The smart energy challenge lesson plan

Help children learn about smart meters through a series of literacy, numeracy and science tasks. Is everyone ready to take the smart energy challenge?

Age range: 4-7

Introduction

Smart meters are being rolled out across the country. Every home could have a smart meter fitted by 2020 and it could radically change the way we use and interact with energy. This activity is an opportunity for children to learn what smart meters do and the energy-saving benefits of using smart meters in the home.

This activity has been divided into three challenges, which correlate to different learning areas, to give the teacher or group leader flexibility in delivering the topic:

Lesson 1: Understanding smart meters (literacy) – This section uses a range of literacy tasks to help children find out what smart meters are and what they do.

Lesson 2: The energy-saving benefits (numeracy) – This section uses data shown on the in-home display and information about energy use as the basis for a set of numerical challenges.

Lesson 3: Changing behaviour (social wellbeing/ citizenship and science) – This section looks at how smart meters can help people to make better choices about how much electricity and gas they use.

There is also an **extension activity** – if time, or if you want to set a homework task – that uses the **Smart meters factsheet**.

The smart energy challenge can be run as a whole class activity, or by a smaller group such as the Eco Club.

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Subjects

- **England:** English; Mathematics; Personal, Social and Health Education (PSHE)
- **Scotland:** Literacy and English; Mathematics; Health and Wellbeing; Sciences; Social Studies; Technologies
- **Wales:** Personal and Social Development, Wellbeing and Cultural Diversity; Language, Literacy and Communication Skills; Mathematical Development; Knowledge and Understanding of the World
- **Northern Ireland:** Language and Literacy; Mathematics and Numeracy; The World Around Us; Personal Development and Mutual Understanding

Lesson objectives

- To develop literacy skills in speaking, writing, and using information sources
- To develop numeracy skills in number recognition, measurements, and data handling
- To be aware of things that use energy
- To recognise how people's actions can affect the environment and the importance of saving energy

Resources and preparation

- You will need an interactive whiteboard with an internet connection, so you can access the Pod's resources at **www.jointhepod.org**
- Download and distribute the accompanying Worksheet (found in the **related resources section**). This has been created in Word so you can edit it to suit the age and interests of your group (and remove the optional clues, if necessary).
- Use these Guidance Notes to lead the lesson or to provide additional support to children.

Before starting

How should this activity be organised?
There are three distinct activities in **The smart energy challenge**. You could rotate children in groups so they get to work on each area or set different parts as homework tasks. Dedicate as much or as little time as you have available.

Is there a good time to run the activity?
You can run the activity at any time, but you might want to consider linking it to **Switch Off Fortnight**, the Pod's national energy-saving campaign in November.

Eco-Schools

Remember, to qualify for an Eco-Schools award, you need to show that environmental issues have been covered in curriculum work.

Lesson 1

Understanding smart meters *(literacy)*

Introduction – group discussion

Start by asking if anybody knows what a meter is. Show children the pictures of meters on their Worksheet and encourage them to discuss what they think they are, what features they can identify, where a meter might be kept etc.

Explain that the pictures show different types of energy meter – and they measure how much gas or electricity we use. We use gas and electricity to power most things around our homes – such as heating, lights, computers, TVs, fridges, games consoles and so on. A meter is important because it tells us how much gas and electricity we've used. Encourage students to ask any questions about how we use energy around the home and in school.

Write the words 'smart meter' on the whiteboard. Ask students what does the word 'smart' mean? Why might we say something is smart?

A smart meter is 'smart' because it sends information about how much gas and electricity we've used back to the company that supplies our energy. It comes with an in-home display that shows us how much electricity and gas we're using at that moment in time, and how much it costs.

Ask for a show of hands if anybody knows whether they already have a smart meter at home. You could point to the picture of the in-home display on the front page of these notes – have they seen one of these at home? If so, what can they tell the rest of the group about it? Has anyone heard their families talking about electricity or gas bills, or helped them to take a meter reading before?

Fact finder

Watch this clip from Smart Energy GB, which explains why smart meters are being rolled out and what they do: **https://www.smartenergygb.org/en/smart-future/about-the-rollout** (scroll down for the film).

Tell students to watch carefully as they need to remember one fact from the film (they could work in pairs or groups, if easier). They can share their fact with the rest of the group or their partner. More capable children could write the facts down on their Worksheet. If they need further guidance, you could write some starter sentences on the whiteboard or keywords to think about e.g. 'electricity', 'gas', 'smart meter' or 'how it works'.

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True or false?

The FALSE answers are:

1. Smart meters were invented in 1792.
3. You must have a smart meter installed by law.

Word spot

The three words related to smart meters are:

Electricity
Energy
Gas

What have I learnt?

You could provide a starter sentence on the whiteboard or encourage children to talk about what they're going to write before they put it down on paper.

Lesson 2

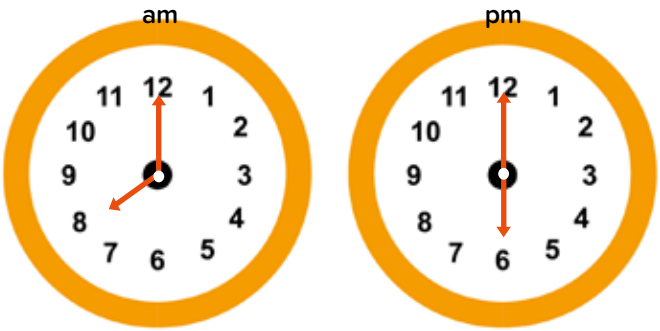
The energy-saving benefits *(numeracy)*

A smart meter comes with an in-home display that shows you lots of useful information about your energy use, including:

- How much energy you're using at the moment (this could include electricity and gas – or just one of them)
- How much it costs
- How much you've used in the past, so you can see when you've used lots of energy, and those days and times when you've used less
- You can even see how much it costs to use different electrical gadgets, or if you turn the heating up or down. For instance, if you turn on a light, you should see the figure that shows the amount of electricity you're using at the moment increase on the screen.

When do we use the most electricity?

The two times of the day when we use the most electricity are 8-10am and 6-8pm.



Optional question. Possible answers include: These are typically the times of most activity in the home, when everyone is present and using a lot of electricity: turning lights on, watching TV, playing on games consoles, charging mobile phones, cooking, washing and so on!

Working out your electricity use

In-home display image 1: 8kW
In-home display image 2: 25kW
In-home display image 3: 67kW

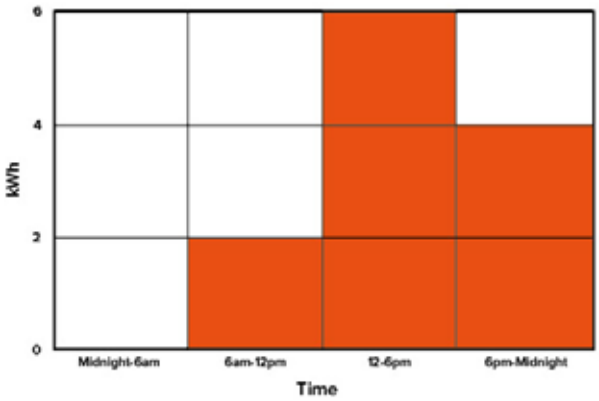
You might want to explain that electricity is measured in kWh and energy suppliers have a cost for 1kWh (approx. 15p*), which they use to work out the cost (in pounds and pence) of the electricity you've used.

The cost of gas

A1. £1
A2. £1 x 7 days = £7
A3. The Khan family (in-home display 2)
A4. £2 - £1 = £1
A5. ½
A6. £7
A7. £7 + £2 = £9

How much electricity do we use in a day?

A8. 12 kWh
A9.



How much electricity do we use in a year?

Low – 2,000kWh
Medium – 3,100kWh
High – 4,600kWh

* As of June 2017: https://www.ofgem.gov.uk/publications-and-updates/infographic-bills-prices-and-profits

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Real-life element

If you have a smart meter installed at school you could use this to bring a real-life element to the lesson. For example: use real-time data on the in-home display to look at how your school's electricity and gas use changes over the day. Which are the busy times for using electricity at school? At what time of day is the least amount of electricity or gas used? You could also use any historical data stored on the display to give a larger dataset for comparison.

Lesson 3

Changing behaviour *(social wellbeing/citizenship and science)*

The top of the in-home display has a light that turns red (high), amber (medium) or green (low) to show how much electricity or gas we're using right now. We can use this to identify when we're using more electricity and gas than usual – the light will be glowing red – and think about what actions we can take to use less energy during these times.

Have a group discussion about why it's important to avoid wasting energy. Possible answers include: It could reduce the amount we pay for energy (as we're using less); or it's better for the planet if everyone around the country uses less energy, as it means less carbon dioxide is released into the atmosphere from our actions – and power stations don't need to generate as much energy.

What uses energy?

The items that DON'T use electricity or gas are: scooter, football and teddy bear.

Saving energy

Have a group discussion about how we could reduce our use of the items in the pictures. For instance, don't leave the TV on, turn off lights in rooms, put a jumper on rather than turning up the heating, avoid deep, very hot baths, only use the hairdryer occasionally etc.

Are there some electrical appliances that we can't reduce our use of (for example, fridges)? Or can you think of ways we could avoid using electricity and gas unnecessarily? For instance, not holding the fridge door open for a long time, buying new machines that use less electricity, reducing the heating thermostat by 1ºC (this controls the temperature at which the heating switches on) etc.

Explain that we all have a responsibility to look after our environment and encourage others to do the same. If we all worked together to reduce the amount of electricity and gas we use, it would have a bigger impact than if only one of us took action, and together we could help to protect our planet.

Ask children to fill in the Saving Energy section on their Worksheet. When they're finished, you could share their ideas in a whole group discussion or ask them to discuss their answers in pairs.

Take action

Ask students to design a poster that encourages people to use less energy. You could hold a class competition and ask everyone to vote on their favourite poster design – why not display the winning entry in the school entrance for everyone to see?

Extension activity

Smart meter facts

Distribute copies of the **Smart meter factsheet** or share this on the whiteboard. Read out the facts to the class or group – or ask students to take turns doing so. You might want to do this a couple of times so they remember them!

Ask students to write down their favourite fact from the list they've just heard (or more capable students will be able to read these). You could leave the list of facts visible on the whiteboard for younger students so they can copy their favourite fact. Another option is to ask students to memorise their favourite fact as a homework exercise, and then to share this with the rest of the class.

If you enjoyed this, why not download our Energy Adventure quick activity? (www.jointhepod.org/energyadventure)