



LESSONS ENERGY COMENIUS MAART 2012

A world full of energy!

Almost everything around us uses energy. Whether you turn on the light, listen to music on your MP3 player or have a nice hot shower.

Where does that energy come from?

With this material you will get to work. You'll discover how we get energy and what we use it for. Also you'll get to know the fuel of the future: hydrogen.

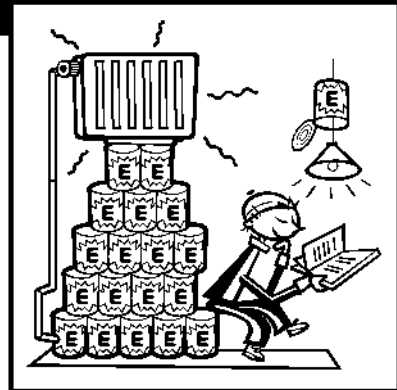
The tasks are divided into three parts on Deck 2. Be sure you are on the right part.

Good luck!



Deck2

Luxurious live eats energy



DO

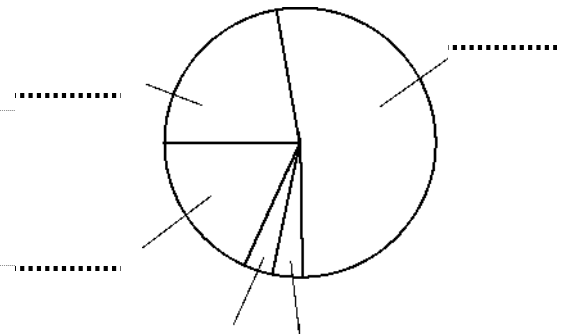
Cooking costs energy, like the refrigerator, microwave, TV or computer. Do you know what costs most energy at home?

Search on Deck 2, the exhibition H2: Blue Fuel. View the pole "luxurious life eats energy".

How is the energy in the house divided?

© — Write down the number and fill in the pie chart.

- Heating %
- Hot water %
- Elektrical energy %
- Lighting %
- Cooking %



EXPLANATION

More than half of all the energy you use in your home, is necessary for heating. You can save energy by insulating the house properly. Showering costs very much energy, so if you shower less it will save energy. You can save energy on electrical devices, if you look carefully what they use when you purchase them. If you use LED-lights instead of regular bulbs, you save on lighting.

THINKTANK

Think of two ways to save energy on heating, lighting and electrical equipment. Fill in the diagram.

©

	Heating	Lighting	Electrical devices
1			
2			



Deck 2

Energy: distribute fairly?



DO

Our luxurious Western lifestyle takes a lot of energy. What about other countries? Does everyone use the same amount of energy?
Find the pole "Energy: distribute fairly".

- © Learn how much energy an African and how much energy a West-European consumes.
 - African %
 - West-European %

EXPLANATION

A West European uses six times as much energy as an African. This is because the standard of living is different. In the Netherlands and the rest of Western Europe almost everyone has a home. As you have seen there is a lot of energy to heat our homes. Most West Europeans have many electrical devices that most Africans do not have.

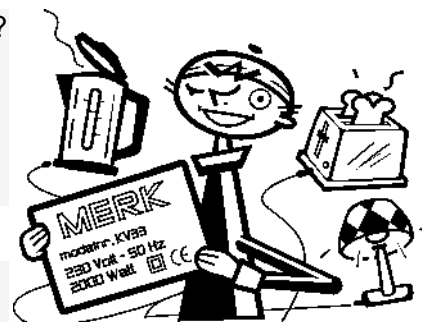
Can you think of a number of devices?

.....

THINKTANK (homework)

The amount of energy an appliance consumes, is measured in watts. As length is measured in meters. The more Watts, the more energy an appliance consumes.

- © How much energy do these electric devices at home use? Look for the label on the device and fill in:
 - Watercooker: Watt
 - Toaster: Watt
 - Lightbulb: Watt
- © Which device is the largest energy consumer? Think also how often and how long you use the appliance.





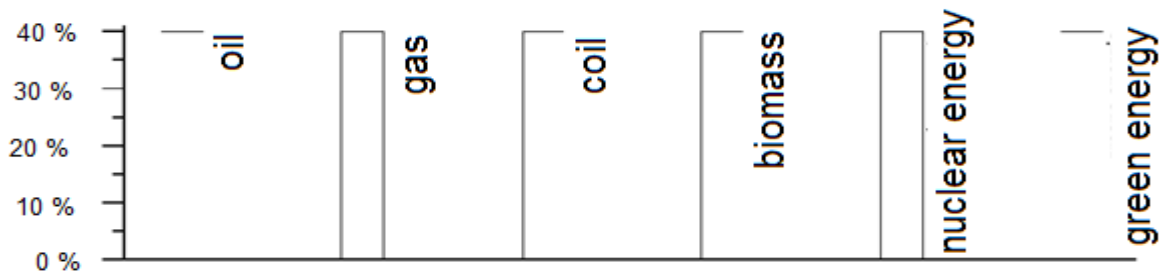
Our Energysources



DO

All the energy you use has it's origins.

Find the pole "Our energysources" and fill in the bar graph:



EXPLANATION

Eighty percent of the energy we use on earth, we get from fossil fuels (oil, gas and coal). They are called fossil fuels because they emerged from animal and plant remains millions of years ago. These fuels will be exhausted on one day. Therefore we are looking for alternatives. With the help of wind turbines, hydroelectric and solar cells it's possible to make electricity from wind, water and sunlight. This green resources will never be exhausted!

THINKTANK

Mention two advantages and two disadvantages of fossil fuels and renewable sources.

	Fossil fuels	Renewable sources
Advan: 1		
2		
Disad. 1		
2		



Deck 2

HYDROPOWER



DO

We especially get energy from fossil fuels. With hydropower you can generate electricity on a clean (green) way.

Search on Deck 2 the part "Hydropower". Choose waterwheel 1, 2, 3 or 4 and try to maximize energy generation. Look at the screen above the waterfall.

© When did you make the most energy?

.....

EXPLANATION

To maximize energy generation, the blades of the spinning wheel must turn as quick as possible. This is only possible if there is a lot of water flowing past the wheel. You can stir the water to the wheel with sandbags and dams. At the wheel is a dynamo fixed. By the rotation of the blades the dynamo generates energy. Hydropower is thus converted into electricity

THINKTANK

© Mention two other rotating things that generate electricity.

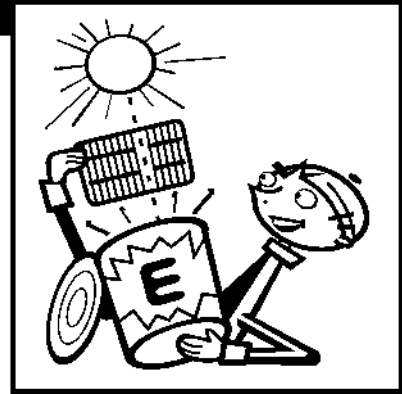
1

2



Deck

MIRROR, MIRROR IN THE HAND



DO

Two examples of green energy sources are wind power and hydropower. You can also convert sunlight into energy.

Search on Deck part 2 the “Mirror, mirror in the hand”. Sit down and let the plane fly.

When does the aircraft fly the fastest?

.....

EXPLANATION

The aircraft flies the fastest when the beam is aimed at all six cells. If the light beam shines on the solar cells, this light is converted in energy. The six solar cells together provide sufficient power for the propellers of the aircraft to rotate. This airplane will fly. If no light shines on the solar cells, the aircraft won't fly.

THINKTANK

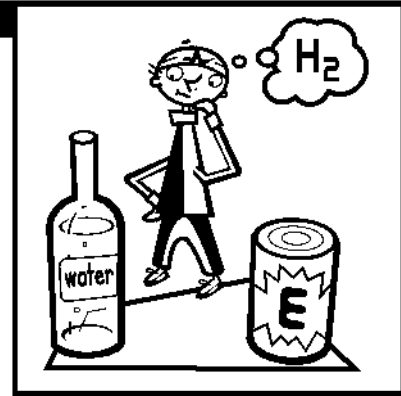
Usually we use solar cells to generate electricity.

Think of another way to use solar energy at home.



Deck 2

Generate electricity: H₂-bus



DO

Fossil fuels have disadvantages: they are running out and pollute the environment. Green sources do not always work. What do you do if there is no wind or if it is dark? It would be nice if we could save the energy from these renewable sources and use it when we need it. This is possible with hydrogen! Search on Deck 2 is the part "Generating electricity".

©

Turn the wheel 15 counts. What happens with the hydrogenbus?

.....

EXPLANATION

Tip:
oxygen =
zuurstof
en
hydrogen =
waterstof

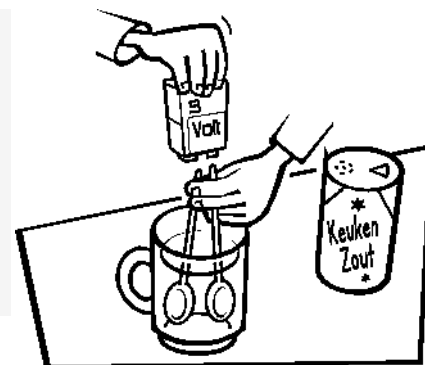
If you turn the wheel, the hydrogenbus starts to driver. A bus needs energy to drive. This bus does not run on gasoline but on hydrogen. If you turn the wheel you make electricity. This electricity splits the water into two gases: hydrogen and oxygen. Hydrogen can provide energy, just like fossil fuels (oil and gas). You will need to burn the hydrogen. With the energy which is released, the bus rides.

THINKTANK (homework)

Make your own hydrogen!

What do you need?

9 Volt block battery, 2 teaspoons
(you can also use strips of aluminum foil), glass of
tea, salt, water.



What must you do?

Fill the glass with water. Put a pinch of salt in the water and stir for 15 seconds. Put the tea spoons in the water. Keep the teaspoons to the plus and minus side of the battery as in the picture. Make sure the forks do not touch. The water may be cloudy or yellow/brown. Do you see bubbles? That is hydrogen!

