

Energy Audit Booklet

Teacher Copy



GREEN-SCHOOLS
ENERGY

Overview

The Energy Audit is an essential component of **Steps Two** and **Four** in the Green-Schools Seven Step Programme (see your handbook for more details). The information gathered here will also be extremely helpful for informing the **Action Plan**.

In this booklet, you'll find everything you need to guide pupils through how to conduct an energy audit of their school. You may wish to adapt it depending on the size of your school, the number of pupils and the length of time you wish your audit to cover. You'll also find detailed instructions on how to calculate your school's carbon footprint, which can be a useful datapoint for helping to save energy.

Learning Objectives:

- To practice collecting and interpreting numerical data. Because this is a data gathering exersise, the **accurate measurement and recording** of any readings taken is essential.
- To understand how to carry out an energy audit of the school and implement findings to reduce energy waste

Required Materials:

- Internet access and interactive whiteboard / projector.
- Student versions of the Energy Audit Booklet. You will need to print off one per pupil.
- Thermometers for taking room temperature.
- For the carbon footprint, energy bills for all of last year. If your school uses gas or oil for heating, make sure to include these bills too.

Pre-requisite Knowledge and Skills:

Pupils should understand that:

- Leaving appliances like photocopiers, interactive whiteboards and computers switched on or on standby mode when they are not being used is wasting energy. This is covered in more detail in the accompanying student version of the Energy Audit booklet.
- That energy in the form of electricity is a resource that the school pays for, and that it comes mainly from burning fossil fuels, which releases carbon dioxide (CO_2) gas into the atmosphere.
- That CO_2 is one of the greenhouse gases that is contributing most significantly to climate change.

Preparation:

1. Photocopy enough copies of the student version of the Energy Audit Booklet for there to be one per pupil.
2. Locate the meters for electricity and gas/oil if the school is using these fuels for heating. Make sure the pupils can have supervised access to the meters once a week to take readings. You can also track energy usage using the schools electricity and gas bills, but meter readings will provide a more accurate means of tracking energy consumption.
3. Establish if any electricity comes from renewable sources. SEAI's website is a good source for this.

Conducting The Energy Audit

For this activity, you will need the student versions of the Energy Audit Booklet

*To encourage positive changes to reduce energy consumption in the school, pupils first need to find out how energy is being wasted in the building. To do this, they will need to complete an **energy audit**.*



Safety First!

- **Adult supervision** by yourself or another member of staff should always be present when the pupils check the meter
- **Identify any hazards** near the meters (e.g. hot pipes or high voltage cables) and make sure the students know not to go near them
- Make sure the pupils know not to adjust any heating settings when carrying out the audit, or plug in/unplug any electrical devices or appliances

The Three Main Components of the Audit are:

Electricity- Pupils will need to count the total number of each appliance in their allocated area then count up how many of these are left on or on standby.

Heating- Pupils will note down the temperature of their allocated areas

Energy Loss- Pupils will check to find out where energy might be lost through open doors/windows or obstructed radiators

Step 1- Weekly Meter Readings

1. Ask the pupils to open their Energy Audit Booklets, and read through it together. Pause when you get to the page titled Meter Reading Record.
2. Decide which pupils are going to be in charge of taking the weekly meter readings. Depending on the size of your group, you may wish to have all the pupils doing this each week, or to have a different pair check each week and design a schedule around that.
3. Go over the instructions given at the top of the Meter Reading Record page. Emphasize that for the sake of accuracy, it is important to read the meter at the **same time each week**.
4. Make sure the pupils know where your meter or meters are, and explain how to read them. You could either do this using a photo of the meter, showing them which numbers to record, or take them now to do a trial reading of the meter.
5. If your school uses gas or fuel oil for heating, make sure the pupils know they need to record this meter too.

Step 2- Carrying out the Audit

1. Turn to the next page of the pupil's Energy Audit Booklet titled Doing Your Energy Audit.
2. Divide the school up into key areas (e.g. offices, reception, classrooms. Don't forget to include the entrance hall, corridors, toilets, and the staff room).
3. Pair the pupils up, and assign each pair with an area of the school. Each pair will then go and carry out the Energy Audit, using their booklets to record measurements.
4. When the pupils have finished the audit, gather again as a group and coallate the findings.



Teachers Note:

The whole idea of the audit is to find out **when energy is being wasted**, so good times to do the audit are during break times or fifteen minutes after the end of school when most of the children and staff will be out of classrooms. You might also want to do two audits, one during lessons, and one outside regular class time.

Make sure you have agreed the energy audit with **all members of staff involved.** You may need to get the caretaker onboard to help with access to the meters or if there are areas that are usually locked in the school that need auditing.

Step 3- Analysis & Discussion

Once you have put together all the findings from the audit you should have a pretty good idea of where your school is losing energy. You can then use this information to help you develop your **action plan** and **awareness raising campaign** in the appropriate areas.

Here are some good questions to ask to help you focus your action plan and campaign...



Are lights being left on in classrooms when no one is in the room?
Do the lights get left on in the library or in the gym when no one is around?



At the end of the day, are the school computers and interactive whiteboards switched off, or left on standby? What other devices are being left on or on standby when not in use?



What's the average temperature in each area of the school? If you check the thermostat or thermostats, what temperature are they set to?* Are doors and windows being left open while no one is in the room? Are all of the radiators unobstructed?

The recommended temperature for maximum energy efficiency is **eighteen degrees Celsius*

Calculating Carbon Footprint

For this lesson, you will need an energy bill for the school to use as an example.

Think Pair Share:

"With a partner, talk for a minute or so and think of all the ways your school uses energy each day. What's using energy directly in the school (e.g. burning gas for heat)? What are some indirect uses of energy that are happening outside the school, but are still needed to keep the school running (e.g. school bus, or staff driving cars to get to school)?

Step-By-Step Guide:

1. Hold up the electricity bill and ask pupils to guess how much money the school paid for its electricity for the period that your bill covers. You could make this into a guessing game of higher or lower.
2. Tell pupils that there is a way to discover how much energy the school is using and how much CO2 this is producing. This is called measuring your **carbon footprint.**
3. Have pupils turn to the page titled Analyzing Energy Bills at the end of their booklets.
4. Project the energy bills for electricity and gas if your school uses gas for heating, or hand out printed copies.
5. Have the students fill out the table themselves.



Teachers Note:
Depending on the age of your pupils, you may want to explain what a kilowatt hour (kWh) is, and what it is measuring exactly. You could use kilometres per hour as a comparison for a unit that measures change over a period of time.

6. As a group, work out how much energy the school used last year in kWh. You'll need to add together the electricity and gas separately.
7. Load the Green-Schools CO2 Calculator by **clicking here**, or by searching for the Carbon Calculator in the resources tab on the Green-Schools website.
8. Enter your totals into the carbon calculator.
9. Find out how many equivalent tonnes of CO2 your school emmitted last year. How many footballs would that fill? (1 tonne of CO2 would fill around 93,000 footballs)

Going a Step Further...

You'll see on the carbon calculator that you can also enter other measurements for things like litter and waste, transport and water consumption. If you have past records of audits taken when working through the Green-Schools Litter & Waste and Water themes, you can input the measurements into the Carbon Calculater for a more accurate carbon footprint.