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Activity A.C 3 - D.C.3.1 Common Educational Tool to Reduce River Litter



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1. Introduction: why is the waste problem relevant?

1.1. What do we call waste?

Waste is anything that has lost its effect for its owner and is no longer needed and therefore he / she intends to dispose of it.

Usually, any object or thing we use becomes waste. Waste generated in homes, our schools, small or large stores, administrative buildings and offices is municipal waste. The waste generated in our families is called "household waste".



Household waste consists of organic kitchen waste, household cleaning waste, clothing waste, paper and cardboard. A growing portion of household waste belongs to plastic as well as other materials, such as glass, rubber, leather and metal.





1.2. Waste generation

Since the Industrial Revolution, for a period of more than 2 centuries, an enormous volume of waste has been generated, and their amount has increased dramatically in recent years. According to the World Bank, in 2019, the generation of municipal waste alone reached 2.57 billion tons.

According to estimates, the population will grow in cities from 3 billion to 4.3 billion in 2025. This means that the volumes of waste generated will double by 2025. In 1950, only 29% of the world's population lived in urban areas, and in 2008, the global urban population has almost exceeded the population in rural areas. By 2050, 70% of the world's population is expected to live in cities (United Nations).

1.2.1. What is the composition of municipal waste?

Most of the time, municipal waste includes such types of waste as food and green waste, different plastic, paper and cardboard, glass, metal and others.





Source: www.worldbank.org/what-a-waste





1.2.2. What is the impact of waste on climate change?

Waste is one of the sources of greenhouse gas emissions. Most of the time, greenhouse gases are emitted from open landfills, where the gases emitted from the landfill are not collected. As a result of the decomposition of organic waste, methane is emitted from landfills, which has a higher heating potential than CO2.

One way to reduce greenhouse gas emissions is to reduce, reuse and recycle waste as well as to use landfill gas. Waste composting is also a good way to prevent methane generation.

In the last 200 years, the intensive and multilateral use of water resources, which in most cases has been useless and irrational, has put man in front of the need to take care of the rational management of water resources and the recovery of environmental problems.



1.2.3. Waste in the oceans and seas

At the current stage, pollution of rivers and seas with waste, especially plastic waste - is one of the major problems. 90% of waste in the seas and oceans is plastic. For example, according to the latest research (EMBLAS-Plus), 87% of the garbage found in the Black Sea is plastic.

Another serious problem is the microplastic, which, through seafood (fish, mollusks), can even enter the human body. Plastic reaches the seas and oceans, most often from rivers and shores due to irregular waste collection systems and low awareness of some citizens.

The amount of waste in the seas and oceans is expected to increase due to population growth and food consumption.







Source: https://globaltelconews.com/last-exit-revolutionize-the-way-plastic-is-used/





2. Waste management and sustainable development

2.1. Objectives

At the moment, the civilized world unanimously recognizes sustainable development as the only way to have a secure and prosperous future.

On 25 September 2015, 193 UN Member States agreed on the Sustainable Development Agenda document entitled "Transforming Our World: The 2030 Agenda for Sustainable Development", which contains 17 global goals and 169 specific goals for sustainable development.

The 17 Global Sustainable Development Goals cover the social, economic and environmental fields.





Source: https://wasteaid.org/wp-content/uploads/2016/05/swm-sus-goals-without-zlcomms.png



2.2. How should we manage waste?

Household waste is composed of different types of waste that have different periods of decomposition in the environment. Through the decomposition process, a distinction is made between biodegradable and nonbiodegradable waste.

The creation of efficient waste management mechanisms in the modern world, the selection of best practices and their prioritization has been a concern since 1970.

Since 1990, the hierarchical pyramid has been used to present approaches to waste management. The pyramid clearly reflected the desirable and less desirable actions of waste management.

The inverted pyramid is a kind of symbolic statement that a large part must be predestined to the most desirable action (especially the 3R principle), and a small part must be predestined to the unfortunate action (landfill).





3. What is the meaning of the 3R principle?

3.1. Waste REDUCTION

Reduction - The purpose of this action is to reduce waste at its source of generation. This means not only reducing the total amount of waste, but also reducing its toxicity or other harmful properties.

Waste reduction is achieved by reorienting producers and consumers towards products and packaging that lead to the reduction of waste quantities.

What do we need to do to reduce waste?

- Avoid unnecessary packaging. Many products in stores are just packaged to attract the buyer's attention.

- Giving preference to reusable products.

- Giving preference to minimum packaging.

- Giving preference to reusable or recyclable packaging.

- Giving preference to recyclable and environmentally friendly packaging materials.

- Use of reusable bags and liquidation of the use of plastic bags of

single use.



3.2 Waste REUSE

Reuse - The purpose of this action is to reuse the material, product and / or its component to prevent it from becoming waste.

Of course, the generation of waste cannot be completely avoided, which is why the reuse of generated waste plays an important role.

Reuse means the repeated use of various products and materials without the purchase of replacements. This includes purchasing products and materials for multiple and long-term use such as repairing and rebuilding damaged products, etc.

It should be noted that while for some waste is garbage, for others it can be a desirable product.







3.3. Waste RECYCLING

Recycling - Restoration action by which waste is transformed into a product, material or substance to be used as an initial or for other purposes.

Recycling is more of a cost-effective method than producing the same materials and goods from new raw materials.

Modern recycling technologies allow us to recycle 90% of our waste. Most household waste is recyclable. The largest of these are glass, plastic, metal, paper and organic waste.

The main problem is not recycling technologies, but the separation of recyclables, which is their separation from other waste.









Source: https://wmp.ge/wmp2







International Recycling Symbol

This symbol was created by an American student Harry Anderson in 1970.

This symbol applied to any product means that it was made from recycled raw material or material that can be recycled.

Frequently, the existence of this symbol significantly simplifies the waste separation process - type-dependent sorting.





3.4. Waste SEPARATION

One of the modern approaches to waste separation is separation at their source of generation, which means that waste generators themselves implement waste sorting depending on their type as well as their subsequent disposal.

In particular, the following actions may be applied:

- Supply of recyclable waste at collection points;
- Disposal of recyclable waste in return for payment;
- Placing waste separated by their type (eg paper, plastic, glass, metal) in special containers.

3R principle for paper

Paper is one of the most widely used recyclable materials. The history of paper production dates back to ancient China, but woodworking technologies only appeared at the end of the 19th century.

The paper can be recycled up to 5-7 times, after which the fibers become quite short and the production of paper from them becomes impossible.









3R principle for plastic

In the 1960s, the intensive use of plastic began. Historically, the production of plastic and plastic packaging materials has been initiated due to the introduction of cheap oil, chemicals and new technologies.

Over the last 50 years, the role and importance of plastic in the economy has been steadily growing. Global plastic production has increased 30 times since the 1960s and in 2015, amounted to 322 million tons. It is expected to double again in the next 20 years.

Packaging materials are very common in the use of plastic and they have different purposes: protection and storage of food; their packaging and distribution, filling cardboard boxes and informing customers.

Today, 41% of global plastic production is used as packaging materials, and 47% of this amount is used for food packaging.

Plastic is used, in particular, for the packaging of soft drinks, vegetables and oils, cosmetics and perfumery products and other products.





Plastic codes

In order to easily identify, separate and recycle plastic for household packaging, in 1988, the Plastic Industry Society (SIP) defined the types and codes of plastic.

SIP codes are widely used for marking packaging materials. This practice is mandatory in many countries.







Plastic recycling

In modern life, plastic waste management is one of the most pressing environmental issues.

The biggest use of plastic waste is its recycling. With modern technologies, plastic recycling can bring a variety of products: pipes, barrels, toys, furniture, duvets, clothing, footwear.

The recycling of plastic waste is carried out, in particular, by mechanical recycling, which, in the case of mixed plastic waste, involves sorting and preliminary identification, shredding and then separation, washing, drying and granulation.

Preliminary sorting involves the raw separation of waste according to different properties: color, size, shape, type of plastic.









Principle 3R for e-waste (E-WASTE)

Waste management distinguishes specific types of waste that require special attention to reduce their negative impacts on the environment. They include: packaging materials, damaged cars, electric batteries, electrical and electronic waste (hereinafter E-waste).

What	is	the	difference	between	The categories of E-waste are:	
electrical equipment and electronic?						

Electrical appliances are conductors of electricity and they supply the appliance with electricity (switches, light which motors. bulbs) is mechanical transformed into heat, energy or light. Electrical appliances equipped with so-called not are "decision-making tools".

In electronic devices, it is possible to disturb or adjust the signal (refrigerator, washing machine, microwave, vacuum cleaner). It is clear that the device often combines both components (electrical and electronic). • Large and small household products;

- Equipment for information and technology
- telecommunications;
- Equipment for the consumer;
- Lighting equipment;
- Electronically and electrically operated instruments with except for fixed industrial instruments);
- Toys, sports and recreational equipment;
- Medical equipment (except products implanted and infected);
- Monitoring and inspection tools;
- Automatic sprayers.





E-waste recycling consists of three main stages:

1. Selective decomposition: separation of expensive and / or hazardous materials;

2. Renewal: renewal of the composition of materials by mechanical or metallurgical treatment;

3. Refining: the final stage, when the material obtained is recycled (treated) by the chemical or metallurgical method (pyrometallurgical or hydro-metallurgical method).





To facilitate the selective collection of waste, plastic or metal dumpsters, different in color and / or inscription, are used. Their volume may vary depending on the flow of waste that can be collected in the area.



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Waste that cannot be recycled and does not fall into any of the types listed above - is collected in brown, gray or black containers.







How to collect the paper correctly?

- collect the papers that you can no longer use for packaging or writing;
- press the cardboard boxes to take up as little space as possible;
- store them in a place specially designed for collecting paper.

How to collect the bottle correctly?

- cleans all glass objects or containers of impurities;
- store them in a specially arranged place for collecting the bottle.







How to collect plastic correctly?

- washes plastic objects;
- check the information written on the packaging5;
- press them to take up as little space as possible;
- store them in places specially designed for PET waste, according to the category in which they fall.











How to properly collect metal waste?

- cleans all packaging and doses of impurities;
- flatten the packaging to take up as little space as possible;
- store them in a place specially designed for collecting metal.







How to properly collect toner, batteries and electronics?

Toner - you can choose to buy toner from companies that offer cartridge recycling services; Batteries - their contents are particularly toxic - take them to a separate collection point (eg supermarket, shops for electrical and electronic devices, etc.) Electronics - store them in a specially arranged place where they will be disassembled for recycling.





4. Black Sea environmental issues

The Black Sea is very sensitive to anthropogenic impacts due to its large water drainage basin and its limited connectivity with the planet's ocean.

The pollution of the Black Sea and the overuse of its resources over the last 50 years has resulted in a drastic deterioration of water quality and the ecosystem.

The adverse effects on the environment are mainly caused by two factors, as follows:

1. The state of the upper level of the Black Sea;

2. Pollution of the sea by industrial facilities located on the seafront and pollutants floating downstream.

Discharges of untreated urban wastewater and marine litter from municipal waste are the main challenges for Black Sea coastal waters.









Source: <u>http://emblasproject.org/</u>

Marine and municipal waste is another problem for coastal waters. Uncontrolled dumping of municipal waste in riverbeds or adjacent coastal areas causes beach and coastal waters to become dirty. In turn, it poses risks to the environment, marine life and human health.







5. Why do we need to protect the earth's water resources?

Our planet is a planet of water, ³/₄ the Earth's surface is covered with water. Water is a unique and indispensable natural resource that distinguishes it from other natural resources.

Water is the key factor in creating the physical and chemical environment, the formation of climate and weather. If there is no water, there is no life. Fresh water available to living organisms is a very small part (only 0.014%) of the planet's water resources. Thus, worldwide, special importance is given to the rational use of water and its protection from pollution. In the last 200 years, the intensive and multilateral use of water resources, which in most cases has been useless and irrational, has put man in front of the need to take care of the rational management of water resources and the recovery of environmental problems.

Currently, all countries in the world focus on the use of water resources, taking into account the principles of sustainable development.







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