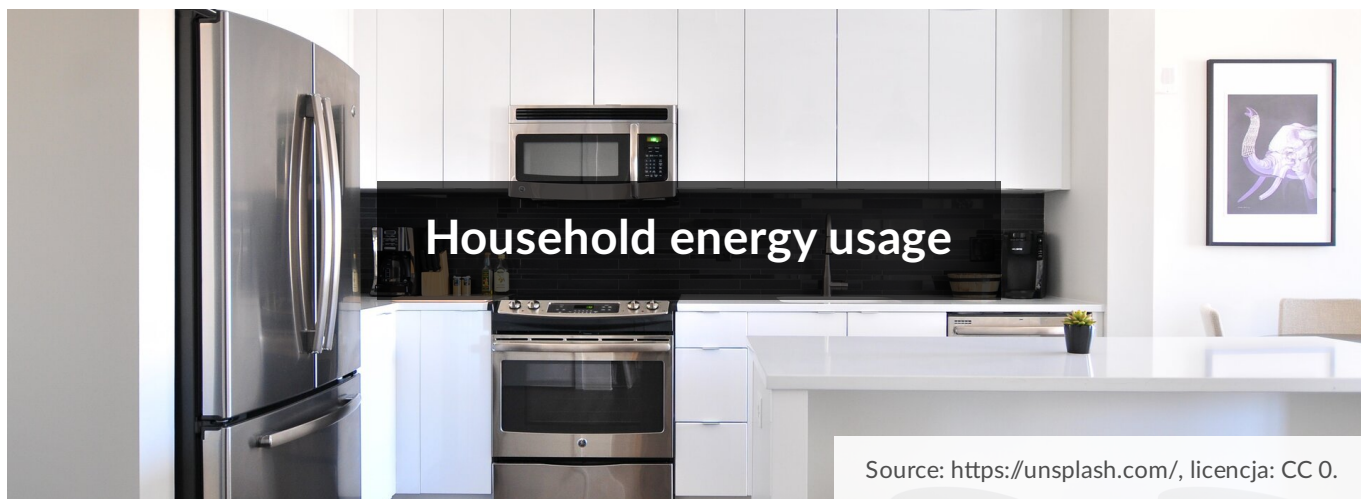




## Household energy usage

- [Household energy usage](#)
- [Lesson plan \(Polish\)](#)
- [Lesson plan \(English\)](#)



[Link to the lesson](#)

### Before you start you should know

- saving electricity is good for the environment;
- carbon dioxide is a greenhouse gas;
- air pollution with exhaust fumes has a bad effect on your health.

### You will learn

- estimate the amount of energy used in a household;
- how to save energy in different ways

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe abstraktu.

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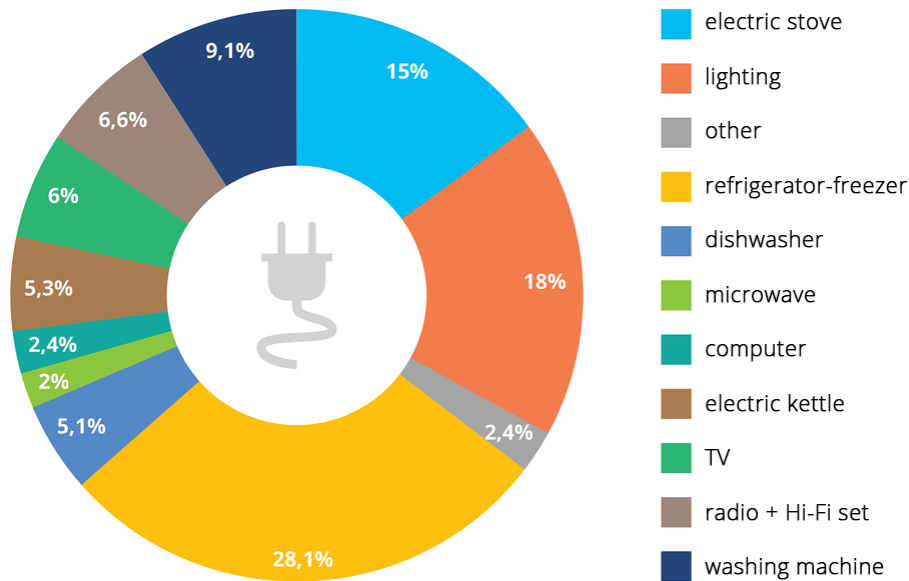
## Household energy usage

Electricity demand is dependent on the number of family members, the number of electrical appliances, how long they last and how much energy they consume. At present, the aim is to use up as little energy as possible, while still achieving the same results. Old appliances are generally energy-consuming, for example a refrigerator bought 10 years ago uses 3 times more energy than a new one with similar properties.

Electrical equipment is divided into different **energy classes** and has to have an **energy label**. Energy class G devices are the least efficient and most energy-intensive. The least energy is consumed by class A devices, especially by the most efficient ones – A+++.

The energy label also indicates how much energy the appliances consume per year. These are estimates and are given in kWh.

### Energy consumption of household appliances



Energy consumption of household appliances

Source: Dariusz Adryan, licencja: CC BY 3.0.

The average annual electricity consumption in Poland is ca. 1900 kWh in a household where four people live. The electric heating and a refrigerator consume most of the energy.

Number of people in a household	Energy consumption (kWh)
1	800-1400
2	1100-1700
3	1400-2100
4	1700-2500

#### Task 1

Production of 1 kWh of electricity in the process of coal combustion means emitting 1 kg of carbon dioxide into the atmosphere. Calculate how much energy your family uses per day and estimate how much carbon dioxide you have released into the atmosphere to allow the appliances you use to work.

#### Type of bulbs

Source: AlixSaz, GroMar Sp. z o.o., licencja: CC BY-SA 4.0.

### Methods of saving the energy

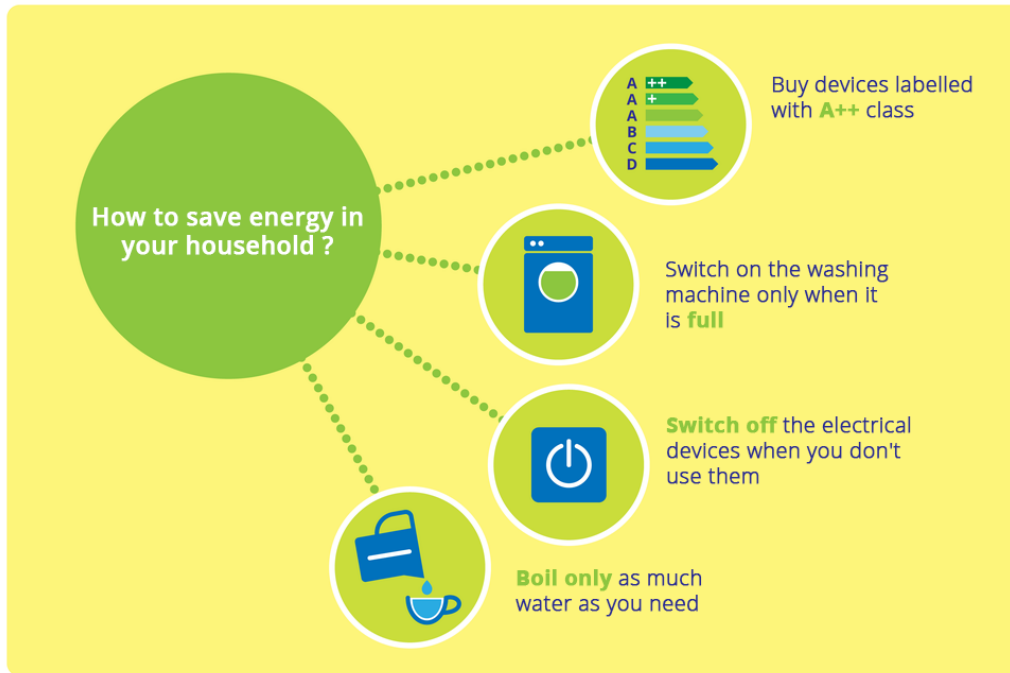
Saving electricity means less energy consumption and less environmental damage. It also allows you to reduce your household expenses. The simplest way to achieve this is to switch on your electrical appliances only when they are needed, and when they are old and worn

out, to replace them with new, more energy-efficient alternatives (this also applies to the light bulbs).

It is worth remembering that many electrical devices, left in the so-called standby mode (*stand-by*), just like a TV controlled using a remote, also consume electricity. This can be up to 30% of the energy consumed during operation.

<b>Appliance</b>	<b>Power of the unit (W)</b>	<b>monthly average time of work (h)</b>	<b>monthly average energy usage (kWh)</b>
CRT TV	80-150	140	14,0
LCD TV 32-56'	150-550	140	48,8
Desktop computer	150-250	180	36,0
Laptop	40-80	180	8,8
Light bulb	100	120	12,0
Compact fluorescent light bulb	21	120	2,4
Mobile phone charger during charging	4-6	20	0,08
Phone charger disconnected from the phone	0,001-0,005	652	0,002
Refrigerator-freezer, production year 2000	250	672	67,2
Refrigerator-freezer class A	100	672	33,6
Refrigerator-freezer class A++	60	672	20,0
Hi-Fi tower	30-150	112	9,2
Hi-Fi tower on stand-by	0,05-25	560	2,0

Thanks to the information on the rating plates it is possible to determine, which electrical appliances consume the most electricity. One of them is a fridge, which works around the clock. A high power device is also an electric kettle. To save energy, you need to pour just as much water as you need. Similarly with the washing machine and dishwasher – they should be switched on when they are full. Do not leave the TV or the light on in rooms that are not used by anyone. It is also worth replacing traditional bulbs with LEDs, which consume about 20 times less energy.



Methods of energy saving

Source: Andrzej Bogusz, licencja: CC BY 3.0.

## Task 2

1 kWh costs about 55 Polish groszy. If you think that in your house too much electricity is being used, estimate how much money you could save in a year if your electricity consumption were to decrease e.g. by 10%. Use your electricity billing data to find out about your annual electricity consumption.

## Exercise 1

What information does the energy label contain? Select all the correct answers.

- information about the appliance and its basic parameters
- information about its energy class
- information about its yearly energy usage
- information about the terms of warranty

## Exercise 2

Source: Dariusz Adryan, licencja: CC BY 3.0.

### Exercise 3

Move the items to the appropriate category.

leaving the light on in empty rooms, always boiling the maximum amount of water in the electric kettle, replacement of obsolete appliances with more energy-efficient ones, replacement of traditional light bulbs by LEDs, switching on only a full washing machine, switching off equipment when it is not in use, not leaving the fridge open for too long., leaving your computer switched on all night, leaving equipment in stand-by mode, sleep with the radio or TV on, Washing of single plates in the dishwasher

<b>actions contributing to electricity saving</b>	
<b>actions that do not contribute to electricity saving</b>	

### Summary

- Saving electricity in a household has an impact on the Earth's atmosphere, environmental resources and the household budget.
- Energy saving means using efficient electrical equipment and using it rationally.

### Keywords

energy saving, energy usage, LED

# Glossary

energy label

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słówka energy label

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**etykieta energetyczna** – etykieta zawierająca informacje o klasie energetycznej i podstawowych parametrach urządzenia, np. zużyciu energii, poziomie hałasu

# Lesson plan (Polish)

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**Temat: Zużycie energii w gospodarstwie domowym**

## **Adresat**

Uczniowie klasy VIII szkoły podstawowej

## **Podstawa programowa**

Wymagania ogólne

IV. Rozumowanie i zastosowanie nabytej wiedzy do rozwiązywania problemów biologicznych.

Uczeń:

1. interpretuje informacje i wyjaśnia zależności przyczynowo-skutkowe między zjawiskami, formułuje wnioski;
2. przedstawia opinie i argumenty związane z omawianymi zagadnieniami biologicznymi.

## **Ogólny cel kształcenia**

Dowiesz się w jaki sposób zmniejszyć zużycie energii w gospodarstwie domowym

## **Kompetencje kluczowe**

- porozumiewanie się w językach obcych;
- kompetencje informatyczne;
- umiejętność uczenia się.

## **Kryteria sukcesu**

**Uczeń nauczy się:**

- szacować ilość energii zużywanej w gospodarstwie domowym;
- planować sposoby oszczędzania energii elektrycznej.

## **Metody/techniki kształcenia**

- **podające**
  - pogadanka.
- **aktywizujące**
  - dyskusja;
  - burza mózgów.
- **eksponujące**
  - pokaz.
- **programowane**

- z użyciem komputera;
- z użyciem e-podręcznika.
- **praktyczne**
  - ćwiczeń przedmiotowych.

### **Formy pracy**

- praca indywidualna;
- praca w parach;
- praca w grupach;
- praca całego zespołu klasowego.

### **Środki dydaktyczne**

- e-podręcznik;
- zeszyt i kredki lub pisaki;
- tablica interaktywna, tablety/komputery.

### **Przebieg lekcji**

#### **Przed lekcją**

- Uczniowie zapoznają się z treścią abstraktu. Przygotowują się do pracy na lekcji w taki sposób, żeby móc przeczytany materiał streścić własnymi słowami i samodzielnie rozwiązać zadania.
- Prowadzący poleca aby uczniowie opracowali pisemnie polecenia z tych lekcji..

#### **Faza wstępna**

- Prowadzący lekcję określa cel zajęć i wspólnie z uczniami ustala kryteria sukcesu.
- Następnie zapisuje na tablicy lub tablicy interaktywnej temat lekcji. Uczniowie notują go w zeszytach..
- Uczniowie interpretują ilustrację okładkową, wskazując na jej powiązania z tematem i celami lekcji.

#### **Faza realizacyjna**

- Prowadzący prosi dwóch lub trzech ochotników, aby przedstawili wykonane w domu obliczenia zużycia energii elektrycznej w ciągu doby w ich gospodarstwach domowych oraz szacunkowe wyliczenie ilości wyemitowanego dwutlenku węgla powstałego w procesie przekształcenia węgla kamiennego w energię elektryczną..
- Uczniowie prezentują wyniki obliczeń i porównują je między sobą. Nauczyciel prosi uczniów o podanie dodatkowych informacji takich jak liczba osób w gospodarstwie domowym i ich nawyki związane z korzystaniem z energii elektrycznej. Cała klasa wspólnie dokonuje studium przedstawionych przypadków, wskazując czynniki, które

mają największy wpływ na zużycie energii w poszczególnych gospodarstwach domowych.

- Nauczyciel inicjuje burzę mózgow na temat sposobów zmniejszenia zużycia energii elektrycznej w przedstawionych przypadkach.
- Prowadzący prosi kolejnych ochotników (również 2-3 osoby) aby przedstawili szacunkowe obliczenia ilości pieniędzy możliwych do zaoszczędzenia, gdyby zużycie energii elektrycznej w ich gospodarstwach domowych zmniejszyło się o 10%.
- Nauczyciel inicjuje otwartą dyskusję na temat zużycia energii elektrycznej w gospodarstwach domowych, sposobach oszczędzania energii elektrycznej oraz negatywnych skutkach jej nadmiernego zużycia (skutki finansowe, skutki związane z zanieczyszczeniem środowiska).
- Nauczyciel prezentuje ilustrację interaktywną pt. „ Typy żarówek”. Uczniowie odpowiadają, co wiedzą o każdej z przedstawionej żarówki. Wymieniają ich wady i zalety..

### Faza podsumowująca

- Nauczyciel przeprowadza podsumowanie metodą kosza i walizki. Rozdaje uczniom kartki w dwóch kolorach (np. zielony i żółty). Na zielonych kartkach uczniowie zapisują informacje i umiejętności, które uznali podczas lekcji za cenne, przydatne. Na żółtych – zbędne. Nauczyciel odczytuje refleksje uczniów.
- Nauczyciel prosi, aby uczniowie samodzielnie wykonali wskazane ćwiczenie interaktywne.

### Praca domowa

Oszacuj swój ślad węglowy korzystając ze strony [www.ziemianarozdrozu.pl/kalkulator](http://www.ziemianarozdrozu.pl/kalkulator).

## W tej lekcji zostaną użyte m.in. następujące pojęcia oraz nagrania

### Pojęcia

energy label

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słówka energy label

---

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## Teksty i nagrania

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe abstraktu.

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### Household energy usage

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- Saving electricity in a household has an impact on the Earth's atmosphere, environmental resources and the household budget.

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# Lesson plan (English)

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**Topic:** Household energy usage

**Target group**

8th-grade students of elementary school

**Core curriculum**

General requirements

V. Reasoning and applying the acquired knowledge to solving biological problems. Student:

1. interprets information and explains causal relationships between phenomena, formulates conclusions;
2. presents opinions and arguments related to the discussed biological issues.

**General aim of education**

You will learn how to reduce energy consumption in the household

**Key competences**

- communication in foreign languages;
- digital competence;
- learning to learn.

**Criteria for success**

**The student will learn:**

- estimate the amount of energy consumed in the household;
- plan ways to save electricity.

**Methods/techniques**

- **expository**
  - talk.
- **activating**
  - discussion;
  - brainstorming.
- **exposing**
  - exposition.
- **programmed**
  - with computer;

- with e-textbook.
- **practical**
  - exercises concerned.

### **Forms of work**

- individual activity;
- activity in pairs;
- activity in groups;
- collective activity.

### **Teaching aids**

- e-textbook;
- notebook and crayons/felt-tip pens;
- interactive whiteboard, tablets/computers.

### **Lesson plan overview**

#### **Before classes**

- Students get acquainted with the content of the abstract. They prepare to work on the lesson in such a way to be able to summarize the material read in their own words and solve the tasks themselves.
- The instructor recommends that the students write written tasks from these lessons..

#### **Introduction**

- The teacher explains the aim of the lesson and together with students determines the success criteria to be achieved.
- Then he writes the subject of the lesson on the blackboard or interactive whiteboard. Students write it in notebooks..
- Students interpret the cover illustration, indicating its relationship with the subject and goals of the lesson.

#### **Realization**

- The host asks two or three volunteers to present home-made calculations of electricity consumption per day in their households and an estimate of the amount of carbon dioxide emitted during the process of converting hard coal into electricity..
- the students present the results of the calculations and compare them with each other. The teacher asks students to provide additional information such as the number of people in the household and their habits related to the use of electricity. The whole class jointly conducts a study of the presented cases, indicating factors that have the greatest impact on energy consumption in individual households.

- The teacher initiates brainstorming on how to reduce electricity consumption in the presented cases.
- The instructor asks further volunteers (also 2-3 people) to present estimates of the amount of money that can be saved if the electricity consumption of their households is reduced by 10%.
- Teacher initiates an open discussion on electricity consumption in households, ways of saving electricity and the negative effects of excessive energy consumption (financial consequences, effects related to environmental pollution).
- The teacher presents an interactive illustration titled „Types of bulbs”. Students answer what they know about each of the bulbs shown. They exchange their advantages and disadvantages..

### Summary

- The teacher carries out a summary part of the lesson using the trash and suitcase method. The teacher hands out small pieces of paper in two different colours (e.g. green and yellow). On the green pieces of paper the students write down the useful knowledge and skills they acquired during the class. The yellow pieces of paper are used to write down things the students did not find useful or interesting. The teacher reads students' reflections.
- The teacher asks students to carry out the recommended interactive exercise themselves.

### Homework

Estimate your carbon footprint using the website [www.ziemianarozdrozu.pl/kalkulator](http://www.ziemianarozdrozu.pl/kalkulator).

## The following terms and recordings will be used during this lesson

### Terms

energy label

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słówka energy label

---

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### Texts and recordings

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