. 1.5 X 10<sup>3</sup>).</li> <li>Confidently interconvert units</li> <li>Use and derive equations and carry out appropriate calculations</li> <li>Consistently use an appropriate number of significant figures in calculations</li> </ul>
<b>5. Literacy</b> 	<ul style="list-style-type: none"> <li>Work is poorly organised, with almost no specialist terms and little or no detail given.</li> <li>The work shows very weak spelling, punctuation and grammar.</li> </ul>	<ul style="list-style-type: none"> <li>The work has some structure and organisation, use of specialist terms has been attempted but not always correctly, and some detail is given.</li> <li>The work shows reasonable spelling, punctuation and grammar although there may still be some errors.</li> </ul>	<ul style="list-style-type: none"> <li>The work is coherent and written in an organised, logical sequence, containing a range of relevant specialist terms used correctly.</li> <li>The work shows almost faultless spelling, punctuation and grammar.</li> </ul>

# EBS Science Learning Ladder

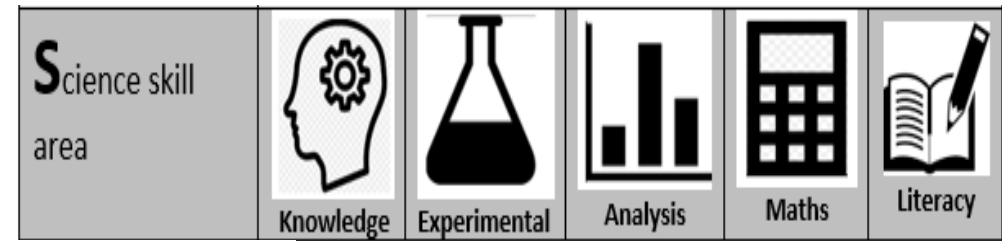
Skill Area	Science Assessment Strands		
	Developing Science Skills	Secure Science Skills	Extending Science Skills
<b>1. Knowledge, understanding of Science</b> 	<ul style="list-style-type: none"> <li>• <b>Recall</b> and communicate some knowledge of the scientific concepts and processes related to the topic.</li> <li>• Beginning to apply a given principal of the topic to material presented in familiar or closely related contexts</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Recall</b>, select and communicate knowledge and understanding of scientific concepts and processes related to the topic.</li> <li>• <b>Apply</b> principals and concepts of the topic in familiar and unfamiliar contexts (with some guidance).</li> </ul>	<ul style="list-style-type: none"> <li>• Recall, select and communicate <b>precise</b> knowledge and <b>detailed</b> understanding of scientific concepts and processes related to the topic.</li> <li>• <b>Apply</b> principals and concepts of the topic in unfamiliar contexts</li> <li>• Can use abstract ideas, models and theories to explain why things happen.</li> <li>• Can <b>link</b> together appropriate facts, principals and concepts from different areas of the curriculum to provide a scientific explanation</li> </ul>
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<b>2. Experimental and investigation skills</b> 	<ul style="list-style-type: none"> <li>• With guidance can write a simple hypothesis or develop a line of enquiry based on observations and prior knowledge</li> <li>• Follow instructions accurately to carry out investigations / or with guidance devise and plan an experiment that leads to meaningful results.</li> <li>• Can manipulate apparatus and make accurate measurements</li> <li>• Demonstrate safe practical techniques.</li> <li>• Identify variables</li> </ul>	<ul style="list-style-type: none"> <li>• Uses simple scientific theory and explanation to develop a testable hypotheses</li> <li>• With minimal assistance or prompting, devise and plan an experiment leading to meaningful results.</li> <li>• Demonstrate skilful practical techniques, paying attention to accuracy, precision and repeatability.</li> <li>• Demonstrates safe practical techniques with regard to health and safety</li> <li>• Identify and understand variables(e.g. IV,DV,CV)</li> <li>• Can evaluate methods and come up with justified improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Uses theories and explanations to independently write and justify a testable hypotheses</li> <li>• Can independently and systematically design an appropriate experiment / investigation, which lead to valid and meaningful results.</li> <li>• Consistently demonstrate skilful practical techniques, paying attention to accuracy, precision and repeatability.</li> <li>• Demonstrate safe practical techniques paying attention to health and safety. Can write and understand a risk assessment.</li> <li>• In the context of the investigation identify the Independent, and dependant variables and explain how and why control variables are kept constant. Appreciate that this is not always possible and the significance of this on the results</li> <li>• Systematically evaluates methods identifying and justifying improvements that feed directly into their planning of further experiments.</li> </ul>
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# How the students engage with it:

One or more of the science skill areas will be a focus of a lesson or series of lessons. The teacher will have planned the lesson with the Learning Ladder in mind and will share the lesson specific objectives and success criteria.

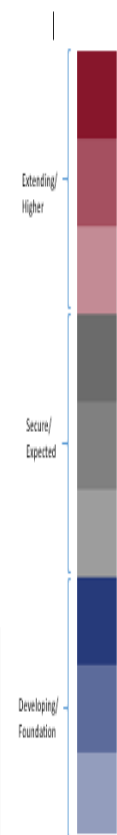
There will be a variety of activities and assessment strategies used. Students will be encouraged to develop their ability to reflect on performance and use the feedback support provided to make progress.

When appropriate, the teacher may use PENS marking. An East Barnet School 'Report Thermometer' will also be stuck in the front of most exercise books. Students will be encouraged to add at least one 'Grade' per half term to this thermometer. The grade is not the intended focus of the feedback, for example, students may be requested to analyse a test with a test review sheet. It is the learning that comes out of any assessment that is important and should be the focus.



<b>P</b> ositive <u>s</u>					
<b>E</b> ffort	<b>Ex</b>	<b>Gd</b>	<b>IR</b>	<b>C</b>	
<b>N</b> ext step(S)					
<b>S</b> cience skill area					
	Knowledge	Experimental	Analysis	Maths	Literacy

My Science Ladder Log Year 7:










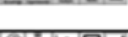





What I am looking forward to in year 7 Science:

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My biggest achievement in year 7 Science (complete at the end of the year):

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Name:		Test Topic:		Date:	
Question	Science Skill Area Tested	Maximum marks available	Marks awarded	Traffic light RYG	Learning from question review:
					
					
					
					
					
					
					
					
					
					
					
					
					
<b>Test Score / grade:</b>		<i>Remember to add your grade to your ladder log.</i>			
<b>Concluding thoughts / questions?</b>					