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| **Session 1: Electrical Festive Challenge** | | | |
| Science curriculum area: **Electricity** | | i. 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  ii. use recognised symbols when representing a simple circuit in a diagram | |
| Working Scientifically (**UKS2**) | | i. plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary  ii. report and present 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 | |
| Teaching Objectives | | * Plan electric circuit investigations to consolidate current electrical knowledge * Establish current understanding of electricity and approaches to working scientifically | |
| Other Curriculum areas | | **D&T:** Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups; understand and use electrical systems in their products | |
| Teaching Objectives | | * Develop success criteria based on design brief | |
| Key Vocabulary: electricity, electrical circuit, complete circuit, circuit symbol, components, cell, battery, positive/negative, connect/connection, loose connection, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), voltage, current, conductor, insulator, metal/non metal, enquiry question, investigation, findings | | | |
| Resources Dragons (parent volunteers), Dragons’ brief, challenge cards, electrical kits (bulbs, batteries, buzzers, motors, switches, wires), sticky-note investigation resource. | | | Weblinks  <http://www.bbc.co.uk/programmes/p0118bzv> - *The Dangers of Electricity;* <http://www.bbc.co.uk/programmes/p01198l5> *- Electrical Circuits;* <http://www.switchedonkids.org.uk> *– Using electricity safely.* |
| Whole Class: *Try and arrange for some parent volunteers to come and be your ‘Dragons’. They will need to attend today’s session and the final session (6). Prep all investigations (see Challenge Cards).* Sit your Dragons behind desks and as chn come in get them to sit down. Introduce the ‘Dragons’, explaining what a Dragons’ Den is and that the Dragons are there to set the chn a design brief for a prototype that will need to be presented in Session 6. As the leader of the Dragons, explain the overarching brief that chn need to design a working festive lights decoration. Get each of your Dragons to read out a section of the design brief and to wish the chn luck. Your Dragons can then leave! Explain to chn that as chief dragon, you will remain as their mentor throughout the process. Explain that first of all they need to watch some health and safety clips (see links) before establishing that they have the key basic knowledge and understanding of electric circuits. Explain that doing experiments with battery operated circuits is not dangerous in the way that we mustn’t ‘play’ with mains electricity. Can chn tell you why? (Much lower voltage in batteries.) Check that chn understand how mains and battery power is created (talk about energy sources vs chemical reactions) and establish that scientists call ‘single’ batteries ‘cells’. Explain that you would like chn to complete a series of electrical challenges, where they will need to demonstrate that they understand how electric circuits work and that they can respond to enquiry questions in an effective and scientific manner (complete Challenge Card activities). Once completed, bring chn back together and explain that they now need to create their own success criteria for their decoration. Go through the brief again and talk about what ‘success criteria’ means (they should be familiar with this from D&T) and create the first of these as a class. Then explain that chn need to come up with the rest of their success criteria in their teams before starting their planning process by looking at existing products during the next session. | | | |
| Activities: *Chn to work in mixed ability teams of three.* **Challenge Card investigations** - have laminated sticky-note investigation sheets available (see resources) for each team and plenty of sticky-notes for chn to carry out their investigations. Use this opportunity to check chn are working effectively with this approach to scientific enquiries (they should now be familiar with it) as well as their current electricity knowledge. Note the contributions of all three levels of ability in each ‘team’ and identify where support and challenge will be required. (NB. while only series circuits need to be used in Y6, for very able pupils you may wish to introduced parallel circuits.) **Success criteria** - encourage chn to use a highlighter to pick out the key design criteria from the design brief before composing clear success criteria for each. | | | |
| Plenary | Look back at the Challenge Cards and ask chn to identify areas they are hazy on and things they want to find out more about in terms of electrical circuits and electricity (check understanding of the terms conductor and insulator). Write these down to ensure you explore them over the next few sessions. Also establish areas where chn have solid understanding. Highlight anything you noted in the investigation process that chn also need to work on. Share success criteria and explain that chn will need to refer to these regularly to ensure that they are on track. Ask chn to see if they have any festive lights at home that they could bring for the next session. *Homework: chn can explore the ‘switchedon’ site to learn more about where electricity comes from (see link)* | | |
| Outcomes | Children will   * Plan and carry out a series of simple electrical circuit investigations * Identify current electrical knowledge and areas to explore further * Create success criteria for their Dragons’ Den electrical challenge | | |