Educational material





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List of Material

1. Information sheet on measuring instruments
2. Teaching Unit for the theoretical input
3. Energy Tour - Worksheet on Building
4. Energy Tour - Worksheet on Heating
5. Energy Tour - Worksheet on Electricity

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6. A Tool Box for Project PR
7. A teaching unit on aspects of the energy audit

A teaching unit on water/garbage if this is required

1. Info on measuring instruments



Digital display thermometer

(with sensor- not on photo)

Important:

instant results

precise display



Data Logger

Used for long time temperature measuring



Luxmeter

For measuring light



Electricity Consumption Meter

Used for measuring the electricity consumption of electric appliances



2. Teaching Unit

„Theoretical“ input on energy and climate for the pupils

We usually calculate 3-4 hours for the input
Unit will be in modular form

We give only one example module here

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Content of the teaching unit

- Aims and Preparation
- Flow chart
- Media (Slides and images for the blackboard in class, experiments)
- Work sheets
- Background information for teachers

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Topics in teaching unit

- Understand greenhouse gases, global warming and its effects
- Discuss climate protection measures and their effectiveness
- Develop an understanding about energy using practical examples and measuring

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Preparation for teaching

- Preparation for experiment (e.g. collecting dark soil on the day before)
- Selecting a place for a class excursion (e.g. a museum, a power station)

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Flow Chart (one module)

Zeit und Fach	Aktivitäten und Methoden	Material und Medien
10 min Physik	Mithilfe eines Tafelbilds wird erklärt, wie der natürliche Treibhauseffekt funktioniert. Die L vertieft das Wissen über den Treibhauseffekt mit Hilfe eines Experiments (→ Ein Marmeladenglas mit Erde füllen und mit Klarsichtfolie verschließen. Mit einem Thermometer alle 5 min die Temperatur in dem Glas messen und an der Tafel dokumentieren) bzw. eines Modells (Luftballons und Schals) und diskutiert mit den Sch, welche negativen Konsequenzen der verstärkte Ausstoß von CO_2 und anderen Treibhausgasen auf diesen Effekt hat.	Tafelbild T1-03 (s. S. 22 – 23), Marmeladengläser gefüllt mit Erde, Schal, Luftballon, Thermometer

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Media proposed in flow chart:

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Image for black board - 1

Earth without an atmosphere. In this situation, temperature would be -18°C and no life would be possible. Sun rays reach the surface and are completely reflected into outer space

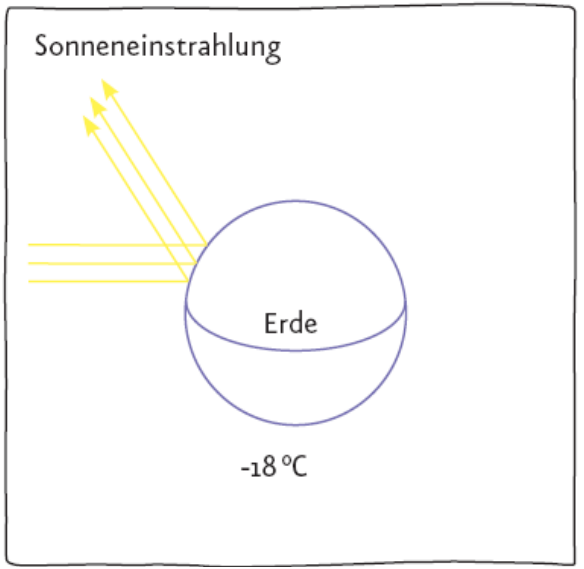
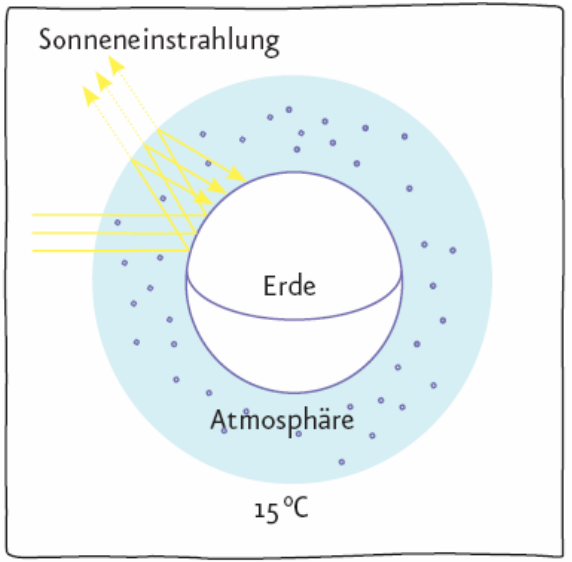


Image for black board - 2

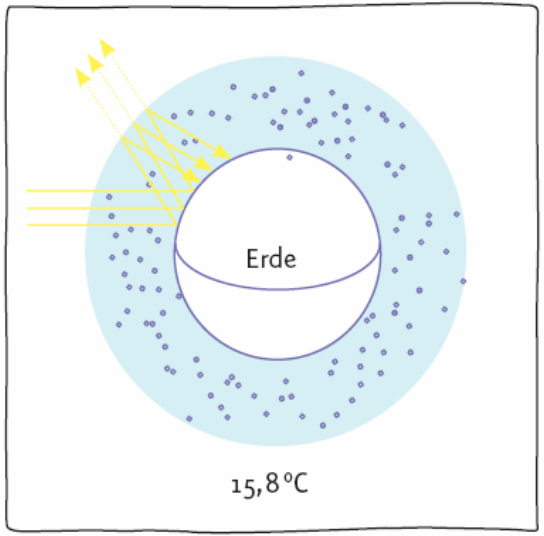
- Natural Green House effect: a fraction of the sun rays is converted into warmth. A fraction of the energy is held back by the greenhouse gases. Temperature is now 15°C



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Image for black board - 3

- Anthropogenic Green House Effect
  atmosphere holds back larger fraction of energy due to higher amount of green house gases, temperature is rising



Experiment – Green House Effect

- Fill jar with soil, cover with transparent film
- Measure temperature every 5 minuts and write the temperature on black board
- Discuss the effects of the raised amount of green house gases with the pupils

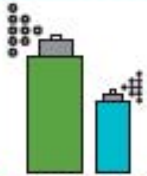
Worksheet Green House Effect

For photocopying

The pupils cut out symbols and create a chart explaining the green house effect

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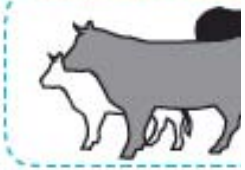
















Wald

Viehhaltung

Brandrodung

Zunahme der Wasser-verdunstung

Kraftwerke und Industrie

Müll

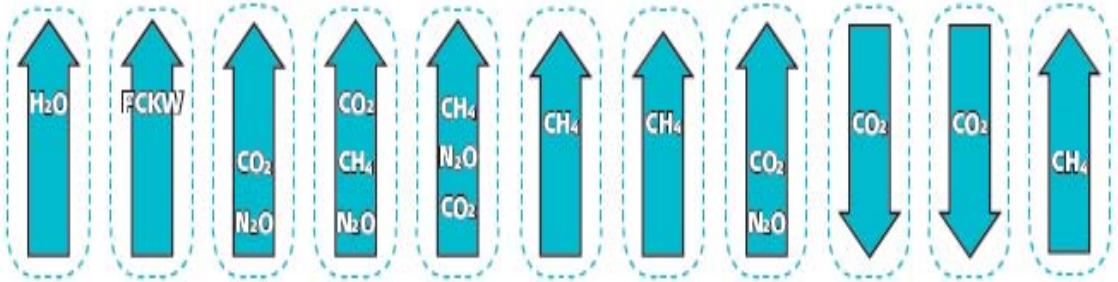
Chemie

Reisanbau

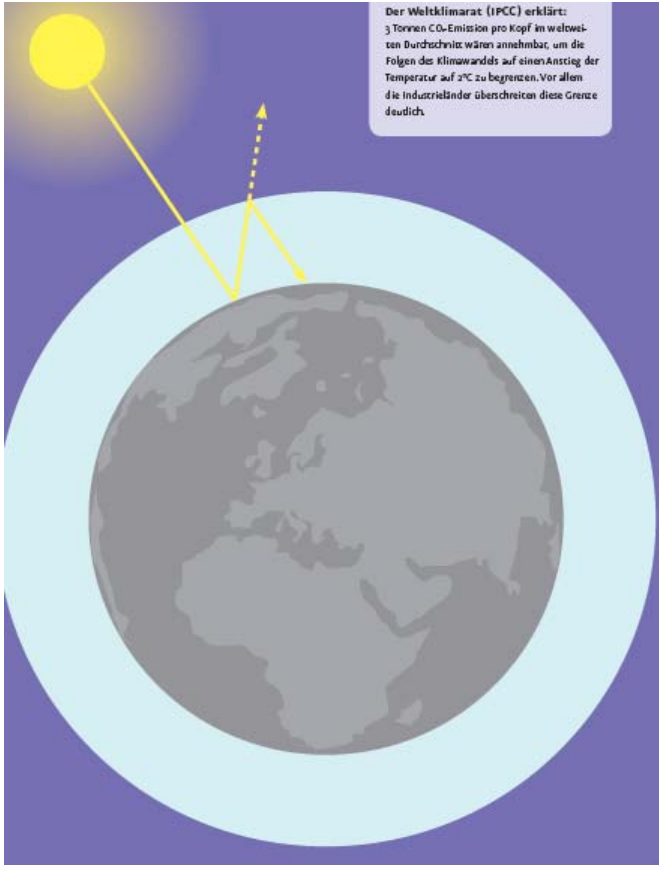
Gewässer

Gewinnung fossi-ler Brennstoffe

Verkehr

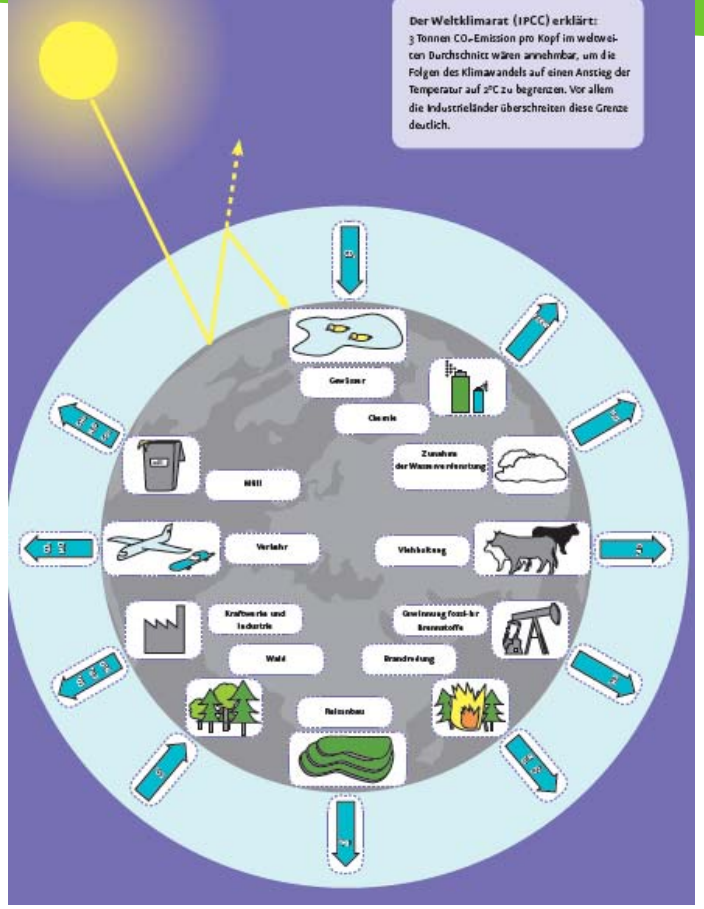


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The chart to place the symbols in

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The result could look like this – it shows what the pupils understood about the green house effect.

Background Info for Teachers

- This section of the unit contains detailed explanations of facts and figures for each module

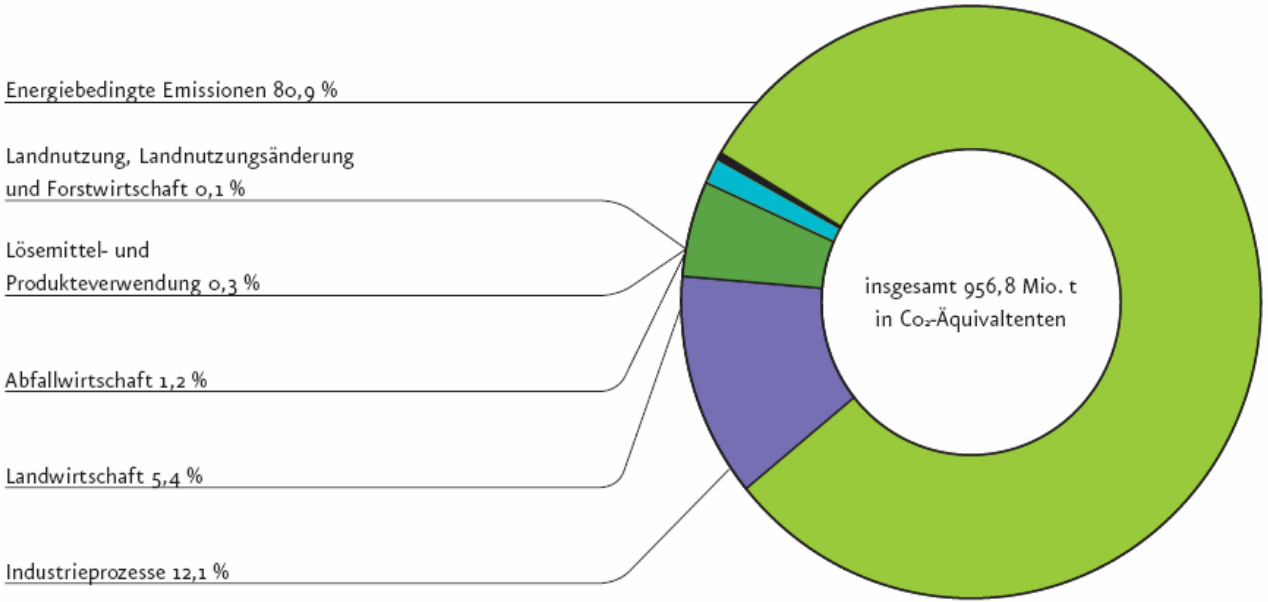
- *For our example „Green House Effect“ this is:*

Background information

- The different green house gases with percentage
- Explanation how energy conversion and reflection work
- Influence of human activities on emission of green house gases

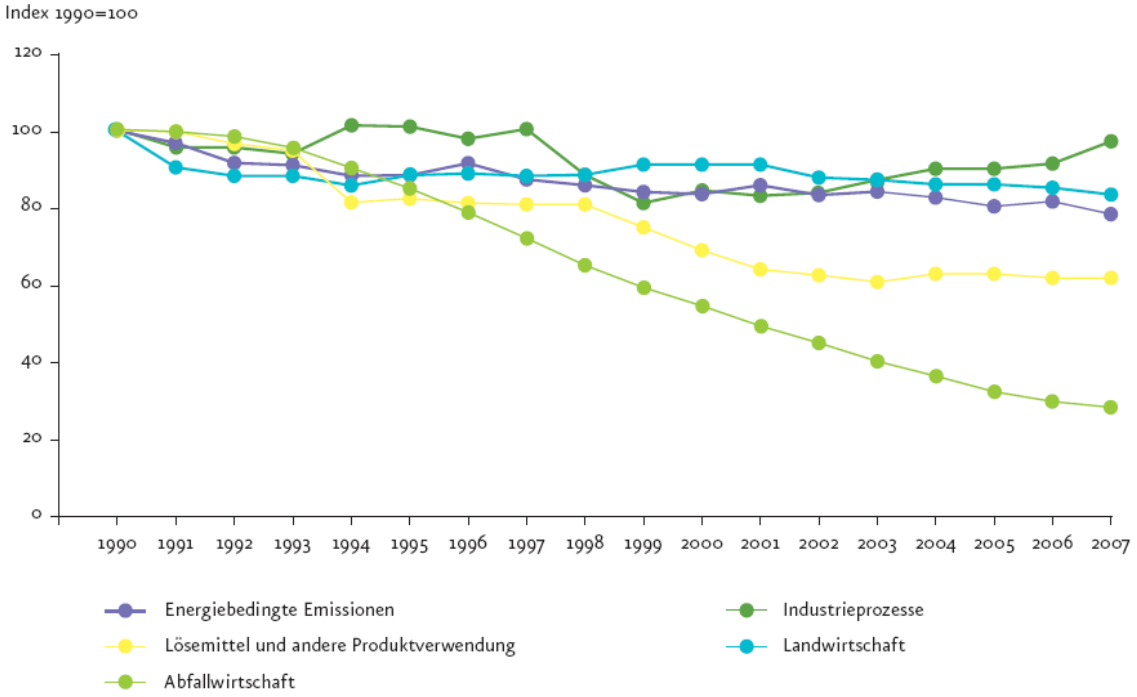
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The sources of CO_2



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Emission trend of green house gases



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Aim of Teachers Background Info

- To give teachers a ready-to-use tool to teach the topic in class


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3. Energy Tour - Building

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Worksheet for Pupils

Task: Draw a plan of the school, make a red outline around heated, a blue around unheated parts

Find out about:

Age&area of building…

Number of windows, doors, radiators…

4. Energy Tour Heating

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Worksheet for pupils

Find out about

- source of heating energy
- what rooms are heated
- Number of heating circuits
- the way the heating is regulated
- How water is heated..

Protocol Sheet for Temperature Profile

Task: To find out about temperature in each room,

- Measure the temperature in all rooms
- Ask people in the room what they feel about the temperature

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Example

Für das Erstellen des Temperaturprofils wird folgendes benötigt:

- Raumplan der Schule bzw. eine Skizze, in der alle vorhandenen Räume eingetragen sind.
- Mehrere Sekundenthermometer

Richtwerte für die Temperatur
20°C im Klassenraum
15-18°C in Nebenräumen und Sporthalle
14-17°C in Treppenhäusern

Datum _____ ; Protokollant: _____ ;

Klasse: _____ ; Außentemperatur: _____

Raum, Nr	Temperatur	Heizkörperventil(e) eingestellt auf			Offene Fenster	Umfrage bei den Schülern (zu warm/zu kalt/ genau richtig)
Beispiel: Klassenraum 3c, 1014	22°C	4	3	5	1	Zu warm

5. Energy Tour - Electricity

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Worksheet

Task:

Find out how electricity is used in the room and whether there is a potential for savings

What you need:

Luxmeter

Electricity Consumption Meter

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Protocol Sheet Electricity

Richtwerte Beleuchtung
300 lux im Klassenraum
100 lux in Nebenräumen
500 lux Fachräume

Raum: _____

» Beleuchtung

Raumseite	Anzahl der Lampen	Beleuchtungsstärke in lux	Persönliche Einschätzung (zu hell/zu dunkel/genau richtig)	Möglichkeit, das Licht einzuschalten (ja/nein)	Energiesparttipps
Fenster					
Wand					
Tafel					

6. A Tool Box for Project PR

To have sucess with an energy saving project, it is essential to

tell the school public

communicate saving tips

motivate others to take part

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Different ways of communication

- Make posters
- Give a speech
- Make a presentation
- participate in competitions
- Write an article for the school paper

Motivate others to do something





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7. Teaching Unit on Energy Audit

Depending on the content of the Energy Audit

We will work on it.

Garbage/Water

Maybe a topic for the second year?!?

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EURONET 50/50

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