



STAY SAFE WITH FIREWORKS

teacher guidance for 5-7 years



The Association
for Science Education

Promoting Excellence in Science Teaching and Learning



Why teach about fireworks?

In order to enjoy the spectacle that fireworks produce, we need to remain safe. The following are ideas to link to the curriculum for different year groups with an emphasis on delivering the overarching objectives below, alongside areas of the curriculum:

Purpose:

To increase consumer awareness of safe and considerate use of fireworks in England and Wales.

1. To raise awareness of safety issues when buying, storing, using and disposing of fireworks.
2. To encourage considerate use of fireworks (e.g. by letting neighbours know that you intend to use fireworks in your garden), so that steps can be taken to protect animals or people adversely affected.
3. To raise awareness among retailers of their responsibilities regarding the sale of fireworks.

The following objectives and related activities are designed to cover one or more aspects of science, both contextual and enquiry-based, and how to be safe with fireworks.

Additional activities are suggested alongside the key actions to allow for expansion for a longer session or sessions depending on your teaching circumstances, extension activities for more able children or for those teaching mixed-age classes, and provide cross-curricular links for a more integrated approach. It is up to the individual teacher how many objectives they work on over what time period.





When can we see fireworks?

Session overview:

During this session, the children will use observation to help answer questions about when they can see fireworks, related to the time of year and time of day, and at what events. They will consider how to remain safe when using a particular firework such as a sparkler.

Resources needed:

- Videos and Images of fireworks going off
- Videos and images of people at bonfire nights and fireworks displays, showing dark nights and people dressed up warmly
- Tea light for demonstration
- At least 4 different coloured sheets of paper, including 1 black and 1 white. Would be advantageous to have at least one other dark, and one other light, colour e.g. pale blue and dark blue
- Container of water, such as a tray or a bucket
- Long matches and short matches
- Chalk and coloured paper (similar to those colours above) for each child



Timing:

Timings have not been included as you may run this as an afternoon session, or set the artwork for another day, or run this as two different sessions focusing on PHSE initially then the science, or vice versa. The design is meant to be adapted for your own circumstances, whilst still ensuring that science and safety are covered.



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
To observe closely and use a range of vocabulary to describe	<p>Show videos of fireworks and bonfires.</p> <p>Discuss the sounds (e.g. bangs, booms), colours (e.g. bright, white, sparkly), and shapes observed (e.g. flowers, stars). Encourage children to think of new words and not just copy others that they hear. Allow made-up words if they help produce a description that others understand. Record these as a list on the board.</p>	<p>What do these images show?</p> <p>What words can you use to describe what you see and hear?</p>	<p>Science WS/ Enquiry – Observation</p> <p>English – spoken language</p>	<p>Science WS/ Enquiry Survey – Recording – collect a class vote on favourite descriptive words in each category, modelling how to record in a table or by number of ticks next to the word on the board.</p> <p>English – create a class poem using the vocabulary generated.</p>
To observe carefully in order to justify a decision	<p>Focus on the people at a fireworks display in the images and video, all dressed warmly, and bare trees around the event.</p>	<p>Why are the people dressed this way?</p> <p>What time of day is this?</p> <p>What time of year do you think this is?</p> <p>How can you tell?</p>	<p>Science Context – Seasons</p> <p>Science WS/ Enquiry – Observation</p> <p>Suggesting answers to questions</p>	
<p>To recognise and name some different feelings</p> <p>To raise awareness of safety in unfamiliar places</p>	<p>Focus on the people in the images (from above) and their expressions and clothing.</p> <p>Discuss what emotions they are showing.</p>	<p>How is this/that person feeling, do you think?</p> <p>How can you tell?</p> <p>How would you feel if you were at this fireworks display?</p>	<p>PHSE – Health and wellbeing</p>	<p>Science WS/ Enquiry - Classification – Recording – how many people feel the same as you do? Children group themselves by the emotion that they would feel on bonfire night. Photograph the groups for a discussion about which group is largest.</p>



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
	<p>Discuss how the children might be feeling in the dark and how they should stay safe. What rules do parents often insist upon when out like this?</p>	<p>How do you feel when it is dark? Is it easy to see in the dark? Why might you need to hold an adult's hand at a fireworks display?</p>		
<p>To recognise that flames and fireworks are hot and dangerous</p>	<p>This could be modelled as 'role play' by the teacher. You will need the tea light, matches and coloured paper for this activity. Light a short match in order to light the tea light. Pretend you have burnt yourself doing it.</p> <p>Drop the match into a tray of water next to you. Shake your hand and model pain.</p> <p>Discuss how hot the match was. Explain that bonfires and fireworks are even hotter, even sparklers.</p> <p>Demonstrate the match being dropped into water again and ask children if they heard anything. Explain that this is the cold water cooling the match down very quickly.</p> <p>Explain safety rules, such as: that gloves should be worn when holding fireworks and that they should not be touched even when finished, or when dropped; that sparklers must be put into cold water when they have burnt out to help them cool down and to go out completely.</p>	<p>What happened to make my hand hurt? How can I stop the pain?</p> <p>What happened to the fire when it was dropped into the water? What did you hear? Do you think you should touch a burning match?</p> <p>Do you think you should touch a firework? Can you explain your answer?</p>	<p>PHSE – Health and wellbeing</p> <p>Science WS/ Enquiry -Observation</p>	



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
To observe in order to answer a question	<p>Light a new match and safely light the tea light. Ask initial question and gather children's ideas.</p> <p>Hold up different coloured pieces of paper behind the tea light (or torch) and discuss which colour paper allows the light to be seen clearest (usually darker colours). Explain that the flame is like a firework and the paper is the sky.</p>	<p>Why do you think we have fireworks displays at night?</p> <p>Which colour of paper background makes the flame/light look brightest?</p> <p>What time of day is the sky this colour?</p>	Science WS/ Enquiry – Classification - Observation Suggesting answers to questions	Science WS/ Enquiry – Classification More able or older children (if you are in a mixed Year 1 and 2 class) could sort or group colours that work well and those that are not so good, such as from darkest to lightest colours, from the observations.
To apply learning to create and share ideas	<p>Ask children to create a fireworks image, using chalks and paper, of their favourite firework. They should choose their own paper to draw on.</p> <p>Make a display, perhaps as a collage or washing line, of the images produced.</p>	Which colour paper should we use to create a fireworks picture?	Art and Design	
To remain safe when using or watching fireworks displays	<p>Review children's ideas about being safe with fireworks. Ensure that the key messages of not touching them, leaving fireworks such as sparklers in cold water to cool and of holding a parent's hand whilst at a display, are delivered.</p>			





Where should we keep fireworks?

Session overview:

During this session, the children will apply their understanding of materials to design (and create) a container for fireworks. This could be to store them in prior to use, or something that can hold water in which to place the fireworks after use, which has links with the year 1 activity.

The children will consider how to remain safe when using a particular firework such as a sparkler.

Resources needed:

- For each group
 - Range of materials, including bricks, cardboard, paper, shredded paper, cotton wool, wool, straw, hay, range of fabrics, for each group of children
- Camera
- Videos of fireworks displays
- Videos or images of children using sparklers
- Matches
- Indoor sparkler if you can obtain one for demonstration and your H & S policy allows for its use
- Tray or bucket of water
- For each group
 - Range of materials for testing for waterproofness
 - Pipettes or droppers
- For each group or pair
 - Small plastic water bottle, $\frac{3}{4}$ filled with warm water and a layer of cooking oil on the top
 - Droppers/pipettes
 - Food colouring (liquid form) or ink of different colours

Timing:

Timings have not been included as you may run this as an afternoon session, or if the sparkler bucket activity is carried out for a second session. The safety poster activity could be carried out as a homework activity. The design is meant to be adapted for your own circumstances, whilst still ensuring that science and safety are covered.



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
<p>To explore what the 5th November represents</p>	<p>Show videos of fireworks and bonfires.</p> <p>Discuss the date of Bonfire Night and any other names that children may be aware of for it, such as fireworks night and Guy Fawkes night.</p> <p>Share a brief outline of the story of Guy Fawkes, for example the video on BBC Bitesize (https://www.bbc.co.uk/bitesize/topics/zjkj382/articles/zjsqbdm)</p> <p>Discuss how ‘blowing up’ something creates fire and explosions and compare this to the bonfire and fireworks.</p>	<p>What do these images show?</p> <p>On what date do we have Bonfire Night? What other names do we give the event?</p> <p>Who was Guy Fawkes?</p> <p>Why are a bonfire and fireworks used to celebrate the event?</p>	<p>History – Beyond living memory</p> <p>Science WS/Enquiry – comparing</p>	<p>If images with a ‘guy’ on the top are available, these could be included and the children questioned about who the ‘guy’ represents.</p> <p>English – spoken language Children could perform role play to enact the story, if you have time.</p> <p>History – Festivals Discuss when fireworks are used at other times of the year, such as weddings, New Year and Diwali.</p>
<p>To make comparisons between a model and something real</p>	<p>Make fireworks in a jar. Half-fill jars with warm water. Pour in some oil so that the water is covered with a layer of oil. This may be best set up previously to allow the two layers to separate out fully. Ask children to carefully drop food colouring into the container and observe what happens.</p> <p>Gather descriptions of what they notice. Explain that this is called a ‘fireworks jar’. Compare the fireworks jar to real fireworks displays from the videos.</p>	<p>How is the fireworks jar similar to a fireworks display (trails of colours)? How is it different? (quieter!)</p>	<p>Science WS/Enquiry - Comparing</p>	



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
<p>To consider the feelings of others and the needs of animals around us</p> <p>To encourage the considerate use of fireworks and the need to protect animals</p>	<p>Consider the sounds made by the fireworks in the videos and how loud they are. Children could imitate the sounds. Ask if there were other sounds, such as voices and the fire itself.</p> <p>Discuss ideas about which firework makes the loudest sound and model drawing a table to record using a tally, or numbers.</p> <p>Gather ideas about how much louder an explosion would be if it blew up Parliament, as Guy Fawkes intended.</p> <p>Ask children about their feelings about loud sounds. Discuss what they do when they are scared.</p> <p>Share the images from the BEIS-OPSS Firework Safety Campaign of the dog and the cat hiding under covers. Emphasise the need to be considerate: people and animals can be affected by fireworks. Let your neighbours know in advance if you're planning on using any fireworks. Be mindful of where you site fireworks to minimise disruption. Look after pets: Discuss why the animals on the posters might be hiding (from the loud sounds) and how they could be kept safe on Bonfire Night (cats and dogs should stay inside. Give small animals who live outside lots of extra bedding and nesting material to burrow into.)</p>	<p>What sounds did you observe in the video?</p> <p>Which sound do you think was loudest? Which firework was loudest?</p> <p>How loud do you think an explosion would be?</p> <p>Do you think you would be frightened by a loud sound?</p> <p>When might you hide under the covers? How can we protect animals if they are scared?</p> <p>Why might putting the radio on help them feel less scared?</p>	<p>Science WS/Enquiry – Survey Recording</p> <p>Science WS/Enquiry – Classification</p> <p>PSHE – Health & Wellbeing</p>	<p>Science WE/Enquiry – Survey Recording – ask which sound the children like best and create a human bar chart, by grouping children first, then sorting into rows – photograph and display for discussion of the class's favourite-sounding firework.</p> <p>Could show video of a building being blown up to help with visualisation.</p>



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
<p>To apply simple properties of materials for a purpose</p>	<p>Ask children about where certain pets sleep, such as dog beds, cats' sleeping places as well as those of mice and other small pets. (If fish are introduced, explain that fish do not really 'sleep'!) Review what other requirements animals have to live well, such as food and water.</p> <p>Discuss ideas about the most suitable materials for animal beds. Explore a range by providing some for observation. Children could match the most suitable material to the pet, or classify materials into groups by their properties. Provide materials such as bricks, straw, hay, range of fabrics, shredded paper, cardboard, plastic, etc.</p> <p>As a class, decide on the most suitable material for certain pets. Give reasons linked to properties.</p>	<p>What sort of material would make a good bed for an animal to feel safe in? Why do you think this is the 'best' material for a 'pet' bed?</p>	<p>Science Context - Animals</p> <p>Science WS/Enquiry – Classification Science Context – Materials Science WS/Enquiry – explaining (conclusions)</p>	
<p>To encourage the considerate use of fireworks and to protect animals</p>	<p>Share the images from the BEIS-OPSS Firework Safety Campaign of the timings when fireworks should have to stop being set off. Discuss how there is a legal requirement not to light them after certain times to show consideration and also to allow animals to sleep.</p>	<p>How does not lighting fireworks after midnight on November 5th help to make us (and other animals) feel safer?</p>		



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
<p>To consider how we can remain safe when using and disposing of fireworks</p>	<p>Show video or images of children using sparklers. Establish that the sparks are fire and discuss how hot fire is.</p> <p>Explain safety rules, such as that gloves should be worn when holding fireworks and that they should not be touched even when finished or when dropped; that sparklers must be put into cold water when they have burnt out to help them cool down and to go out completely.</p> <p>Discuss with children how firemen put out fires, using hoses.</p> <p>Discuss what to do with sparklers after they have burnt out, and model this with a match, or, if you have a safe indoor sparkler, use this and drop it into the water. Discuss how the water removes the heat and also ensure that the sparkler is completely put out.</p>	<p>What are the sparks?</p> <p>What do you think the water does to the fire?</p>	<p>Science WS/Enquiry - Observation</p>	<p>There are images of a Lego man that has melted from being in contact with a sparkler here: https://www.ukfr.com/using-sparklers-safely. Discuss what happened to him and why.</p> <p>Show videos of fires being put out by firemen and the use of water for this.</p>
<p>To test materials to discover the most suitable for holding water</p>	<p>Whilst this is another materials activity, it is engaging because of the use of water!</p> <p>This could be set up as an activity with a range of materials and containers on the teacher's desk, such as paper, plastic, metal, cardboard, etc, and some odd ones, such as cotton wool, or polystyrene, or a plastic bag.</p>	<p>Which is the most suitable material for a sparkler bucket?</p>		



Objectives	Activities	Key questions	Curriculum links	Additional / Extension activities
	<p>Children should predict, with ideas and reasons, which container they think will hold water. They could sequence in order of the most suitable to the least.</p> <p>Discuss ideas for how to prove their predictions. Provide children with either the containers directly or materials to test, by pouring small amounts of water and seeing if the water passes through or not. Provide sorting circles for children to record materials into two groups.</p> <p>Once the materials are sorted into those that will hold water, discuss what else would make them suitable for the sparkler bucket; for example, a plastic bag holds water but isn't very strong or stiff (rigid).</p>	<p>Why do you think this one is better than that one?</p> <p>How could we test the materials to find out?</p> <p>What other properties does the material need to be a good bucket?</p>	<p>Science WS/Enquiry – Classification Predicting</p> <p>Science WS/Enquiry – Classification Observing</p>	<p>Design and Technology – Alternative idea to testing for waterproofness would be to consider keeping fireworks safe prior to being lit, so design a box that is strong and can be locked, choosing a suitable material.</p>
<p>To raise awareness of safety with fireworks</p>	<p>Children can choose which aspect of safety for Bonfire night they wish to share in a poster: either animal safety of safety with fireworks. Create a poster to share how to be safe with fireworks, using what they have covered in the sessions about safety, and putting them in a bucket and not taking them out, once they have finished, or about how to protect animals by giving them beds, not lighting fireworks late at night, etc.</p>	<p>How can we make sure that others are safe and protected with fireworks and sparklers?</p>	<p>Art & Design</p> <p>Science WS/Enquiry – Presenting information</p>	





Appendix 1: Fireworks and the Law

Recent years have seen a number of changes in the Law surrounding the sale and use of fireworks. These changes are summarised below:

Fireworks curfew

There is a curfew on firework use between 11pm and 7am (in line with the Noise Act), with the exception of the following nights where the curfew will vary:

- November 5th – until midnight
- New Year's Eve – 1am on the following day
- Chinese New Year – 1am on the following day
- Diwali – 1am on the following day

Retailers' responsibilities

- As with alcohol sales, retailers are responsible for ensuring that they do not supply to under-18s
- Retailers must not split retail boxes of fireworks
- Retailers wishing to sell fireworks all year round must be licensed
- It is an offence for anyone under the age of 18 to be in possession of F2 or F3 Category fireworks in a public space (including public parks)



The following fireworks must not be supplied to the general public:

- Bangers, flash bangers or double bangers
- Jumping Crackers
- Jumping ground spinners
- Spinners
- Mini-rockets
- Air bombs
- A battery containing bangers, flash bangers or double bangers
- A combination (other than a wheel) that contains one or more bangers, flash bangers or double bangers
- Category F4 fireworks

Consider careful disposal of used sparklers

- Lay flat in a tray of water to cool them
- Place in a deep bucket and avoid spikes sticking up by bending them into a loop

Always wear gloves when handling sparklers



Appendix 2: Additional background information

What events use light and fireworks?

Fireworks are used for a range of celebrations, from ancient festivals such as Diwali and Chinese New Year, to the relatively modern Bonfire Night. They are becoming more widely available, and there are even indoor fireworks, often used at weddings.

Whilst we traditionally think of Bonfire Night as also being ‘fireworks night’, the event stems from Guy Fawkes (as the protagonist discovered by the soldiers) attempting to blow up Parliament. Fireworks weren’t actually included in the annual celebrations until the 1650s, some 45 years after the failed event. They were used to simulate the explosions that could have happened if the Gunpowder Plot had succeeded, as it was gunpowder that was stored in the cellars under Parliament and gunpowder is the main ingredient of fireworks.

The first fireworks were probably manufactured in China during the 9th Century, when bamboo shoots were filled with gunpowder to explode on Chinese New Year. This event is on a different date each year, as the Chinese follow a lunar calendar for many of their traditions (whilst maintaining a Gregorian calendar for integration with the rest of the world). This means that Chinese New Year ranges from January 21 to February 20 on the Gregorian calendar.

As gunpowder has been a part of Chinese culture for centuries, firecrackers and fireworks have become an important part of their New Year celebrations to ward off evil spirits. In the final part of the celebrations, during the Lantern Festival, lanterns are lit and released into the sky (along with more fireworks!) as part of a celebration of moving into the light and the beginnings of the New Year.

Possibly one of the oldest uses of light that now incorporates fireworks is Diwali, or The Festival of Light, which quite literally translates as ‘row of lights’. It is celebrated by Hindus (as well as Jains, Sikhs and some Buddhists) around the world and is over a thousand years old.

It is celebrated for five days in between the Hindu lunar calendar months of Asvin and Kartik, which usually fall during the Gregorian calendar months of October or November; much like Christian Easter, this date changes relative to the position of the Moon, a similarity with the Chinese calendar.

Each religion has a slightly different way of celebrating and focuses on different deities or famous figures in their culture; for example, Hindus in Northern India commemorate Prince Rama’s return to Ayodhya after 14 years exile; in the South, Diwali is in honour of Lord Krishna’s victory over King Narakasura; but all focus on a banishment of darkness or coming out of a dark period into the light, celebrating a triumph of good over evil and of new beginnings – a common theme in many festivals of light. The lighting of the clay lamps, or diyas, symbolise the inner light that protects each household from spiritual darkness and this is done on the third day. Candles and fireworks are also lit to celebrate this day.





Why do we have Bonfire Night?

Bonfire Night is marked on the 5th November in the UK as part of the remembrance of the Gunpowder Plot of 1605.

Sometimes called Guy Fawkes Night, this event reminds us that Guy Fawkes was famously the person caught trying to blow up the Houses of Parliament on that fateful date. He was not working alone, however, but was originally part of a group of five who were determined to blow up King James I (King James VI of Scotland) and the Houses of Parliament at its official opening. This was an attempt to force a change in the treatment of those of the Catholic faith, which stemmed from Henry VIII's divorce from Catherine of Aragon, and his breaking away from the Catholic Church of Rome. Catholics were persecuted throughout the reign of Elizabeth I, and this continued with James I when he ascended to the throne, as these monarchs feared that the Catholics would support invasions from those other countries on the continent that did follow the teachings of Rome.

The group, led by Robert Catesby, a staunch Catholic, and his co-conspirators Thomas Winter and John Wright, planned to use Guy Fawkes' knowledge about the use of gunpowder (as he was a mercenary), and he was therefore tasked with the lighting of the slow fuses.

However, as the opening of Parliament was delayed, the secret spread round the family and friends of the activists, so, instead of only five, there were over 60 sympathisers aware of the plot. As with all secrets, the more people that know, the greater the chance of betrayal or discovery, even by relatives! The Gunpowder Plot would have succeeded except for a letter, written by Francis Tresham to his brother-in-law (Lord Monteaagle), ending up in the hands of King James' Secretary of State, Robert Cecil. Francis was trying to warn his brother-in-law not to attend Parliament's opening, in an attempt to save his life.

The plotters, although they knew about the letter, thought that the authorities were unaware of the details of their endeavours and therefore could not prevent them from succeeding. They continued with their plans and Guy Fawkes was in the cellar with the gunpowder, on November 4th 1605, awaiting the Opening of Parliament on the 5th. This was where he was discovered at around midnight. He was arrested and taken to the King for questioning. Despite torture, he did not give up the names of his friends, but the government spies had already linked him to them.

The group, now numbering about 60, fled London for the Midlands, many arriving on the Staffordshire / Warwickshire border at Holbeche House, where, on the 8th November, they were attacked by the Sheriff of Worcester and his forces. Robert Catesby, John Wright and Thomas Percy were killed, and the remaining men discovered, arrested, tried, found guilty as traitors and executed in January 1606.

The people of London lit bonfires on November 5th in 1606 to mark the anniversary of the foiling of the plot, burning effigies of Guy Fawkes and the Pope (as a continued persecution of Catholics). The bonfire tradition has survived to this day.





You can find out more at:

Gunpowder Plot:

<https://www.bbc.co.uk/teach/class-clips-video/history-ks1-the-gunpowder-plot/zsb7wnb>

<https://www.history.com/topics/british-history/gunpowder-plot>

<https://www.parliament.uk/about/living-heritage/evolutionofparliament/parliamentaryauthority/the-gunpowder-plot-of-1605/>

Staying safe with fireworks:

OPSS has produced safety guidance on how to use fireworks responsibly, protecting people and keeping animals away from harm.

<http://www.gov.uk/government/news/staying-safe-with-fireworks>

Consumer advice from the British Fireworks Association

<https://www.britishfireworksassociation.co.uk/firework-advice-for-consumers/>



Chinese New Year:

<https://www.britannica.com/topic/Chinese-New-Year>

<https://www.bbc.co.uk/teach/school-radio/assemblies-ks1-ks2-chinese-new-year-festivals-lunar-festival/zp993j6>

Diwali:

<https://www.nationalgeographic.com/history/article/diwali-history-customs-indian-festival-of-lights>

<https://www.bbc.co.uk/bitesize/topics/zh86n39/articles/zjpp92p>

