

Electrical safety and sustainability

Lesson 1



Overview

Pupils identify a range of objects that use electricity (batteries and mains), then learn about staying safe around electrical objects and using electricity safely. They also look at why it's important to save electricity, and ways to do so.

Learning outcomes

We will be able to:

- identify appliances that use batteries or mains electricity
- describe and demonstrate how to use electricity safely
- explain the importance of saving electricity, and ways to do this



Starter activity

Slide No.



Ask pupils to spend two minutes making a mind map using the word 'Electricity'. They should write or draw anything they know about electricity, or associate with the word, e.g. objects that use it, what it is, what it does, places it occurs, safety etc.

Note: This can be a useful way to gauge existing understanding and learning; you can return to it at the end of the lesson or series of lessons as a way to assess progression.

Resources

A4 or A3 plain paper

Core activities

Slide No.



Show pupils the different images and ask them to click on those which use electricity. When they have finished, show slide 4 with the correct responses, and ask if there are any surprises. Ask them to list up to 10 more objects they might find around the house or in school, which use electricity.

Ask pupils how we know whether something uses electricity or not – for example, what is the difference between using a football and using a TV? (e.g. essentially something that uses electricity doesn't work without it).



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Slide No.

Explain the difference between mains electricity and batteries. Can pupils identify which objects use which? (They should also be able to recognise that laptops can use both!)

Ask them to look at the list of objects they made themselves and identify which form of electricity these use.

Note: In Lesson 2, we refer to a battery as a cell. Make pupils aware of this interchangeable term.

Slide No.

Explain that to make things work, electricity can be turned into four things: **Heat; Light; Sound; Movement.**

Using Worksheet 1, ask them to identify what electricity is being turned into to make each object work.

Look at slide 8 to identify the correct responses.

Resources

Worksheet 1: Heat, Light, Sound, Movement

Slide No.

Electrical safety

Ask pupils what they already know about staying safe around electricity. Is there anything they know they should or shouldn't do?

Slide No.

Electrical safety indoors

Show the indoors image, and ask pupils to identify where they think there are dangers. Click on each aspect to reveal the safety information and discuss each one together, including the reasons why each aspect is unsafe.

In pairs or small groups, ask pupils to identify how they can make each aspect in the image safer (e.g. asking adults for help; plugging leads in where they are out of the way; using guards to prevent younger children putting their fingers into sockets). Discuss their solutions as a class.

If at home, ask pupils to have a look around and identify examples of safe use of electricity, and anywhere that electricity could be used more safely (e.g. in their bedrooms or in the kitchen).

Resources

An alternative interactive game about indoor safety can be found here: <http://www.switchedonkids.org.uk/electrical-safety-in-your-home>

As an extension activity, pupils can also look at the Socket overload activity, to see which household appliances can be plugged in safely together: <http://www.switchedonkids.org.uk/fun-and-learning/socket-overload>



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Electrical safety outdoors

Show the outdoors image, and ask pupils to identify where they think there are dangers. Click on each aspect to reveal the safety information, and discuss each one together.

Discuss further with pupils, raising awareness of different examples they might see and related safety issues. You could draw attention to particular examples and ask if and where anyone has seen them locally (e.g. walking past a sub-station on the way to school; seeing steel towers or overhead wires in fields or from a train etc.)?

Highlight and emphasise any safety messages related to electricity they might have seen (e.g. danger signs or 'keep out' warnings), or anything particular they might have spotted (e.g. exposed electrical connections or panels in street lights). What do they think they should do if they see something that is damaged or potentially dangerous (e.g. a damaged overhead powerline)? Explain that they should ask an adult to contact the electricity company for their area or call 105 in an emergency.

Emphasise that electrical substations must never be entered under any circumstances. Ask pupils what they think they should do if something of theirs goes into a substation (e.g. a ball; Frisbee; a pet etc.) and tell them that they should always ask an adult to call the electricity company for their area.

Some pupils might have seen on-street fuse boxes being opened and maintained – how do they think the person doing the maintenance does it safely?

Note: You may want to discuss that the dangers around electricity are often associated with materials which are good conductors, which means that electricity travels through more easily. Conductors and insulators are then covered in detail in Lesson 3.

Slide No.

Ask pupils to create a piece of electrical safety information for younger children, such as a poster, a presentation, a leaflet, a cartoon or a song, rap or poem. Pupils should be advised to include the 105 number as part of their safety messaging.

Note: You may also want to discuss basic first aid in relation to electric shocks. You can find a summary of what to do here: <http://www.switchedonkids.org.uk/teachers-and-parents/first-aid>

Resources

To help support with this task, you could watch our safety video as a class here: <http://www.youtube.com/watch?v=6yQqGgUCoPo>

We also have a slideshow of the most common electrical assets so you can educate your pupils on what they look like what they should avoid, which you can find and use here: <https://www.enwl.co.uk/globalassets/stakeholder-engagement/csr/electricity-resource-files/electrical-assets.pdf>



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Slide No. 13

Sustainability and saving electricity

Ask pupils if they know why it is important to save electricity. Explain that there are two main reasons:

1. Adults pay for the electricity used at home, so when we save electricity we also save money.
2. Electricity is made by generating energy, which has traditionally been done by burning fossil fuels such as coal, gas and oil. However, these fuels can cause pollution through burning, and they are also running out.

Resources

Show them either or both of these BBC videos:
What is renewable and non-renewable energy?

<https://www.bbc.co.uk/bitesize/topics/zp22pv4/articles/ztxwqty>

Fossil Fuels and Renewable Energy

<https://www.bbc.co.uk/bitesize/topics/zshp34j/articles/zntxgwx>

Slide No. 14

In pairs or small groups of three, use Worksheet 2 and ask pupils to sort the cards into 'Saves electricity' and 'Does not save electricity'. Discuss the different ways of saving electricity that they have identified. Ask them to identify the benefits of this method – i.e. to save money at home, to save the planet, or both.

Show the correct responses on the slide. You could discuss some of the savings, such as asking 'Imagine what you could buy with £75!' or experimenting to see what 6l of water looks like by filling different containers.

Ask pupils what role they can play in saving electricity and make a list of suggestions.

As an extension or home learning activity, pupils could identify ways they could save energy around their homes or in school, and to count the number of times over a week that they take action to save energy. For example, they could count the number of lights or switches left on unnecessarily in their homes or the school building, or check whether computers have been left on standby instead of being shut down, and create a campaign to educate and persuade people to turn them off.

Resources

Worksheet 2: Saving electricity card sort



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Ask pupils if they know of any alternative ways to produce energy, and to discuss any they might have seen locally, or on a journey (e.g. wind turbines, solar panels). Then show pupils the alternative sources of producing energy on the slide. Ask them to do some research into each source, and create a fact file for each one. They could do this using the Worksheet 2 template, or create their own in whatever form they choose. Give them the links below to help them with their research, or provide trusted sources of your own.

If your local community has any visible alternative energy sources (e.g. offshore windfarms, solar, wind turbines), ask pupils if they can find out more about these in particular and include them in their fact files.

Pupils could present their fact files to the class, or they could be used as a sustainable energy display.

Resources

Worksheet 3: Alternative energy source fact file

Useful links

What is renewable energy? <https://www.alliantenergykids.com/RenewableEnergy/RenewableEnergyHome>

Renewable energy sources: https://www.youtube.com/watch?v=Giek094C_I4

Curious Kate: <https://www.funkidslive.com/learn/curious-kate/>

Useful links

BBC Bitesize: Renewable energy (KS3 resource, but suitable for upper KS2) <https://www.bbc.co.uk/bitesize/guides/zh7hvcw/revision/3>

Renewable resource facts for kids https://kids.kiddle.co/Renewable_resource#Wind_energy

Slide No. 16

To extend discussion about renewable energy and saving electricity, ask pupils if they can give any examples of rechargeable devices that they might have at home. Are there any other rechargeable devices they can think of?

Show the examples on the slide – these are devices which are becoming more common – and challenge them to spot any being used around the community (e.g. car charging points in car parks).

Plenary

Slide No. 17

(Optional) If required, return to the baseline/starter activity. Ask pupils if they know anything more about electricity that they didn't know before, and to write or draw this in a different colour on their mindmap.

Alternatively, you could revisit this activity at the end of the series of lessons, or at the end of each lesson to demonstrate progression each time.