



Big Question: How do you make the best fireworks?

AoLE: Science and Technology	Subject: Science	Year: 7
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Big Question / Aim / Objective / Concept	Vision (Proposed outcome) / Purpose of curriculum	Prior knowledge / Learners previous knowledge
How do you make the best fireworks?	The main theme is fairgrounds and fireworks including associated issues of fire safety, pyrotechnics and explosions. There is development of some of the ideas on safety introduced in Unit 7E. The unit introduces the idea of chemical changes and includes work on key criteria for deciding whether a change has taken place. There is also an introduction to the reactions of acids with metals and limestone, and the tests for common gases.	From KS2 most pupils will: <ul style="list-style-type: none"> • be able to describe the ways in which materials change when they are heated or cooled • know that when a material is burnt, new materials are formed; they may know that this change cannot be reversed

What does progression look like in this Big Question?

Progression Indicator	Description of learning (What matters statements)	Student evidence of progression (Blooms) / Knowledge
Excelling	<p>I can research, devise and use suitable methods of inquiry to investigate my scientific questions.</p> <p>I can use my findings to draw valid conclusions.</p> <p>I can evaluate and identify ways of improving the reliability of data, taking anomalies into account.</p> <p>I can investigate, evaluate, select and combine component parts, materials or processes to improve the functionality and effectiveness of my outcomes.</p> <p>I can use prototyping as a link between my designing and making.</p> <p>I can take into account the impact my making may have on the environment.</p> <p>I can select and safely use specialist tools and techniques in order to develop and construct my outcomes.</p> <p>I can describe and explain the properties of different types of matter and relate these to how they are used.</p> <p>I can describe different types of chemical reactions, explain their uses and identify any effects of the products formed.</p> <p>I can use my knowledge of chemical reactions to explain what happens when conditions are changed and can explain why they may have been processed to make them useful.</p> <p>I can use a variety of simple models to describe the forces acting on an object.</p> <p>I can explain and calculate how multiple forces acting on an object will affect its motion.</p> <p>I can understand conservation of energy and can explain that energy is used at differing rates, and that this affects the power and efficiency of a system.</p>	<p>Describe how observations from a combustion experiment can provide evidence for and against different theories of burning.</p> <p>Justify reasons for why you agree or disagree with others when discussing the arguments for and against the use of fuels and explosives in modern society.</p> <p>Explain how well your conclusions match your evidence.</p> <p>Put together information from several different sources in order to develop an argument.</p> <p>Explain how the products of burning a hydrocarbon are formed.</p> <p>Explain why some reactions are explosive.</p>
Advancing	<p>I can identify questions that can be investigated scientifically and suggest suitable methods of inquiry.</p> <p>I can suggest conclusions as a result of carrying out my inquiries.</p> <p>I can evaluate methods to suggest improvements.</p> <p>I can recognise that changes in materials affect their properties and uses under different conditions.</p> <p>I can recognise that our planet provides natural materials and can explain why they</p>	<p>Draw conclusions from observations using a theory about burning.</p> <p>Describe some of the arguments for and against the use of fossil fuels and combustible materials in modern society.</p> <p>Tell others about your ideas on how to stay safe when using acids or burning materials.</p> <p>Carry out a fair and safe investigation to collect accurate evidence.</p> <p>Present data as a line graph.</p> <p>Suggest a scientific question to be investigated and plan a fair investigation for that question.</p>



	<p>may have been processed to make them useful.</p> <p>I can explore how the motion of objects can be affected by applying specific forces.</p> <p>I can use a variety of simple models to describe the forces acting on an object.</p>	<p>State whether a change is reversible or irreversible, chemical or physical.</p> <p>Explain that new materials are formed during a chemical reaction and give an example.</p> <p>List the gases formed when acids react with metals and limestone.</p> <p>Describe how oxides form.</p> <p>Describe the tests for hydrogen, oxygen and carbon dioxide.</p> <p>Use word equations to represent combustion reactions.</p>
Securing	<p>I can identify questions that can be investigated scientifically and suggest suitable methods of inquiry.</p> <p>I can suggest conclusions as a result of carrying out my inquiries.</p> <p>I can evaluate methods to suggest improvements.</p> <p>I can identify and consider factors when developing design proposals.</p> <p>I can recognise patterns from my observations and investigations and can communicate my findings.</p> <p>I can recognise that changes in materials affect their properties and uses under different conditions.</p> <p>I can investigate different forms of energy.</p> <p>I can recognise that our planet provides natural materials and can explain why they may have been processed to make them useful.</p> <p>I can explore and communicate the basic properties of light and sound.</p>	<p>Identify and list evidence that supports a theory.</p> <p>List some benefits and drawbacks of using fossil fuels and explosives.</p> <p>Recall that some changes can be reversed and others cannot.</p> <p>Identify some products of chemical reactions.</p>
Beginning	<p>I can ask questions and use my experience to suggest simple methods of inquiry.</p> <p>I can observe and describe ways in which materials change when they are mixed together.</p> <p>I can safely use simple tools, materials and equipment to construct and deconstruct.</p> <p>I can explore the properties of materials and choose different materials for a particular use.</p> <p>I can explore and describe the properties of materials and justify their uses.</p> <p>I can observe and describe ways in which materials change when they are mixed together.</p> <p>I can investigate different forms of energy and how it can be transferred.</p> <p>I can communicate the effect forces have on myself and on objects.</p> <p>I can explore and communicate the basic properties of light and sound.</p>	<p>Use observations to tell if a chemical reaction has taken place.</p> <p>Carry out a fair test.</p> <p>Work safely with acids and when burning materials.</p> <p>Recall what a fuel is.</p> <p>Recall that oxygen or air is needed for burning.</p>

Authentic learning experiences (Local / National / International)	Skills (Literacy / Numeracy / DCF) / Cross Curricular links
<p>Students will study this topic in the autumn term in preparation for Bonfire night on 5th of November. They will investigate different fireworks displays around the local region and across North Wales.</p>	<p>Numeracy</p> <ul style="list-style-type: none"> ● Students will collect data to required standards and calculate mean averages ● Students will plot line graphs and draw charts when appropriate ● Students will use SALUTE to progress their understanding and implementation of graphs



	<ul style="list-style-type: none">Students will explore patterns and trends in data <p>Literacy</p> <ul style="list-style-type: none">Students will read and comprehend instructions to complete investigative tasksStudents will write extended responses to describe and explain their ideas about scientific phenomena <p>Cross-curricular</p> <ul style="list-style-type: none">Students could investigate the history of fireworks and combustion and why Bonfire Night is celebrated across the countries of the UK
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Assessment (How will we know that students have learnt what we taught them?)

<p>Formative assessment:</p> <p>Students will be provided with a range of assessment techniques throughout the topic to give them immediate feedback on a range of skills and knowledge required to progress in this topic in line with the whole school assessment policy.</p>	<p>Summative assessment:</p> <ul style="list-style-type: none">End of 'Biq Question' test x2 (mid topic and end of topic)
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Evaluation (to be reviewed in 2024)

Strengths	Areas for Development	Pupil Voice