

<p>Activity Idea</p>	<p>A Christmas Eve Emergency</p> <p>This activity can be used to develop children’s understanding of electricity, in particular, how to make components brighter and louder to help Father Christmas fly his sleigh safely on Christmas Eve. It develops the skill of Fair Testing and helps to correct a generally held misconception about cells and batteries.</p>
<p>Outcome</p>	<p>Children will have a deeper understanding of cells and batteries and know how to make a bulb brighter or buzzer louder. They will also be able to measure these changes using a Data Logger and display their findings through numerical data in a graph.</p>
<p>Guidance</p> <p>Year 6 Knowledge</p> <ul style="list-style-type: none"> • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram. <p>Upper Key stage 2 Working Scientifically</p> <ul style="list-style-type: none"> • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • taking measurements, 	<p>It is a good idea to split the activity into two lessons in order for the children to lead the investigations and this also gives the teacher time to provide the resources the children have requested.</p> <p>Lesson 1</p> <ul style="list-style-type: none"> • Tell the children that you have had a letter from Father Christmas and read it out. <p><i>“Dear Children, I need your help, otherwise no one is going to get their presents delivered on Christmas Eve this year. Rudolph has a really bad cold and so his nose is not going to be very shiny and bright on Christmas Eve. This is especially worrying because the forecast for Christmas Eve is very foggy. Normally Rudolph’s nose lights the way and lets other aircraft see where the sleigh is and stops us having any collisions. I have heard you are learning about Electricity so thought you might be able to work out how to keep us safe on Christmas Eve. Please could you work out the answer and then send a diagram so that I can get the Elves to make your invention? Happy Christmas”</i></p> <ul style="list-style-type: none"> • Ask the children to get into partners and discuss how they think they may be able to help solve the problem. How can they make the sleigh be more noticeable? Hopefully the children will be aware, from work carried out in Year 4, of the difference between cells (1.5v) and batteries (anything bigger than 1.5v) and be able to use this knowledge to solve the problem (If they do not know the difference then you need to do a separate lesson on the difference between cells and batteries). • If you have the Concept Cartoon Resource, then 10.7 Circuits is an appropriate cartoon to use at this point and return to in the plenary at the end of Lesson 2. • The children may come up with the idea of making a brighter nose for Rudolph perhaps using a coloured LED or a higher voltage of bulb with batteries. • Encourage them also to think about ways that other vehicles, such as boats navigate through the fog (fog horns). If they are unaware of this then show them a clip (see resources). Perhaps they could make a fog horn for Father Christmas? • Ask the children to work in groups to plan the best way to keep the Sleigh out of danger and also create a resource list for what they will need to solve the problem. At this point they may draw something into their Group Book but don’t let them have the electricity components at this stage. • Each child can also make an individual prediction in their book about the best way to keep the sleigh safe. • Ask the children what unit of measure do we measure electricity in? (voltage). How might they measure how bright their bulb/buzzer is? They may come up with a non-standard way to measure which is fine at this point. • Ask them to look at the bulbs and buzzers to see what voltage they are. The children should become aware of the different voltages of bulbs and the voltage of the

<p>using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p>	<p>buzzers. This should help them to think about how many cells will be needed with each component in order to make it brighter or louder.</p> <p>Lesson 2</p> <ul style="list-style-type: none"> • Children make their circuits to either create a brighter bulb or loud buzzer. When they have made them ask them if they can provide a way to switch them off and on as Father Christmas may not need them on if the fog lifts. The children should be able to add a switch to their circuits. You may have wished to direct the more able to make the buzzer louder as this is a little more difficult. • Ask the children how they know their bulb is brighter or buzzer louder? What could they use to measure it accurately? Hopefully they will have had experience of using a Data Logger before and be aware that it measures both light and sound. • The Data Logger can be used to see who has made the brightest/loudest circuit. The data can be logged on a graph and the pattern can be discussed. • Remind the children that Father Christmas had asked for a diagram of their inventions so that he could get the elves to make it for the sleigh. • Get each child to return to their individual books and draw their tables invention, accurately using the correct electrical symbols. • Also ask them to return to their predictions and write whether their results matched their prediction or not and why. • In the plenary the children can pretend to be the elves and swap their diagrams with each other and see if they can use the diagrams to create the circuit. This double checks the accurateness of the invention but also gives the children a chance to show whether they understand the symbols enough to create a circuit.
<p>Success Criteria There are many possible success criteria for these lessons - it depends on your focus.</p>	<p>Must know that components have different voltages. Should be able to locate the voltage on the different components including cells and batteries and use this information to make a bulb brighter. Could (as above) in connection to making the fog horn as loud as possible for the sleigh.</p>
<p>Resources</p>	<p>Electricity resources - variety of cells and batteries, buzzers, variety of different voltage bulbs, switches, coloured cellophane, coloured LEDs (optional), wires, battery holders Data Logger that measures light and sound – Data Harvest Vu is a great one</p> <p>Fog Horn Noise - http://www.bbc.co.uk/learning/schoolradio/subjects/earlylearning/stimulusoundslibrary</p> <p>Concept Cartoon 10.7 Circuits – optional.</p>