

# THE CURRICULUM & ENERGY REDUCTION

By enabling pupils to use their learning to impact their immediate environment, the school becomes a living laboratory and curriculum topics are brought to life.

Energy issues can be taught through a range of curriculum subjects including:

- Science
- Technology
- Mathematics
- History
- Geography
- Citizenship
- English.

You can also cover energy issues in non-statutory studies such as economic and industrial understanding, and health education.

Curriculum topics can range through:

- Measuring, monitoring and analysing energy use
- Data management
- Campaigning, leadership and behaviour change
- Energy use - rights and responsibilities
- Energy saving innovations
- Energy saving and financial management
- Closed-circle technologies
- Renewable energies
- Building design and adaptation

## Switch Off Fortnight

As a taster activity why not sign up for the annual switch off fortnight in November.

[www.jointhepod.org/campaigns/switch-off-fortnight/](http://www.jointhepod.org/campaigns/switch-off-fortnight/)

## HERE ARE JUST A FEW CURRICULUM IDEAS...

### CLASS AUDITS - MATHS, SCIENCE AND BUSINESS SKILLS

After collating energy usage data from across the school, pupils can analyse performance using a range of scientific theories and then recommend potential actions to reduce cost, usage and CO2 emissions. This can be extended to problem-solving and the development of project management and STEM skills to reduce energy loss.

### DESIGNING EXPERIMENTS

Pupils can design experiments to investigate specific impacts of energy saving; for example the insulating effect of double glazing: first, design simple experiments to investigate draughts around windows and doors; then consider airflow in more detail e.g. by using fume cupboards as an air flow problem.

### RECORDING ENERGY USE

Pupils can act as energy monitors, taking meter readings (available online and offline). Real time meter readings can provide a range of curriculum opportunities but make sure that meters are read correctly. It is best if pupils can take readings themselves but be aware of health and safety issues if the meters are located in inaccessible or dangerous locations. Each meter should be read at the



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same time each day or each week. On Fridays at the end of school activities is a good time. A second check first thing on Monday morning gives weekend consumption.

- A meter register template is in the appendices
- Details to access online readings and details are in the appendices to this document (Systems-Link and BG360)

## ANALYSING ENERGY USE

Monitoring patterns of consumption is a simple way of introducing the use of graphs into the curriculum. Real time meter readings are an excellent source of data for analysis.

Pupils can:

- Compare patterns of use. Today's pattern of energy use should be very similar to the same time last year and not that different from yesterday. You can also look at data for the school week, weekend, month, term, or school year. Significant differences can be investigated;
  - Determine the general trend in energy consumption - is it up or down this term / year?
  - Try to relate changes in energy use to changes in weather, occupancy, community use or other factors;
  - Identify where equipment may be operating out of sync;
  - Benchmark consumption by working out the floor area of the school or the total number of people on the site;
  - Estimate progress towards your energy saving objectives.
- Lesson plans using your real-time school data are in the appendices

## PROBLEM SOLVING

The tricky part for all schools is that once all the data is gathered and core issues have been identified, how do we improve the energy performance of the building? Some issues will be behaviour related and require protocols and campaigns but others will be concerning the construction and use of the building. Students can seek to apply scientific theories, such as air flow and convection, to find achievable solutions and adaptations that balance environmental impact, cost, payback and viability.

- See Using STEM in the appendices for an interesting case-study

## PROJECT MANAGEMENT AND EVALUATION

Transferable to many roles and industries, project management is a core skill that can impact on students' employability, but also their approach to their studies.

Introduce a single issue to be addressed within a clear framework of:

identify need - research - plan action - SMART delivery - review and evaluation

Students can work together to use simple PM tools and methods such as action plans, budgeting, questionnaires and role distribution to deliver a project.

**BEFORE BEGINNING ANY WORK ON SCHOOL ENERGY ISSUES IT IS USEFUL TO GET A SENSE OF PRIOR PUPIL ENERGY AWARENESS.**

- Short energy awareness questionnaires are included in the appendices

## ENERGY LESSON PLANS & RESOURCES IN THE APPENDICES

Energy awareness questionnaires (all key stages)

Whole-class energy projects (multi subject)



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Eco-Schools energy lesson plans (all key stages)  
Energy / subject area links  
Using your school's online real-time data - lesson plan  
Examples of innovative STEM projects

## ENERGY REDUCTION RESOURCES IN THE APPENDICES

Energy checklists  
Eco-Schools FAQs, environmental review and action plan templates  
Meter register template  
Understanding your Display Energy Certificate

## ENERGY LESSON PLANS AND RESOURCES AVAILABLE ONLINE

Many other sites exist; this is just a small selection!

The first place to try is Eco-Schools England, who have a broad range of lessons that link to curriculum but also to achieving the Eco-Schools Awards.

<http://www.eco-schools.org.uk>

Our lesson ideas are intended to inspire teachers to deliver the curriculum in thought provoking ways that encourage students of all ages to engage with the concepts of living and working in tomorrow's world.

Our lesson ideas will help you set out on a learning adventure with your students. We cannot predict what you will discover but we look forward to you joining us on your journey.

All the lesson ideas are flexible and can be adapted by you to suit your needs. They are not intended to act as formal lesson plans.

Make sure you apply for an Eco-Schools award to recognise the achievements of your students and the school.

Can't find what you're looking for? We have developed some more teaching resources based around global citizenship and community cohesion in partnership with the Love Where You Live campaign.

<http://www.generationgreen.co.uk/teachers>

Generation Green is an education programme run by British Gas for Key Stage 1 to Key Stage 3 pupils and teachers, providing free of charge classroom resources, educational experiences and sustainable energy technologies to more than 13,000 schools across the UK

<http://www.ourplanet.org.uk/teacher-resources-search.asp>

STEM Lesson Plans addressing renewable energy

<http://www.atlasschools.org/the-toolkit/>

The Atlas Schools toolkit helps schools to measure their carbon footprint and understand how different activities of the school affect carbon emissions. It also helps schools to identify actions that it can take to reduce its environmental impact and save money and helps schools track their carbon footprint over time

<http://www.ncb.org.uk/osow>

NCB and the Institute for Development Studies worked with children's charities to understand and connect sustainability to their core purpose. The project culminated in guidance for children's organisations on becoming Climate Smart.



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[http://www.foe.co.uk/sites/default/files/downloads/lesson\\_plan\\_energy\\_and\\_cli1.pdf](http://www.foe.co.uk/sites/default/files/downloads/lesson_plan_energy_and_cli1.pdf)

Energy and Climate Change with Friends of the Earth - covering Citizenship Key Stage 3: Unit 18: Developing your school grounds; and Unit 21: People and the environment; Geography Key Stage 3 Unit 14; Can the earth cope?; Science Key Stage 3 Unit 71: Energy resources; Unit 9G: Environmental chemistry; and Unit 9I: Energy and electricity

<http://en.seacs.eu/energy-house-kit-secondary-primary-schools/>

The School Energy House Kit lesson plans were developed to teach pupils about personal energy use and climate change and to involve them in planning and implementing a low energy lifestyle at home and at school. The central feature of the programme is to design and produce a model home (the Energy House), demonstrating features of energy good practice, to be used as a tool to inform and engage others

<http://www.eonenergy.com/about-eon/energyexperience>

The E.ON Energy Experience has been created to help teachers to teach young people about energy. The resources will help young people to understand about the different sources of energy we use, the relative merits of each, the options for energy production going forward and what their choices will mean locally, nationally and globally.

[www.jointhepod.org](http://www.jointhepod.org)

Curriculum-linked resources for 4-14 year olds across Science, Geography, Maths and a range of other subjects. A range of resources linked to Eco-Schools for any teacher or pupil trying to make their school greener and more sustainable.

[www.powerdown.actionaid.org.uk/](http://www.powerdown.actionaid.org.uk/)

PowerDown is an award-winning multimedia resource for geography, citizenship and science which takes learners on a journey to: Learn (find out about climate change and how it is already affecting young people around the world); Investigate (focus on how energy use at home and at school is linked to climate change); Act (take real steps to be part of the solution to climate change). Then, a "climate heroes" section introduces people around the world who are adapting to climate change.

[www.co-operative.coop/green-schools-revolution/](http://www.co-operative.coop/green-schools-revolution/)

Being green isn't just about recycling or turning down your thermostat. With Green Schools Revolution's wide range of inspiring resources, your pupils will learn about the magic of bees, how to reduce water consumption and the facts on Fairtrade farming. They'll get into debates about the pros and cons of nuclear power and even learn about the ingredients of a healthy breakfast

[www.sustainable-schools-alliance.org.uk/doorway-resources/energy-water/](http://www.sustainable-schools-alliance.org.uk/doorway-resources/energy-water/)

Run a Green Day event to inspire pupils and colleagues in your school to learn about climate change and how it relates to the buildings and spaces around them. This activity kit provides ideas, activities and resources for holding a Green Day in your school, and making it a more sustainable place in which to work, play and learn. It is designed to work in both primary and secondary schools for key stages 1, 2 and 3.

