



WebQuest

Advanced Level

Bruised Not Broken



WEBQUEST NAME:

Bruised Not Broken

WEBQUEST LEVEL:

Advanced level

INTRODUCTION

What exactly is a WebQuest? A WebQuest is a research activity that allows you to learn new interesting things and knowledge. At the beginning of each WebQuest you will be given some tasks and you will try to complete these tasks as a real scientist. You will search the Internet, where you will gradually find all the information that will help you to fulfil your scientific tasks. Each WebQuest has different tasks and a different topic.

This WebQuest is called "Bruised Not Broken". Did you know that you can drop off your old electro-appliance (broken or not) in the store where you buy a new similar appliance? The merchant must take it for free. If the merchant doesn't have the space to store old appliances, he will advise you, where to put it - it will probably be the nearest recycling site.

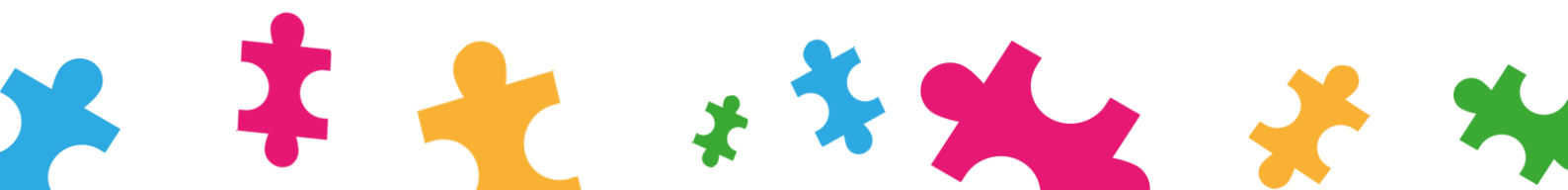
Your first task in this WebQuest will be to find out what is the electrical equipment and what are its categories.

Your second task will be to find out what is the proper place to dispose of unneeded electrical and electronic equipment.

Your third task will be to find out what is the environmental impact of electronic waste.

The fourth task will be to find out why is electronics recycling important.

The last task will be to find out what is the circular economy.





TASKS

This WebQuest will make you an expert on electrical waste. You will be able to discuss electrical waste and you will be able to tell a short story about it. The story of what is the electrical waste, where it is dumped, what impact it has on the environment, why it is important to participate in the recycling of electrical waste and what is the circular economy. Gradually prepare this story as you complete the following tasks. Make brief notes to tell this story at the end of WebQuest.

TASK 1.

Your first task in this WebQuest will be to find out what is electrical equipment and what are its categories.

TASK 2.

Find out what is the proper place to dispose of unneeded electrical and electronic equipment.

TASK 3.

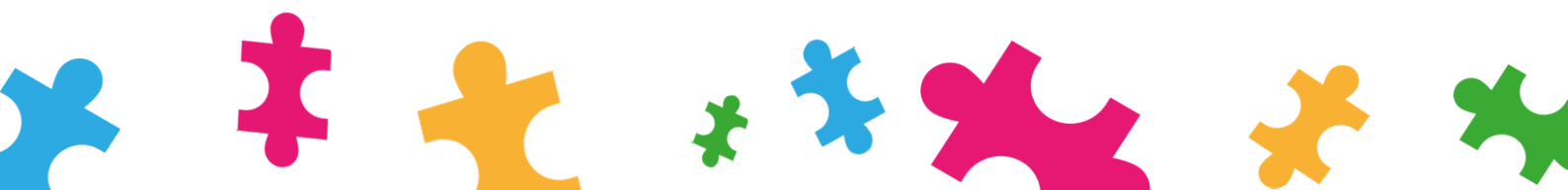
Your third task will be to find out what is the environmental impact of electronic waste.

TASK 4.

The fourth task will be to find out why is electronics recycling important.

TASK 5.

Find out what is the circular economy.



PROCESS

TASK 1

In the following video, you will find out what is an electrical device. Try to remember its categories.

https://www.youtube.com/watch?v=PPdsS8Py-uc&ab_channel=IFKregion%C3%A1n%C3%ADtelevizeT%C5%99inec

Simply put, an electrical equipment is small or major household appliances - everything that can be plugged into an electrical outlet or that works on batteries.

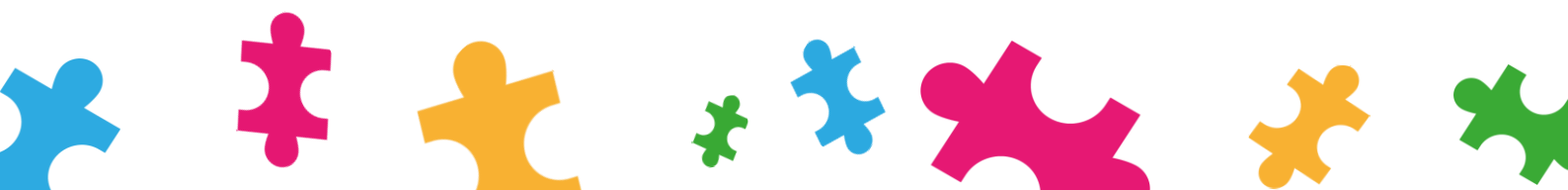
Divide the following electrical devices into the appropriate category (there are 3 devices in each category).

Mobile phone, racing track, refrigerator, vacuum cleaner, iron, laptop, television, video games, washing machine, printer, dishwasher, radio, toy trains, DVD player, toaster

Major home appliances	Small home appliances	Telecommunication device	Consumer equipment	Equipment for fun
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All new electrical devices are marked with this symbol, do you remember what it means?



TASK 2

What is the proper place to dispose of unneeded electrical and electronic equipment?

If the home electrical appliances no longer works or if we want to throw them away, we shouldn't put them into a dumpster! It is an end-of-life product with take-back arrangement. In general, the term "e-waste" has been used for obsolete electrical appliances (small appliances, garden and hobby appliances, fluorescent lamps, gas-discharge lamps and batteries). These contain many valuable substances and precious metals so why not to use them? Some appliances may contain hazardous substances to the environment, for example, old refrigerators contain Chlorofluorocarbon (CFCs), which can cause the depletion of the ozone layer. Old fluorescent lamps contain mercury. That's why the used electrical waste should be recycled by experts in specialized facilities. There are several ways in which you can recycle non-functional appliances. For example, bring them to the recycling site.

In the Czech Republic, collection in special red containers has also been introduced recently. These are placed directly in collection nests with other coloured containers or in crowded places (in parking lots in front of shopping malls). They are collected as needed.

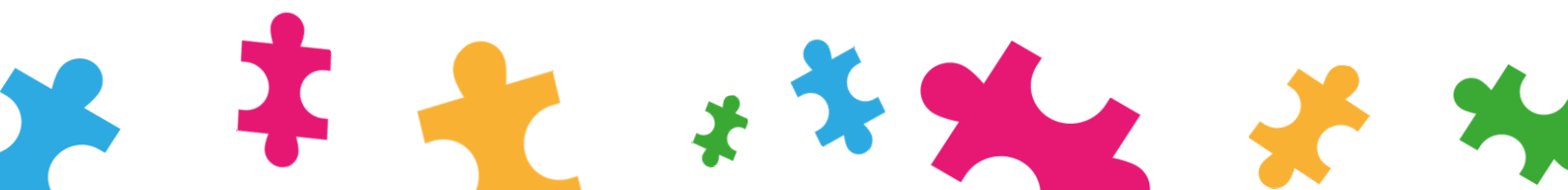
On the following website find out what belongs in the red container and what does not.

<https://www.cervenekontejnery.cz/>



On the same page, find the location of the nearest red container.

You did a great job with this task!
Let's work on the third task.



TASK 3

Find out what is the environmental impact of electronic waste.

Look at the picture and give 2 examples of why electrical waste is dangerous.



In 2019, people produced 53.6 million tons of e-waste.

Environmental impacts:

- water pollution (leading to fish kill)
- acidification of the soil (hazardous substances occur in the soil → effect on plants, crops, groundwater contamination)
- air pollution
- ozone depletion

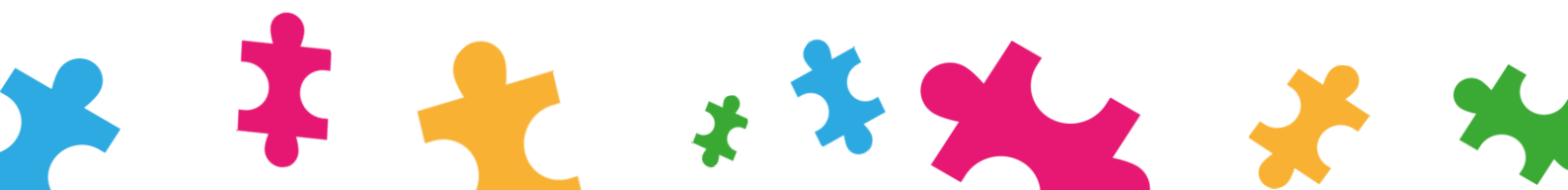
Impact on human health:

- diseases of the heart, liver, kidneys, spleen
- memory problems
- breathing problems
- skin cancer
- DNA damage

And how can your mobile phone be dangerous? The mobile phone contains roughly:

- 45% plastic
- 35% metal - alloys of copper, iron and aluminium
- 10% glass and ceramics
- 9% battery electrodes
- 0.11% of precious metals - lithium, cobalt and others
- 0.9% of other non-metallic materials

That's why the used electrical waste has to be recycled by experts in specialized facilities.



Find out what toxic metals electrical waste contains. In addition, you will find out what health complications each metal causes.

<https://www.ekovyzva.cz/elektronika-a-elektroodpad-a-jejich-dopad-na-zivotni-prostredi/>

Can you name at least 3 toxic metals that electrical waste contains?

You have learned that, for example, beryllium is a dangerous metal that has been shown to be carcinogenic (leads to cancerous tumours). Another highly toxic metal is cadmium, which causes damage to the kidneys and bones. Hexavalent chromium causes lung cancer. Lead is dangerous for children and their development. The mercury found in display lighting negatively affects the central nervous system.

You also managed the third task of this WebQuest perfectly!



TASK 4

Find out why is electronics recycling important.

Unfortunately, some people do not sort waste, so in some places illegal dumping is created. For more information, watch the video.

https://www.youtube.com/watch?v=5SPTPoHr7QA&ab_channel=IFKregion%C3%A1In%C3%ADtelevizeT%C5%99inec

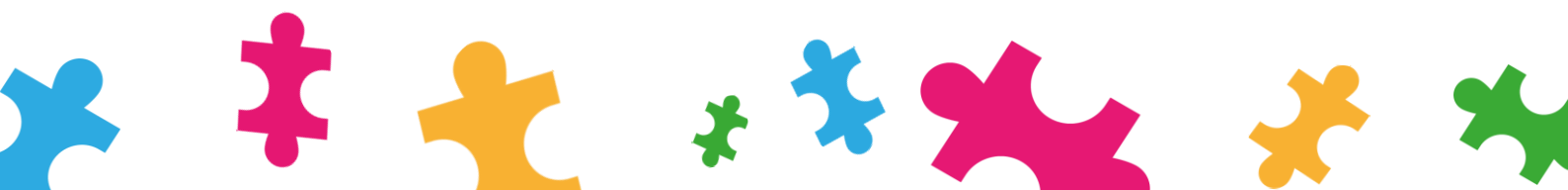
An ounce of prevention is worth a pound of cure. Ideally, do not create electrical waste at all or at least minimize it. Let's not throw away slightly worn products, let's not replace them with new ones, we can always repair them.

And how to extend the life of appliances?

It is very important to read the instructions of the product. There is information how to handle the product properly and how to maintain it. Proper maintenance is the basis of longevity.

But we don't always read the instructions, so now you will find out what are the general rules. Electrical appliances are very sensitive to water and humidity in general. In addition, water conducts electricity, so moisture is a potential danger to our health. Electrical appliances are also sensitive to direct sunlight or extreme cold. Generally, the temperature plays a big role in the life of appliances. You should prevent them from overheating, i.e. do not overload motors or power supplies and provide enough cooling. For example, place refrigerators and freezers in a cooler and drier place if possible. LED bulbs are also sensitive to overheating, so they should not be placed in lamp-shades that do not provide proper cooling.

Another big enemy, especially of electrical appliances equipped with a fan, such as a computer, is dust. It settles on the surfaces of the coolers (for example to the refrigerator and freezer cooler),



and if it is not removed, the dust layer can cause a short circuit of the appliance. Almost every appliance lasts longer when it is used less, so it is recommended not to leave the appliances running unless it's necessary. And what should we do when there is a storm? Just unplug the appliance.

In addition to regular care, we should also monitor whether some appliance components don't need to be replaced.

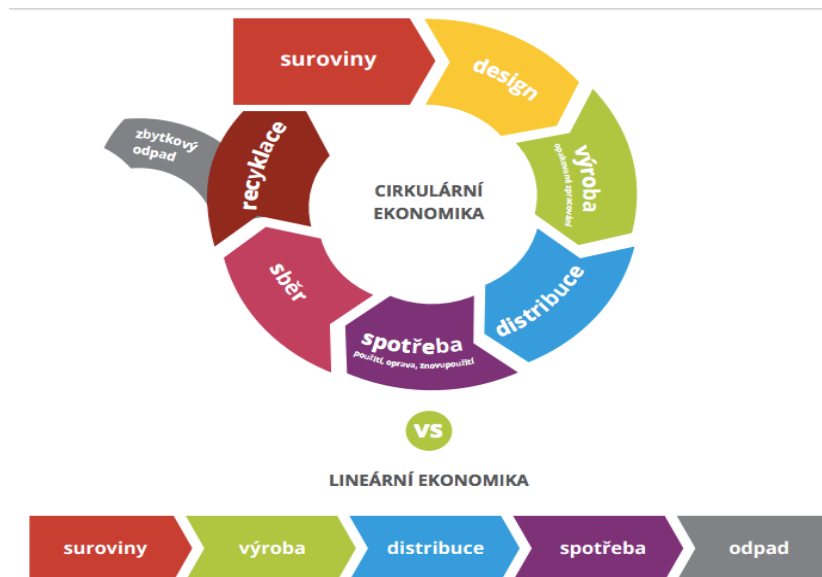
TASK 5

Find out what is the circular economy.

In the following link, read what is the circular economy.

<https://www.startupjobs.cz/newsroom/kolobeh-zdroju-neboli-cirkularni-ekonomika>

What is the difference between circular and linear economics?

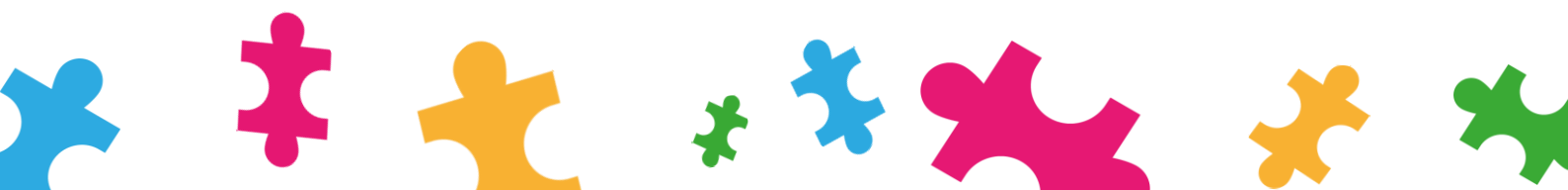


Linear economics means that a product is produced, used and thrown away, which means that material that is no longer used in any way accumulates.

The circular economy is trying to reduce waste, emissions and energy leakage through maintenance, repair, reuse, refurbishment, renovation and recycling.

You're at the end of WebQuest about electrical waste. To prove that you are an expert on this topic, tell a short story about it. The story of what is the electrical waste, where it is dumped, what impact it has on the environment, why it is important to participate in the recycling of electrical waste and what is the circular economy. If you can tell such a story, it proves that you already know a lot about electrical waste.

You also did the last task of this WebQuest perfectly!



EVALUATION

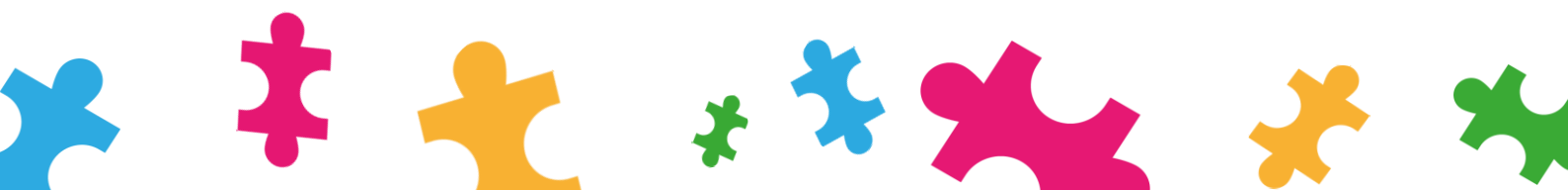
You have successfully completed several tasks in this WebQuest. Try to answer the following questions:

- Which knowledge from this WebQuest was just a repetition for you, because you already knew the answer?
- What knowledge was new to you?
- Why should people have the knowledge contained in this WebQuest?
- If you had to say a few words about electrical waste to someone, what would you say?

CONCLUSION

In this WebQuest you learned new knowledge about electrical waste. You already know what is the electrical equipment and how it is divided. You also know where to throw the electrical waste. You found out how it affects the environment and human health. You learned why it is important to participate in the recycling of the electrical waste, how to extend the life of appliances. You also know what circular economy means. And a little tip for you at the end: Buy electronics if you really need a new product. First think, whether you really need brand new electronics or whether second-hand ones are sufficient for you. It's up to us if we let the catchy advertisement influence us and force us to buy a new product that we don't need at all.

Congratulations, your knowledge of electrical waste is very good now!





GRETA

Challenge-based Learning in Primary Schools for Climate Change Awareness



Istituto Comprensivo "Don Milani" di Lanciano



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