



EduBOCK LIFECYCLE OF WASTE

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About the project

Project 'Cross-border Partnership for Environmental Protection and Best Quality of Life" - **WasteEDU** is a joint initiative between "Alliance of the Producers of Ecological Energy-BG" from Bulgaria and "Center for Climate Change – Gevgelija" from Macedonia. The project is realized with the financial support of the EU and aims at increasing both the level of awareness and knowledge of the project target groups and stakeholders for environment protection by promoting actions related to waste management, reducing and recycling waste. **WasteEDU** comprises a variety of initiatives, such as:



- Elaboration and delivery of equipment for separate waste disposal and collection in educational institutions of the CB area in Bulgaria and Macedonia;
- Development of joint training programme for informal learning "WasteEDU"
- Organization of Joint Green School and Camps "WasteEDU" in Bulgaria and Macedonia;
- Development of WASTEEDU web-portal;
- Development of a software for mapping of illegal landfills and other polluted areas;
- Development of an EduBook "Lifecycle of waste" specially designed for students"

Join us at: www.waste-EDU.eu







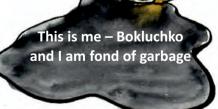




This short educational book tells the story of us - Binny, Batty and Bokluchko.

We will briefly introduce you the different types of waste, their impact on the environment and the various measures for the limitation of their distribution. It is really important to us to make the environment protection a common cause which to "infect" everyone around.

ENJOY IT:)





There is no garbage in nature!!!

There is no garbage in nature. During their existence, plants and animals separate "waste" (fallen autumn leaves for exemple), and sooner or later they die themselves. Dead plants and animals (their products as weel) are not waste, but a valuable raw material for other organisms which feed on them. Thus, those "organisms"(animals, fungus, mico-organisms) provide constructive elements for their bodies and energy for their existence. The circle in nature closes, and the environment remains clean.





Waste is solely our deed!!!

People generate huge amounts of waste in their life which "choke" nature. The waste remains in the environment for a long periods of time, covering big areas and some of them release toxic or harmful to health substances. Unlike nature, men generates waste which can not be fully unfences. What would be the solution? At this stage, ladfills are being contructed, occupying large areas of space.

Of course, the accumulation of waste in ladfills can not last forever—our space is limited. On the other hand, for the most part waste can once more be transformed into a resource by being processed. If we think in an ecological way, we could throw out less amounts of waste by consuming less food and using fewer things, utilize items longer or we find them new applications. If we recycle waste, we could have enough energy and resources, obtain less natural resources, live in a cleaner and healthier environment, conserve nature.



Who does manage waste once we've dumped it?



IMPORTANT!!!

Different groups of people are engaged with the management of the waste we generate once we've thrown it out. It is the refuse collectors to carry the burden of collecting the waste from our conteiners and transporting it up to the landfills. We may not be aware with the fact that a very big part of the "separate collection" and recycling of waste have the homeless men. Except for them, people with various occupations, such as engineers, entrepreneurs, clerks, environmentallists etc., have dedicated themselves to the waste issues. A number of questions arise for every settlement: where to be stored the waste; should it be collected separately; what part could be processed; how much will it cost; is it safe for all of us? The answers to these questions are not always easy and they require the attention and efforts of anyone, including our personal!



PART WHAT IS WASTE?

According to the Limitation of the Harmful Impact of Waste on the Environment Act, "waste" is any matter or item that has been disposed of, or is intended to be disposed of, or it is required to be disposed of by its generator or owner. In other words, waste is the name we give to anything that we throw away. Any sybstances, objects or parts of objects submitted to specialized waste management companies by the owner or authorized by him persons are being also classified as waste until the materials recovered or the energy produced by them are included into the production process.









Additional information

According to the dictionary:

"Waste is an unnecessary remnant of something".

According to Wikipedia:

"Waste is needless, unsuable or unwanted matter or item. Different types of waste vary according to technology and society development".

According to our parents:

The most requested task at home - "Could you please throw away the trash!".











History and facts



In the prehistoric times when the waste pile acquired huge amounts, people just moved from one to another areas.

Mankind has generated waste since ancient times.



Did you know that the first Act forbidding waste disposal could be traced far back to 1388 in England? Did you know that the first landfill ever was developed in Athens 2500 ago?





Types of waste

According to its origin, waste is divided into several main groups: • Industrial (Production) waste; Domestic waste; Hazardous waste; Construction waste. Domestic waste is the waste generated as a result of the everyday life of each one of us.

Scan me and discover a real iceland made of trash







Industrial waste is waste generated as a result of our industrial activities.





Hazardous waste is waste which endangers human health and environment. This type of waste requires precaution.







Construction waste is generated during the process of construction of buildings and facilities.

Scan and see a real plastic sea







Biodegradable waste is waste generaded as a result of the discarding of plant debris or as a result of the life of organisms.







But we have generated waste!!

Yes, you have made your lives easier!



We have forgotten that as long as we've deposited waste, it does not just disappear, it moves somewhere – in the air, the soil or the water. It always stays with us.

IMPORTANT!!!

There is hardly any human activity in which no pollutants are released into soil, water and air.

The biggest polluters are concentrated in the big cities. Our aspirations for living opulently and wastefully has led to the emergence of different technologies which help us cultivate the land and use its goods to a great extent. Due to the scientific and technological progress, power generation plants have been constructed, as well as factories for the production of plastics, electronics and chemistry have been built.

As a result, the generated waste polluted the nature, soil and water, and have contributed to the climate change. Thus, today's society has accumulated huge amounts of waste that threatens the balance of nature which has been existing for millions of years..



Waste and society

It seems that our community is addicted to waste. **Why?** See the following interesting facts and judge by yourself?

The average amount of generated domestic waste per capita for the member states of EU is 513 kg per year.



Anually, more than three billion plastic bags are being used in Bulgaria. Each Bulgarian uses at least one plastic bag per day. It makes 3.2 billion a year or 100 plastic bags each second. Over 80% of them are being used only once.

The truth is that you cannot live without me!

According to the latest World Bank surveys, every man on planet generated over 1 kilogram of waste per day, and these figures are expected to be growing up in the next 15 years.

In Bulgaria, the average amount of domestic waste per capita is 470 kg per year.





Different ways for waste prevention

There exist different ways for waste management. Some of them may be performed in our everyday life, while others require for this purpose specialised factories and companies. These various ways could be divided into four major groups.



Take a look at what they are!



No! We won't tollerate you anymore! We will put you into use!

Reuse!

- Use of cloth bags;
- Use of glass bottles;
- Use of rechargeable batteries.



2

DISPOSAL!

- Waste incineration and generation of heat and electricity;
- Waste storage in particular landfills.

3

PREVENTION!

- Avoid usage of plastic bags;
- Purchase of products in larger packages;
- Use of electronic editions instead of printed ones



Hey friends, this is how we will all deal with Bokluchko!

UTILIZATION!

- Generation of electrical and thermal energy;
- Use of glass and rubber particles in pavements;
- Processing of organic waste for producing biogas.





PART WHERE DOES WASTE COME FROM?

Along with their unreasonable and negligent actions, men can cause major environmental changes with unpredictable consequences. One of these consequences shall be the accumulation of **huge amounts of waste**. The desideration of our society of living a good life, producing and using commodities and services is based on the indiscriminate use of raw materials. They are used in industry, transportation, agriculture, производството на ел. ergy



The main sources of industrial pollution are:

- · Metallurgy;
- Chemical industry;
- Energy production.

generation and in other world economy fields for the provision of goods and services. This is the manufactured products used by people or the residual raw materials used in their production, which are the source of all of the waste.



Production of electronics and household appliances, especially with the use of recycled materials and wastewater treatment plants has been proven to be environmentally friendly and clean..

Nowadays, conventional energy sources are still being widely used, which is a major factor for the pollution of the environment. On the other hand, nuclear energy does not pollute the environment but is a source of hazardous radioactive waste.



Trash art!
Scan to find
out more!







Collecting of waste



Waste is being collected in waste containers (or dustbins, trash cans, etc.).

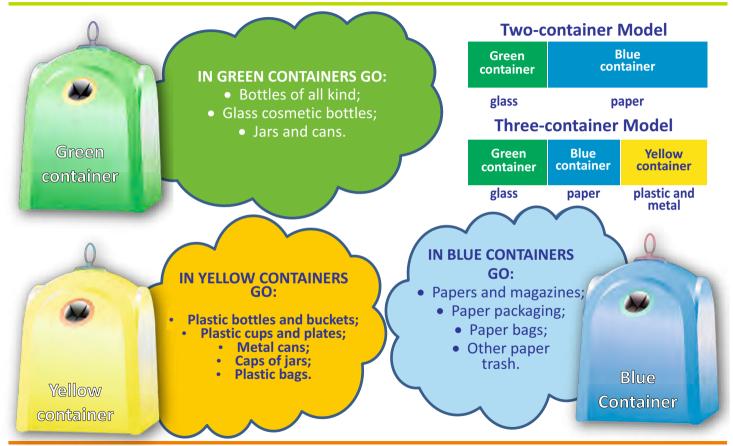
After the "Waste Management Act" of the Republic of Bulgaria, they need to be collected separately. "Separate waste collection is a system of measures and actions for separate waste collection from paper, metal, glass, plastic, disused electronic equipment, batteries etc. This prevents hazardous waste from entering into the environment and reduces the human impact upon it, by reusing raw materials and matters after their recycling. Separate waste collection requires waste to be collected in coloured containers.



Scan me and find our more information on how to separate waste!









Депониране на отпадъците

According to the "Waste Management Act", "storage of waste" is a method where no further treatment or use of waste is forseen. Waste disposal in landfills involves their burial, and it still is a common practice in most countries worldwide. A well



designed, constructed and well-managed landfill could be a sanitary and relatively inexpensive waste disposal method. Older and poorly managed landfills could cause some adverse environmental impacts, such as windblown waste, parasites, diseases, infections and so on ¶¶



Did you know?



In 2015, 1.856 million tons of waste have been deponed in Bulgaria – in 278 local and 25 regional landfills.





Waste disposal landfills are one of the largest sources of greenhouse gases such as **METHANE and CARBON DIOXIDE**. These gases are responsible for the atmosphere warming and the imminent climate changes. By this token, contemporary landfills are being designed with methane combustion installations which results at generating electricity. Landfills polute soil and groundwater and thus negatively affect on the environment and human health.



The Landfill

Contemporary landfills have a special construction and are equipped with gas capture installations, such as methane and carbon dioxide.





According to the contemporary environmental standarts, each landfill needs to contain composting cel in which the organic waste to be treated. As a result of their processing is generated fertilizer (compost) for manure gardens and parks.





Waste Recycling

RECYCLING is a process, where waste is being processed so as to produce a raw material to be used for the production of new products. Recycling contributes for saving up of raw materials, reduction and prevention of waste and environmental pollution as well. In recycling, waste is being separately collected in specialized containers. Recycling provides a number of benefits. It saves energy and resources, as well as costs related to the waste storage and disposal.





Most common recycled products are aluminium, such as beverage cans, wire copper, steel cans and vials, old steel furniture or equipment, polyethylene and plastic bottles, glass bottles and jars, cardboard boxes, newspapers, magazines and light paper etc.



Interesting facts......



A ton of recycled paper saves up to 4 cubic meters of space in the landfill area. This equals of 13 trees, 2.5 barrels of oil and 4100 kWh of energy.

A recycled glass bottle saves up electricity enough for a bulb of a 60 watt to be on for 4 hours.

A ton of recycled plastic saves up electricity of one Bulgarian household for 2 years. However, if it is disposed to the landfill, it takes 400 years to degrade. A ton of recycled plastic saves up electricity of one Bulgarian household for 2 years. However, if it is disposed to the landfill, it takes 400 years to degrade. The recycling of a plastic bottle is equivalent to supply a computer with power for 25 minutes.

56% of the recycled fabric could be applied on the carpet and clothing manufacturing market.



Three tons of plastic enter the Black Sea every day. It is 15 tons per minute as regards to the Global Ocean.



..... and some interesting ideas!!!

We can easily find the application of some of the waste we've generated; we simply need willingness and time!!! Here are some examples:















Reuse of waste

The waste reduction principle is one of the basic principles the grounds of which the waste management system has been built on.

Reuse of waste involves the repeated use of objects or part of the objects which are still suitable for usage. Reuse is much more efficient than recycling, as it requires very few raw material and energy to revert the waste in use.



Scan and find out your carbon footprint!





To reduce the waste generation, it would be more efficient if the focus stands mainly on "reduction", next on "reuse" and finally on "recycling".







SPART THREEWASTE IN SCHOOL

Schools are source of different (waste, such as paper, cardboard, plastic bottles, aluminium cans and organic waste.



- Who produces waste at school?
- What amount of waste is being generated at your school?
 - What kind of waste do you generate at school?

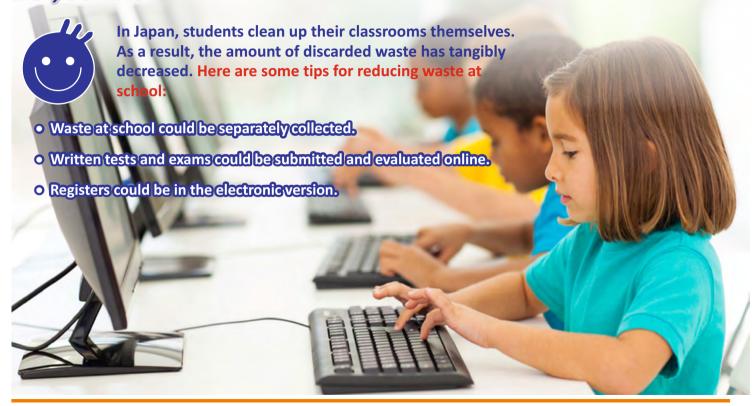


Bokluchko
is wrong again!
It is important
to know the answers
because they would help
us to successfully
manage the waste at school.





Do you know?





Who is producing waste at school?

DID YOU KNOW THAT in 2017 the Ministry of Education and Science of Republic of Bulgaria has endorsed 267 different textbooks? And do you know that the total number of students in Bulgaria in 2017 is 609 803? On average, one student works with ten textbooks, so for all students 6 098 030 textbooks are

required. Assuming each of them contains 50 pages,

the total volume equals 304 901 500 pages.

Please pay attention:

The production of **9 000 paper sheets** destroys a tree! This means that to produce textbooks 33 444 trees are being cut down.

Have you ever thought that a lot of packings, aluminium cans and plastic bottles are used and disposed of during each school break.

Did you know that the school canteen is a major source of waste? Do you finish your breakfast, or you simply trow it in the trashbin?



Do you think it is time for the mouse to "eat" the book?????



PART FOUR

WASTE PREVENTION

Waste is a key environmental, social and economic issue. Within the EU, the amount of waste increases annually, as 3 billion tones of waste are deposited every year.



This is equal of 6 tonnes of solid waste for each of us. If we assume that hypothetically 2/3 of them are being processed, significant amounts of the waste remain to be deposited.

The answers to these questions are not easy at all. You should not as well neglect them, because our and our children's future depends on that!

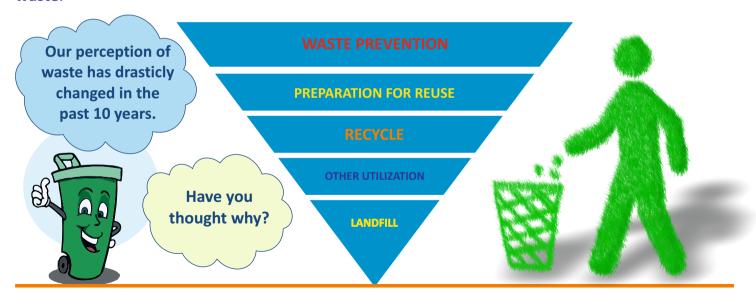
Could it go on forever? Can we presume this wastefulness?
Could the environment sustain it?





What is Waste Management?

The waste management hierarchy classifies waste management measured according to their overall impact. The prevention of waste generation is the most effective and sustainable waste management measure. The chart below represents the different waste management methods. In the past, waste was seen useless. Nowadays, it is a resource which could be used for recycling, use and reuse of waste.





1

Informational campaigns

- Raising of awareness;
- Sharing of information;
- Training programmes.

In order to achieve a significant reduction of the generated waste, the European Union promotes three main strategies.

7

Strategies for promotion

- Fostering reuse;
- Stimulus for clean utilization:
- Promotion of research and development activities.

3

Regulatory strategies

- Taxes and incentives;
- Planning;
- Policies for environmental protection.





Our future without waste

Could we run out of waste? Is it possible for all mankind to learn how to effectively utilise and reuse waste it has generated? **Someday, maybe!** Due to the high waste recycling rate, in 2015 Sweden ended up without any waste which imposed **80 000 tons** of waste to be imported in the country.

Electricity, heating, household items, clothing – this all could be made up out of our waste.



Our society can not terminate waste generation but actually could learn to rationally use them to transform them into valuable raw materials.



A modern factory for waste management



How to keep our school and environment clean?



So far I have realized, that if we want to bring Bokluchko to order, we need to reuse. Collecting separately waste would be useful as well.



I know now! Waste should be recycled. Return your used notebook and sfae a tree!



Keep your textbook in good condition so that they could be used again!

Scan and see stories of students who clean up at school





5

PART FIVE

WASTE AROUND US! Reuse and Recycle!

Part of the waste is non-biodegradable (glass, plastic), while the decomposition process of other is very prolonged (iron, paper, cloth). A big part of waste could repeatedly be used instead of being thrown away through a process, named RECYCLING.



Nowadays, waste literally costs money! Old paper, waste iron, plastic, aluminium, even dirty air – today, all of that could be traded. Recycling is the most effective way for tackling the pollution of the Planet.





Lifecycle of paper

As expected, as population of the **Earth** grows, **paper** consumption grows as well. The biggest problem about paper production is deforestation. **Defforestation** leads to the reduction and extinction of different species of the flora and fauna, soil erosion, groundwater level declining. In addition, paper production causes atmosphere pollution with **sulfur oxides** and pollution of water by bleaching chemicals.



Brief history of paper.
Scan and find
out more:



Paper was discovered a long time ago in China – at the beginning of 2nd century AD. Today, thousands of modifications of paper product exist. The production principle of all of them comprises: clearing the forests, mixture of plant fibers with water, wet scrubbing and bleaching, extrusion and drying.





Save the Forests!

There are three basic ways for reducing the clearing of forests:

Reuse of paper products (borrowing books from friends, using the back of the paper sheets in office, using carboard boxes for items storage etc.)

Reducing the use of paper (reading electronic newspapers instead of buying paper ones)

Recycling of paper waste (in this way, the paper circle could be closed while saving much energy and resources (forests) indispensable for the production of paper.

I could burn the needless paper out without creating waste. This is not a good solution!





Let's save a tree!

Apart from the production of paper, trees are being cut down for countless of other reasons. We use trees for the construction and other industries, for combustion, etc. We cut down trees to clear the ground for agricultural purposes and construction of buildings and roads...

Is there an effective way of saving forests and trees?



I know the solution!!! I will explain to my friends how trees help to save the environment, and altogether we are going to plant new trees every year.





Tin cans

Most cans are made of **iron**, extracted from nature (iron ore). This type of production requires a **lot of energy and water**. For producing a can, metal needs to be formed into thin sheets. This method was implemented for the first time in the XIII century in Germany. **Contemporary cans** appeared in the XIX century in England and France. Since then, food production has been impossible without the use of cans.







The lifecycle of Aluminium

Life is unimaginable without the use of aluminium. Today's planes could not fly, cars would burn much more liquid fuels, and the operation of computers and TV sets would be practically impossible. Although

it is a very light metal, aluminium and its alloys could be stronger and more durable than steel.

Aluminium is used in the production of beverage cans, kitchen foils, bicycles, tourist equipment etc.

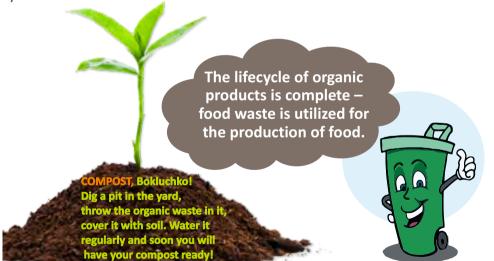






Lifecycle of organic products

One of the most environmentally friendly ways of treating organic waste is **COMPOSTING.** It is a process whereby organic matters decompose **with the help of microorganisms, bacteria and fungi,** in the presence of oxygen. The result of the composting process is an organic fertiliser (compost). **Compost** can be successfully used for fertilisation in agriculture. On the one hand, there is a less organic waste while on the other – limited usage of synthetic fertilisers.





A larger amount of waste that we generate when we eat, coo or work in the garden is thrown out in the trash. For every household, the percentage of the organic waste may reach up to 30-40% of the total amount of waste. A question arises: could we use organic waste?



Glass is our friend

Glass is our old and faithful companion. There are evidence of the use of glass which date back to the third millennium BC.

In fact, the glass is not a solid substance, but a rapidly frozen liquid. It is obtained by melting sand (silica) at a very high temperature and subsequent rapid cooling.

Oh, Bokluchko! The glass is a natural and sanitary material for food and liquids storage. It is invaluable! Life would be unthinkable without the glass that we use for our buildings, cars or airplanes!



When discharged in nature, glass waste cannot decompose or disappear. This could be avoided by reuse and recycling. Recycling of glass is a much easier, energy-saving and environmentally friendly process, compared to the production of new glass.





What do we know about plastics?

Plastics are synthetic human-made materials to be used instead of some natural materials. The plastic appeared relatively soon, but they diversity today is immense.

Different plastic items and packages have their acronyms designated. The amount of disposed of household plastic waste is steadily increasing. The most effective way of this waste dismissal is their incineration, but this causes atmospheric pollution and greenhouse effect acceleration. We need to be aware that the recycling of almost all plastics is possible, but they need to be divided into different types.

Scan and see 16 ideas on how to give a new life of the used plastic bottles.



PLASTIC PACKAGING SYMBOLS – WHAT DO THEY MEAN?

- **PE** (polyethylene)
- PP (Polypropylene)
- PVC (Polyvinyl chloride)
- PET (Polyethylene terephthalate)
- PS (Polystyrene)
- PC (Polycarbonate)
- SBR (Poly styrene, butadiene rubber)
- ABS (Acrylonitrile-butadiene-styrene-copolymer)







Batteries – our friends

Batteries are widely used energy sources. They are applied to all portable devices: flashlights, electronic games, remote controls, calculators etc. While in use, batteries are really useful, but once they drain and get thrown away to the waste, they become hazardous. Different batteries contain heavy metals which are bad for human health. These are cadmium, lead, mercury etc. Once thrown out, gradually batteries decompose, and these heavy metals fall into the natural environment. Though rainwater they could enter rivers and lakes, and thence – into the drinking water. One of the most hazardous metal – mercury could fall into humans not only through water but also through the food one consumes out of vegetable or animal origin.





By collecting all of the old batteries in specialised containers, separate from the other waste, batteries are delivered to processing companies. Such containers are placed in larger stores, gas stations, office buildings. It is important to avoid leakage of harmful substances from batteries into the environment.

Specialized containers are destined for separate waste collection not only for batteries, but also for unused electronic equipment and devices which are being delivered to processing companies where they're being safeguarded and prepared for reuse. Such containers are placed in larger stores for kitchen and home appliances.





What should we do with all this waste!

The issue with waste is very serious! The volume of trash that we generate increases every day. The landfills are overfilled, and new ones are needed. Also, the number of unregulated landfills is growing. If growth rates continue to rise, soon there will be no place left where we could store our waste.

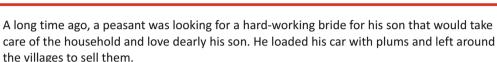
I am not aware of how landfills operate. Isn't waste fully degradable?

WELL, IT WILL BE GOOD, BUT THAT IS NOT THE CASE! Let me explain. The waste is usually shipped daily to the dumpsite. There, it is spread on a thin layer and compacted with special machines. Each layer of garbage is covered with a layer of soil or an inert material that is also compacted. This operation is carried out to prevent the spreading of waste from birds and other animals, as well as to prevent the spread of diseases and infections. Modern landfills are covered with cloth to protect underground water from pollution. The landfills are surrounded by a fence to stop people and animals from getting in. Once the dumpsite is fully exploited, it is covered with fertile soil and afforested with decorative trees. The waste that remains in the landfill is decomposing very slowly over a long period.



"Plums for Trash"

Bulgarian folk tale



- Plums for garbage, folks, plums for garbage! Shouted the man around the streets. Women, lasses and old women hastened forward to sweeping up their houses. They competed with one another for collecting bigger amount of garbage, so more plums to take. Some carry whole sacks, others half a bushel, still others aprons. Carrying and bragging:
- Have a look at how much garbage I have gathered out of the house! It is so nice that foolish man arrived so that we could exchange it for plums!

The peasant was collecting the garbage and was giving plums in return. At one time, a pretty young woman approached clutching a piece of cloth in hands.

- Pretty young woman, you've gathered so little —the peasant said For this little amount, how many plums shall I give to you?!
- We have no more of it, uncle. This garbage has not been gathered in our home. My neighbours gave it to me for lending a helping hand to them to sweep. Once the peasant heard the words of the lass, he was delighted.

Such a tidy and diligent girl shall be the best housewife for my son — he said and made the young woman his daughter-in-law!















Useful tips.....



Bokluchko, did you know that some of the things we throw out, we can in actuality utilise for a period of a long time?





You can do this alone or with the help of your parents! Flowerpots from old teapots and cans, autumn leaves and bottles' caps decoration, old pallets furniture, kitchen utensils hanger, bags from out-of-use clothing and so many other things!!



Become an eco detective!



Trash Tracker

Mobile application for mapping of illegal landfills and waste

- 1. Locate a landfill or discarded waste!
- 2. Take a picture and describe it!
- 3. Locate it on the map!
- 4. Choose its size and the type of waste!
- 5. Upload it to our database!

All mapped landfills will appear on a map which is available at:

www.waste-edu.eu





In conclusion.....

Protecting the environment is a challenge that each of us must accept. **For some people, it is a cause!** For others, it is a way of life! **See how** the **WasteEdu project** can help you make your school or living environment more clean and welcoming.

Visit our website and find out more: www.waste-edu.eu

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