The smart energy challenge lesson plan

Discover all there is to know about smart meters by undertaking a series of brain-twisting exercises. Are you ready for the smart energy challenge?

Age range: 7-11

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 students to learn what smart meters do and the energy-saving benefits of using smart meters in the home.

The smart energy challenge has been divided into three parts, which correlate to different learning areas. This gives the teacher or group leader flexibility in delivering the topic. For instance: you could rotate children in groups so they get to work on each area or set different parts as homework tasks.

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 from 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 an **extension activity** – if time, or for a homework task – that uses the **Smart meter factsheet**.

There is also a **Smart energy challenge for 4-7s**.

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Subjects

- **England:** English; Mathematics; Science, Personal, Social and Health Education (PSHE)
- **Scotland:** Literacy and English; Mathematics; Health and Wellbeing; Social Studies; Technologies
- **Wales:** English; Mathematics; Personal and Social Education; Science
- **Northern Ireland:** Language and Literacy; Mathematics and Numeracy; The World Around Us; Personal Development and Mutual Understanding

Lesson objectives

- To develop literacy skills in reading, writing, and using information sources
- To develop numeracy skills in number recognition, use of the operations, fractions and data handling
- To learn about the role of smart meters in managing our energy use
- To learn about how we use electricity and gas
- 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?
The smart energy challenge can be run as a class activity, or by a smaller group such as the Eco Club. You can dedicate as much or as little time as you have available to the activity – and adapt the challenges to suit the age and abilities of your students.

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 at home. We use gas and electricity to power most things around our homes – such as heating, lights, computers, TVs, fridges, kitchen appliances and so on. A meter is important so we can find out 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? Ask students to put up their hands to answer these questions.

Fact finder

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

Then give students the following three web links and ask them to use a search engine to find a fourth website to use – make sure it's one they believe is credible – and include the URL. They can use one or all of the web links to answer the questions in the Worksheet.

https://www.smartenergygb.org/en
https://www.gov.uk/guidance/smart-meters-how-they-work
https://www.ofgem.gov.uk/gas/retail-market/metering/transition-smart-meters

A1a. Smart meters are the next generation of gas and electricity meters. Unlike traditional meters – which rely on households or meter readers to take meter readings, a smart meter will automatically send your gas and electricity readings to your energy supplier, so your bills are always based on the true amount of electricity or gas you've used.

A1b. Smart meters are being installed now in houses in England, Wales and Scotland. 50 million will be installed

by 2020. Energy suppliers will be contacting households when it's their turn to upgrade to a smart meter.

A1c. Some benefits of smart meters:

- No more estimated bills – your bills are based on what you've actually used.
- You can see how much money you are spending on your gas and electricity at any point in time.
- You can potentially save money, as you know what you're spending and when your home is using a lot of electricity and gas (so you can hopefully do something about it!)
- You can see how much energy you've used in the past, which could help you identify those times when you are using too much electricity or gas.
- If you reduce how much electricity and gas you use, this has benefits for the planet, as less carbon dioxide is released into the atmosphere from your actions. Power stations might also not need to generate as much energy.

The explainer

Teacher to correct, but possible answers below:

A2. They're clever gadgets which can tell us how much electricity and gas we're using, and how much it costs.

A3. They're a new type of meter that could help you save money on your energy bills.

A4. They're like your old meter, but send your readings directly to your energy supplier, so you no longer have to take a meter reading yourself.

True or false?

The FALSE answers are:

1. Smart meters were invented in 1792.

3. You need to pay for a smart meter to be installed.

6. You must have a smart meter installed by law.

Smart meter editor

Here are some suggested edits to the text (including possible headlines to use):

Safety

Smart meters are covered by UK and EU product safety legislation, which requires manufacturers to ensure that any product placed on the market is safe. Public Health England (formerly The Health Protection Agency) provides advice and information on the health implications of smart meters, as it does for a range of technologies commonly found in homes and businesses across the UK.

How safe are smart meters?

Public Health England has advised that the evidence suggests that exposures to the radio waves produced by smart meters do not pose a risk to health.

Find out more: Further information about smart meters and health.

When will homes get a smart meter installed?

All homes and small business sites will be offered smart meters by their energy company between now and the end of 2020.

What have I learnt?

The teacher could write headers on the whiteboard that relate to the topic to give children inspiration for this section e.g. 'electricity', 'gas' or 'smart meter'.

Lesson 2

The energy-saving benefits *(numeracy)*

The in-home display that is installed with a smart meter shows you lots of useful information about your energy use, including:

- How much energy you're using in near-real time (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 those dates and times when you've used lots of energy and those days 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 showing the amount of electricity you're using at the moment increase on the screen.

When do we use the most electricity?

A1. The two times of the day when we use the most electricity are 8-10am and 6-8pm.

A2. Possible answers include: These are typically the times of most activity in the home, when everyone is present and using a lot of electricity and gas for turning lights on, using the heating, having hot baths or showers, watching TV, playing games consoles, charging mobile phones, cooking, washing and so on!

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Working out your electricity use

A3. 75kWh
A4. 2,625p = £26.25

If you want to spend more time on this topic, download our what is a kWh information sheet.

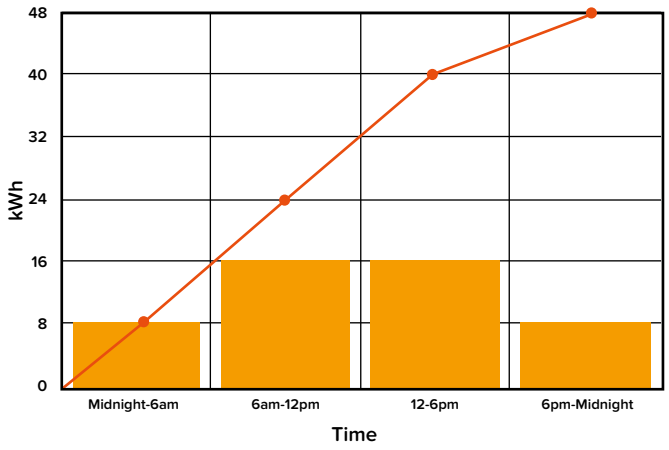
The cost of gas

A5. £4
A6. £28
A7. £120
A8. £16
A9. 1/5 (one-fifth)
A10. £1.25
A11. £2.40
A12. £18

How much electricity do we use in a day?

A13. 48 Watts

A14 & A15.



How much electricity do we use in a year?

A16.
Low – 2,000kWh
Medium – 3,100kWh
High – 4,600kWh

A17.
a) High
b) Low
c) Medium

Lesson 3

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

The traffic light system – green / amber / red – on the in-home display shows when you're using a high (red), medium (amber) or low (green) amount of electricity and gas. We can then use this information to think about ways to use less energy during busy times. This could reduce the amount we pay for electricity and gas (as we're using less) and it's also good news for the planet if everyone uses less energy.

Saving energy

Have a group discussion about how we could reduce our use of electricity and gas. For instance, don't leave the TV on, turn off lights when leaving rooms, only use the hairdryer occasionally, turn the thermostat down 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 or gas unnecessarily (e.g. not holding the fridge door open for long, putting a jumper on instead of turning the heating up when it's cold etc.)

What actions could you take at school? For example: turning off lights in empty classrooms and making sure monitors and other electrical devices aren't left in standby when they're not in use. Take a look around the room to see if you can spot anything wasting energy!

Explain that we all have a responsibility to look after our environment and encourage others to do the same. If we all reduced the amount of energy we use, it would have a bigger impact and help to conserve our planet.

Take action

Teacher to correct.

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Real-life element

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

Extension activity

Smart meter facts

Distribute copies of the **Smart meter factsheet** or share this on the whiteboard. Ask students to write down their TWO favourite facts from the list and to research two additional facts of their own.

If you're inspired to save energy, go on a vampire hunt around school in our **Vampire Slayer quick activity!** (www.jointhepod.org/vampireslayer)