



Exploring the First Electrical Houses: the Story of Electricity in the Home

Notes for teachers

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1. Introduction and background

This interactive KS2 resource has been developed as part of '[Electrifying the Country House](#)' (ECH), a project undertaken between May 2015 and July 2016 by researchers at the University of Leeds in collaboration with staff at three country houses – Cragside, Northumbria and Standen, West Sussex (National Trust) and Lotherton Hall, West Yorkshire (Leeds City Council). The resource can be used in the classroom or at home, as a group exercise or as an independent learning assignment.

In the past, and especially during the Victorian era, country houses were important places for new technologies to develop and to be used. This was because the owners of these big houses were very wealthy and could afford to install new technologies in their houses so that they would be more comfortable – or so that they could show off when they had guests. This was how some of the technologies we take for granted in our homes today started: things like electric lights, telephones, and central heating.

One of the key aims of the ECH project was to highlight this under-appreciated history. As country houses are more traditionally known for their artistic or architectural heritage, this focus on science and technology broadens the educational possibilities for visitors, including school groups. We thus hope that this resource will encourage teachers to consider how a visit to a local country house might support a cross-curricular learning approach integrating different areas of the KS2 curriculum: science, history, and art and design.

Over the course of its development, the ECH project researcher Dr Michael Kay piloted the interactive with classes of Year 4 and Year 6 pupils in local schools, and below we set out some recommendations from these trials regarding how best to use the interactive.

2. Learning outcomes

Pupils will learn:

- How electricity was used when it was first introduced into the domestic sphere in the 1880s, and what different people thought of it.

- The role that country houses, especially Cragside, Standen and Lotherton Hall played in the story of domestic electrification.
- About conductors and insulators, including some examples.
- What basic electrical circuit components do, and how these early houses made use of them to work lights, bells and other electrical apparatus.
- How the important invention of the electric lightbulb made a difference to people's lives, and how it wasn't always seen as a good thing – and wasn't always reliable.

3. Curriculum links

Science:

- Electricity comprises a key part of the science curriculum for Year 4 and Year 6, and the interactive can be used to support learning in this area.
- The Cragside videos and the quiz explain conductors and insulators, and give examples of both.
- Throughout the interactive pupils are introduced to different components of electrical circuits and their symbols. This is further reinforced by the quiz, which is structured around six main components: wire, bulbs, switches, buzzers, motors and batteries.

History:

- The interactive can be used to support a study of an aspect or theme in British history that extends pupils' chronological knowledge beyond 1066. The use of electrical technologies of lighting, communication and power can be studied as a significant turning point in British history. For example, electrical communication was key for the expansion and consolidation of the Empire.
- Questions that the interactive might help to address include:
 - o How has technology changed the world over time? Pupils could list all the changes they can think of, and could look at key examples of technologies, such as electrical technologies, and consider why they mattered both nationally and in their local area.
 - o Who had different opinions about new technologies, and why? Did changes in technology affect the rich and poor differently? Pupils could look at how different people's jobs were affected by new technologies. Considering how men and women often saw electricity differently can also be used as a way to understand changing gender roles in society.
- Schools in the vicinity of any of the three houses in the interactive could also use this content as part of a local history study, perhaps of the effect electricity had in their local area. Alternatively, schools elsewhere could use the stories of these houses as starting points for investigations into a country house local to them.
- The interactive could also help pupils understand the long arc of historical development, for example, by also considering other technologies of lighting in history and how these have enabled/restricted people's activities – for example in Roman times or Anglo-Saxon times.

Art and Design:

- KS2 curriculum requirements include pupils learning about artists, architects and designers in history. The interactive can be used to introduce the 'Arts and Crafts' movement of the late nineteenth and early twentieth centuries, and in particular the architect Philip Webb who designed Standen.
- Pupils could use light fittings featured in the interactive as inspirations for sketches, and note differences between masculine and feminine designs, such as those seen in Lotherton Hall.

Design and Technology:

- The interactive can be used to support learning about evaluating products and understanding how key events and individuals in design and technology have helped shape the world – for example, Joseph Swan's lightbulb in Cragside, or Alexander Graham Bell's telephone.
- The knowledge of electrical circuit components gained through the interactive will also help pupils to understand and use electrical systems.

4. The structure of the resource

The resource encourages users to take virtual tours around the three country houses involved in the ECH project: Cragside, Standen and Lotherton Hall. Users progress from one house to the next, unlocking them as they go, and finish with a quiz. The content in each house is loosely themed to emphasise different aspects of domestic electricity: in Cragside the focus is science and technology, in Standen it is aesthetics and design, and Lotherton Hall highlights the social history of electricity.

Users begin with Cragside, and are introduced to the house's guide character, Mr. Grey the butler – he was the real butler at Cragside at this time. After watching the introductory video users are given a floorplan of the house, from which they can explore four rooms. In each room is a 'hotspot' icon highlighting an object of electrical interest in the room. When clicked this expands out into a larger picture of the object and an accompanying question. After considering the question, users can watch a video of the guide character giving an answer.

When the user has watched all four of the room videos, a notification appears linking to a conclusion video in which the guide character sums up what has been learnt (please note videos must be watched all the way through). The user can then progress to the next house, Standen, where they go through the same process before moving on to Lotherton Hall. The guide character for Standen is Mrs. (Margaret) Beale, who with her husband James had the house built for their family. The guide character for Lotherton Hall is Bertha, a maid, who is a fictional but representative character. Throughout the interactive users can navigate between sections they have unlocked via the pop-up menu in the bottom right of the screen.

After Lotherton, the user can take a multiple choice quiz comprising six questions, each representing a different electrical circuit component which they have seen in the three houses. The questions highlight the interactive's three themes of science, history, and art and design. To answer them, users select their choice and then click the 'Check your answer!' button. A comment underneath the questions then confirms if the choice is correct,

or provides a hint or prompt if it is wrong. Upon completing the questions, users can see an animation of the circuit components in action.

The order of the houses corresponds to the order in which they were electrified. In each house, other rooms are also given on the floorplan for context – although they cannot be selected. Subtitles can be toggled on or off on the videos using the ‘cc’ button at the bottom right if users want to read along as the character speaks. The transcripts of all the videos are also available to download from the teachers’ resources section of the interactive.

5. Using the resource in the classroom or at home

When trialling the interactive, with a couple of classes we sat the pupils down at their own computers with headphones and observed as they explored the content of one or two of the houses; however, this proved problematic as the internet connection wasn’t good enough and the videos often didn’t load properly. An alternative which worked quite well with another class was pairing pupils up at computers, using headphones with splitters, and having them move through the interactive together, discussing it as they went along.

The most effective way of using the interactive in the classroom is for the teacher to use a large screen to lead from the front. In this case, teachers can move the pupils forward through the interactive, asking which rooms they would like to explore first/next. They can then pose the questions asked in each room to the class, and encourage pupils to suggest answers, before playing the associated video. They can throughout provide clarifying or summarising remarks if necessary, or they can refer back to learning points which the pupils have already studied. Finally, they can lead the quiz by prompting pupils to choose which of the multiple choice answers is correct, and encourage discussion.

In one class we also asked two (Year 4) pupils to come up to the front to lead the rest of the class in exploring one of the houses. The pupils asked which room the class wanted to visit next, read out the questions in the rooms, and collected suggested answers from the other pupils before playing the videos. This was a very empowering way to use the interactive, and – with a teacher supervising and offering clarifying comments from the side – could provide a very engaging learning experience.

From these experiences, we recommend allowing 45-50 minutes to complete the interactive with a class, allowing just under 15 minutes per house. This can be longer or shorter depending on how much discussion pupils want to have around the questions in each room.

The interactive could also be set as a homework task, with pupils going through it individually and using the content from the videos to write down their answers to the questions asked in each room – these can then be assessed. This would probably take a pupil about 30 minutes. The interactive is optimised for use on tablets as well as computers.

6. Individual house URLs

The interactive can be used to support a visit to one of the houses featured in the resource. Although the default flow of the interactive takes the user from Cragside to Standen to Lotherton to the quiz, it is possible to jump directly to any of these sections using the URLs:

Cragside: www.electrifyingthecountryhouse.org/ks2interactive/cragside/

Standen: www.electrifyingthecountryhouse.org/ks2interactive/standen/

Lotherton Hall: www.electrifyingthecountryhouse.org/ks2interactive/lotherton-hall/

Quiz: www.electrifyingthecountryhouse.org/ks2interactive/quiz

In this way, the interactive could be used before a trip to one of these houses to prepare pupils for the visit.

7. Suggestions for follow-up activities

A circuit component worksheet

This worksheet can be downloaded from the teachers' resources page of the interactive, and links to the Science curriculum – electrical circuits. Pupils match up the circuit components with their symbols and label them.

History of electricity timeline

This involves placing developments in electricity (and other historical events) on a timeline, individually or in small groups – perhaps using the internet to find out when things happened. This helps pupils to situate events chronologically, an important History curriculum skill, and use of the internet could help develop individual or group research skills. This can be downloaded from the teachers' resource page of the interactive.

Cragside character cards: 'Princess Alexandra's sore finger, and other stories'

Lord Armstrong liked to show off his house Cragside and had many important visitors. In 1884, the Prince of Wales (later King Edward VII) and his wife Princess Alexandra came to stay and were very impressed by the electricity. These cards focus on 4 characters at the time of this visit: Armstrong, Princess Alexandra, the butler and the maid. The cards can be printed out (double-sided) and given to small groups of 4 or 5 pupils. Each group will read their card and devise a short piece of drama to portray the information on their character card to the rest of the class. These cards can be downloaded as part of this resource. This could link into the curriculum as a reading comprehension exercise and as an opportunity to create improvised or devised drama in small groups for the rest of the class.

Building circuits

Pupils could use circuit components discussed in the interactive to build their own circuits – perhaps trying to build the circuit they see animated at the end of the quiz. Alternatively they might try to make a lamp for their desks, or an electric call buzzer of their own – perhaps to summon a friend! This activity would link to the Science curriculum – building circuits.

Writing letters

After using the resource, pupils could choose one of the three guide characters and write a letter as that character to a friend talking about what they think about electricity. Were they for or against it? Were they excited, happy, nervous or scared about it? This could link in to the English/Literacy curriculum as a composition skills exercise.

Writing explaining or persuading texts

Pupils could write an explanation text about how an electrical circuit works – or for an extra challenge, write a text about how the lamps in the Library at Cragside worked. Alternatively, they might write an advertisement or make a poster from an electrical company offering electricity for a house, persuading people to install electricity. These activities would link to the English/Literacy curriculum.

Sketching light fittings

A set of pictures of some of the light fittings featured in the interactive can be downloaded from the teachers' resources page. Pupils can use these as inspirations for sketches, observing materials, textures, and differences in design between more masculine and feminine fittings. This links to the Art and Design curriculum.

8. Additional resources

Animations

The cloisonné lamp in the Library at Cragside, which the butler describes as an early example of how people switched electric lights on and off, is fascinating and pupils may find it interesting but hard to understand. We have created an animation which helps to illustrate how lifting the lamp switched it off, and putting it back down again switched it on. This animation can be found on our YouTube channel [here](#).

Likewise, we have also made an animation which demonstrates how the hydroelectric system at Cragside worked. This can be found [here](#). More information on how to explain these animations can be found on the 'Downloads' section of our project website [here](#).

Short film

As part of the ECH project we produced a short film (10 mins) at Lotherton Hall about how the family and the servants responded to the installation of electricity in the house, and to a fictional accident in which one of the maids received an electric shock in the house. Pupils could watch this film as a follow-on from the interactive, either in the classroom or at home. This film can be found [here](#).

Timeline

In addition to the timeline activity noted above, the completed timeline, also included as a downloadable resource, could be used for various purposes:

1. pupils could annotate it (individually or as a class) with other historical topics being covered, adding in other events to place them in context;
2. pupils might illustrate the electrical events on the timeline to practice representing ideas/events through images;
3. pupils could refer to it as an example timeline, using it as a template when writing their own in relation to another historical topic.