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Smart Waste Management

for Smarter Cluster Schools

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coordonator

To Care as a Duty!

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Acknowledgement

To Care as a Duty was developed during the Erasmus+ Project Smart Waste Management for Smarter Cluster Schools and provide information about embedding smart waste management into school culture.

This book have 2 sections.

The first section of this book comprise examples of strategies adopted by schools for improving waste management at school level. These strategies were developed during the Erasmus+ project Smart Waste Management for Smarter Cluster Schools.

The second section of this handbook is following the hierarchy for waste management, the five options we have to consider if we want to minimize the negative environmental impact. Most of the options in the waste hierarchy also bring economic benefits. Each chapter, besides the short description of each option, provide useful tips for changing attitudes and example of activities that can be a reliable help in societal changes, whether we are targeting changes at individual level or at the community level.

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4 INTRODUCTION

The best waste management strategy is one that integrates the principles of the waste hierarchy, which prioritize waste reduction and reuse over disposal. This can include practices such as composting, recycling, and responsible waste disposal, as well as reducing waste at the source through product design and consumption habits. A successful waste management strategy also involves involving the community and businesses in waste reduction and management efforts. Additionally, it is important to consider the local context and infrastructure when developing a waste management strategy.

Schools can implement a number of measures to have an effective waste management strategy:

1. **Reduce waste at source**.

2. **Recycling and composting**. Set up a recycling program and educate students and staff on how to properly sort and dispose of recyclables and compostable waste.

3. **Engage the community**. Partner with local organizations and businesses to promote waste reduction and management.

4. **Education and awareness**:.Incorporate waste management education into the school curriculum and promote awareness about the importance of waste reduction and proper disposal.

6. **Implement a "no-waste" policy**: Develop a policy to eliminate unnecessary waste and promote waste reduction and reuse.

7. **Monitor and track waste**: Regularly monitor and track waste generation and disposal to assess the effectiveness of the school's waste management strategy and identify areas for improvement.

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Section 1- School Strategy

Do you think that is possible to change something in the school?
If you ever thought of this question this section is for you, showing what changes can be made in school through Erasmus+ projects.

Our intention is to present experiences of each school, carrying out activities of the Erasmus + project Smart Waste Management for Smart Cluster Schools. The purpose of the project is to develop in each school a strategy for smart waste management.

The partners in this project are schools form Croatia - Ploce, Greece- Anoixi, Lithuania- Marijanpole, Romania- Bistrița, Romania- Romuli, Turkey - Istanbul.

The activities carried out by each school took into account the local specificity, and the situation existing at the beginning of the project. The teachers and students involved and have made their mark on the results. Each developed strategy is tailored for a certain school but it is also an example, a good practice that other school can borrow.

With our strategies we aimed to identify a pattern for smart waste management in the school environment. Such a pattern aims to:

- Encourage recycling,
- Reduce the amount of generated waste.

What do we want to achieve?

Our vision is to include curricular and extracurricular activities aiming to:

- iacquire knowledge and skills related to the selective collection and waste recovery
- build positive attitudes about smart waste management
- develop the school's capacity in terms of waste management
- provide tools and resources.

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School Strategy #1

Primary school „Vladimir Nazor“ Ploče, Croatia

When we decided to participate in this project, our town had just begun to implement the new waste management policies. The majority of the municipality of Ploče, mainly the population in the rural areas with individual households, got a set of bins for recycling waste in their houses. The people in the city used the so-called “green islands“- places with containers for recycling.Two new waste management buildings were opened - a recycling yard and a station for waste sorting.

We wanted to contribute to this new green wave in our city and become a part of community in which everybody takes care of their ecological footprint. In the 21st century, we are buried in trash. How much waste do we produce on a daily basis? What kind of things do we throw away? What happens with waste when we throw it away in public containers?

Take a deep dive into your trash

We searched for the answers to these questions in the Smart Waste Strategy. We know that successful waste management program starts with a waste audit to collect data about the contents of our trash. The way to start down this path is through a waste characterization audit. Our first steep was a workshop called "Identification of waste types using different criteria: solid, liquid, gas/industrial, biological/recycable and non-recycable”. Matea Pirjevac, a professional associate for waste management from the Municipal Maintenance of our town answered our initial questions.

The way we treat our waste now – by depositing it in the local landfill, which is nothing but a hole in the ground - is not sustainable. In fact, the landfill is a huge pollutant for the environment. The amount of waste that is separated and sorted to be recycled is very small. However, the management of waste should start even before we buy something. The best and cheapest way to treat waste is to prevent waste production. That is the first step in the waste hierarchy. Waste prevention is something we all need to start doing, and this should begin in the shops.

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Resist consumerism!

We need to ask ourselves: Do I really need this? How long will I use it? Is this the packaging that can be recycled? Do I already have something in my house that can serve for the same purpose as this product? Can I borrow it from somewhere? etc. The biggest problem is the single-use plastic. It is something that we use for a few minutes and then we throw it away for it to stay in the environment for hundreds of years. It's not very logical, isn't it?
Nowadays, it is very hard to resist all the products that are designed to make our life easier, and all the marketing which convinces us that we really need that product in our life. So how do we resist consumerism?

The theoretical knowledge that we got was tested in the following field activities of this project:

We visited the shop without plastic that offers only products in reusable packaging. The products are a bit more expensive, but in the long run they pay off because they last longer. Then we made reusable bags, by using only old shirts, to be used for grocery shopping and school activities. We also showed how to upcycle old furniture that was collected in the recycling yard.

Matea explained to us how to read the packaging labels that show what kind of material it is made of, so we learned that there are 7 types of plastic packaging and how to recognize the one we can recycle.

When we learned different types of waste and how to properly manage each of them, we were ready to set up "a green island" with recycling bins in our school. We installed 4 different bins for the 4 most produced types of waste at school - plastic, metal, paper and biodegradable waste. Then we measured the amount of waste that was thrown in the bins, so that we can develop a strategy for waste reduction.

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Primary school „Vladimir Nazor“ Ploče, Croatia

S.O.S. message from the Adriatic Sea

Our students and the students from cluster schools created the items for the exhibition “Trash for art” from non-recyclable plastic waste. The exhibition was installed on a beautiful sandy beach, in cooperation with our partner teams. The exhibits made from plastic waste sent a strong message to the media about the effects that plastic waste has on marine life. And all we left on the beach was our footprints in the sand.

After we presented the report about the amount of paper waste thrown away in our school, the school principal limited the use of paper, and soon enough the amount of paper waste was cut in half. One part of it is recycled at school, and the other part is taken to the recycling yard. We also appealed to teachers to stop using single-use cups for coffee and other drinks, so now every teacher has their own reusable cup. Also, many students bring their own reusable water bottles to school, thus preventing production of waste from plastic bottles.

We don’t produce much hazardous waste at school. It’s mainly the waste from cleaning products. We educated senior students and the staff on how to make natural cleaning detergents and reuse the packaging. We hope that in time the use of natural detergents becomes a standard way of cleaning at school and a good example for other schools.

We learned to compost biodegradable waste and use it to strengthen the plants in the school garden.

While we were carrying out all these activities, the students proved that a waste audit can reveal materials which can be recycled, composted, or otherwise redirected from the landfill. We can reduce waste production by developing good habits.

We know that these are small steps from our small team, in our small school, in our small town, but they make us happy and optimistic. We are proud of the fact that we managed to reduce the amount of waste at our school. We made our small circle of smart waste management and proved that it is possible. We believe that students, teachers and school staff will share a part of what they've learned with the members of their family, friends and fellow citizens.

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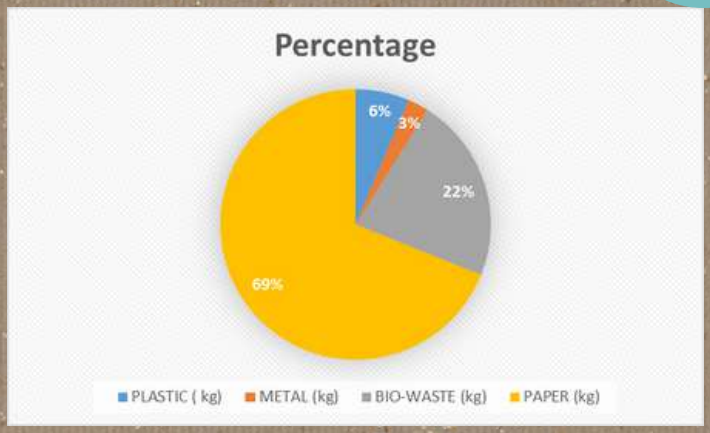
Primary school „Vladimir Nazor“ Ploče, Croatia



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School Strategy #2

Anoixi Junior High School, Greece

Objectives

The objectives set by Anoixi Junior High School were the following:

1. Make the school community aware of the problem of increasing waste and its consequences on our planet.

2. To familiarize our students with the materials which are recyclable.

3. To gain an understanding of the stages, forms and function of recycling.

4. To develop a positive attitude towards recycling.

5. Awareness of individual responsibility towards the environment and the ability to help save it not only through awareness but also the adoption of attitudes and practices in everyday life.

6. To cultivate the perception that recycling is the right way to manage waste and save the raw materials from which recyclable items are made.

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Actions

In order to achieve the above objectives, the following actions were carried out in our school:

Action 1

Educational excursion to the Hellenic Centre for Marine Research (Hellenic Centre for Marine Research). After a comprehensive presentation concerning recycling, there followed the collection, its sorting of waste and weighing by the students. The goal was for the students to be informed about the destructive effects of dumping waste on the marine ecosystem. (The Hellenic Centre for Marine Research (HCMR) is a governmental research organisation operating under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry for Development and Investment.

Action 2

We organized a voluntary clean-up of the beach of Attica (Agii Apostoli - Kalamos) by a group of school students. Their participation was spontaneous, enthusiastic and particularly effective as 20 very big bags of waste was removed from the beach. Our groups received the endless thanks and gratitude of the local community, who didn't stop praising us for the great work we did,

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Action 3

The English Department of our school cooperated with the Stavros Niarchos Foundation and successfully participated in two the Foundation's recycling programmes. Through virtual classes, with the help of experiments, research and meteorological stations, students discovered the consequences of the greenhouse effect, how man has impacted the global and local climate and how the use of renewable energy sources has evolved.

In the second programme, we investigated nature's ecosystems and how a balance is maintained between the organisms that make themup and the energy used. What would the future Athens look like if we saw it as an urban ecosystem? Could it be fueled by the energy of its population? What if waste could be a new raw material?

The students, through a fast-paced design workshop, learnt about the sustainable ecosystem of the SNFCC, about the sustainability practices followed worldwide and were invited to envision, design and build the model of the Athens ecosystem of the future. The aim of the course was to acquaint students with the concept of climate change and the principles of bioclimatic planning as they are applied at the SNFCC.

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Action 4

We informed the whole school community (parents, students, teachers) about the importance of proper waste management through posts on our school website, following our activities as they unfolded.

Action 5

There was construction of recycling bins by teachers and students working together. Old blackboards, which would otherwise end up in the garbage, were used as raw material. In addition to their construction, the students, under the guidance of their teacher, made sure to decorate the bins appropriately so that they would be attractive to all. There were placed in strategic places in the school premises so as to constantly remind our students of their duty to nature and our planet. Such was the participation of the students and their families that we won anaward for the largest amount of recyclable waste collected and taken to be recycled in the whole of Attica region.

Action 6

Paintings were painted by the students on the theme of recycling, smart waste management and artistic illustrations of how much our earth is suffering. We turned a lot of heads with our amazing pictures.

Action 7

A group of particularly artistic students created posters related to the destruction that plagues the marine ecosystem.

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Action 8

Reuse of old pens and wrappers to create artwork depicting symmetry and color change.

Action 9

A big group of teachers and students sewed canvas shopping bags from old t-shirts in a lovely ambience of working together with a common goal. Of course, our students become acquainted with the notion of reusing of materials and putting them in good use.

Action 10

The Faculty managed to successfully engage students with learning disabilities in the recycling process through positive rewards and collaboration with teacher-mentors.

Action 11

We watched the making of soap from pancake oil within our school's Chemistry Laboratory in the presence of our dear friends, who visited our school in the context of the current programme.

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Action 11

Our school Participated in the GreenCity project of the Region of Attica.

Our goal was to Inform the school community about Circular Economy and encourage its implementation in our daily life. There was a series of presentations organized in English and presented by our students to the participants of the current programme during their visit to our school. Participation in the programme was initiated by the Parents and Guardians Association of Anoixis High School.

It was very important to make everyone aware of the importance of the problem in order to achieve our goals. The Parents and Guardians Association of Anoixi High School ensured the cooperation of our school with GreenCity. GreenCity is a recycling program where citizens deliver unsorted waste to GreenCity's recycling trucks. There they are weighed by employees and points are awarded to the school. By securing points it is possible to purchase libraries, computers and equipment to upgrade the educational process for the school. Once a week, in addition to the school's waste, waste from their homes was collected by the students in order to achieve high points. Needless to say, this engaged the parents and the entire household as they had to sort their waste and carry it to school once a week.

All these good practices were disseminated to the partner schools and implemented by them as well.

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School Strategies #3

Marijampolės Jono Totoraičio Progymnasium
Lithuania

As circular economy and sustainability is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible, Marijampolės Jono Totoraičio Progymnasiums decided to develop a strategy participating in the Erasmus+ project and accomplish the idea among the memebers of community.

Gather information

The first step in the process of preparing the strategy was to collect the information about the waste gathered in our progymnasium and cluster schools. Having the results helped us to involve the school community and local organizations and develop healthy habits of circular economy and achieve the best results in the project.

For this reason the system of waste collection was prepared in the participating schools. The eco corners with smart bins and the information for disabled students were established. Bins for batteries, bins for paper, plastic and glass in school corridors and, finally, bins for smart waste collection appeared in every classroom. After calculating the results, the conclusion was drawn that the biggest amount of waste collected was cotton, coffee grounds, paper and plastic.

With these results the Erasmus+ team gathered for a discussion in which the participants brainstormed healthy habits to help to reduce the amount of waste. As a lot of cotton was collected, making shopping bags, decorating them and using them everyday was one of the solutions for circular economy.

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Thank You cushions

The team also organised a public event „Thank You cushions“, in which the school community made cushions for the doctors and nurses working hard during the pandemic time and presented them. Another suggested idea was to buy second hand clothes, which would lead to decreased consumption. Besides, before going shopping every customer should plan the purchase and buy the products that have non-plastic packaging. To spread the ideas, the Erasmus+ team prepared videos for the school community that were shown to the students on school television during the breaks. Doing this helped to raise the awareness of every member of the school community.

Another sore subject in the school was the amount of paper used. Together with the school authorities the decision to install smart whiteboards in every classroom was made. It had great impact on using less paper in the process of teaching and learning. Together with the town council the school arranged solar panels, which lead to smart electricity consumption.

Furthermore, one more way of consolidating the key message was by creating artworks from recycled materials and decorating the school area. This idea was especially welcome during the celebration of the school anniversary when special welcome photos were made using the art. Besides, when the guests and former students visited the school on that special day, their attention was drawn to the smart waste management as well.

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The continuation of the project is also very important. The class teachers together with the students were invited to create smart bins for the classrooms according to the waste they collected most. There appeared bins for plastic, paper and coffee grounds. The later was collected as a fertilizer for the plants in the school area. Furthermore, a teacher of primary school, who is especially into zero waste and buy nothing policy, together with her students made school furniture using collected paper and used it in her classroom to store the items her students needed.

Fashion

An incredible idea of recycled fashion was also accomplished in our school. The after school club decided to prepare dresses using bottle caps and participate in an international contest. The school community was storngly involved in the process because every bottle cap had to be collected. The activity drew into work the family members as well. When the dresses were prepared for the show but some bottle caps were still left, they were used to make a bin to collect plastic and batteries.

Events

Our school also participated in a lot of public events concerning the topic. For example, our public library organised the sustainable Christmas event. Students of our school prepared Christmas tree decorations using the items or waste collected at school. As April is considered as the month of Earth, public events were held in the town and our school team took part in every possible event to disseminate our project, to evaluate the gained knowledge and have good time.

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Sustainable school

At the same time our school organised a public event for the community called „Sustainable school“. During the time, students of our school together with their family members were invited to use no cars for the everyday routine, refuse using plastic as much as possible in everyday consumption and feel responsibility for water and electricity consumption. Besides, our school ran a competition of the best idea of recycling and circular economy. The participants presented their ideas and accomplished them. It was a good practice of making ideas real.

To disseminate the project into deeper waters, our school also participated in the conference organised by the President of Lithuania where participants from different schools shared different ideas of what else can be done to increase smart waste management.

By raising awareness about the impact made by humans on our planet, participating in different contests and conferences, organising workshops and creating products that care about the future and induce circular economy and non- consumption habit in every day life, promotes the hope for the brighter future.

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School Strategy #4

National College ”Liviu Rebreanu”, Bistrița Romania

"Liviu Rebreanu" National College has developed a better strategy for responsible waste management due to this Erasmus project. Achieving the planned objectives has brought us a wider experience and a new approach to our classes which we would like to expand beyond the school borders into the wider community.

Our first goal was to create a selective collection infrastructure to encourage recycling and adopt positive behaviors regarding waste collection. To maximize the impact of the whole project, we organized the strategy considering all the age levels of our students.

Collection infrastructure

The primary and secondary school pupils personalized their spaces with funny bin boxes following the waste collection criteria. In every classroom, with the help of the project volunteers, the teams had to recycle materials and use them to create trash containers for two categories of waste. Using the yellow and blue color tagging, they made one bin for plastic and metal waste and another for paper and cardboard items. This way, the simple cardboard boxes were recycled and creatively transformed into small artworks. By involving the pupils in the practical process of organizing the waste management strategy and using this activity as an opportunity to valorize the differences through art and focus on common goals, the key messages were better assimilated and the products were perceived as group identity reference points. Printed resources about the types of collected waste were added in every classroom enriching selective collection skills. After the improvement of the classroom space and applying the new rules, the classroom doors were decorated with Waste Heroes stickers, celebrating the positive behaviors.

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Not only inform, but act!

Smart waste management is more than providing information and expands to the second goal: reducing the amount of generated waste. During extracurricular activities, secondary-level teams of volunteers made digital resources and posters that were used to teach the younger students how important it is to reduce the amount of waste and adopt active citizenship in preserving the environment.

Discussions about plastic bag pollution were held in transdisciplinary classes called "From Plastic to Design". Pupils found out how this was first considered a miracle material because of its versatility, low price, and flexibility and became later a source of environmental disaster. Students learned that not all types of plastic are reusable or recyclable and the products made of it end up in landfills where they will remain stuck. It is the only material that is more expensive to recycle than to produce, and the effect is that it slows the reduction of the consumption chain. They studied the design trends that use it on a large industrial scale and how innovative strategies are part of the solution trying to determine how plastic could be continuously used and reused in a circular economy model. The most helpful variable in decreasing the impact of plastic usage remains reducing the amount of generated waste. The plastic bag painting workshop was a creative challenge for the students. Using the technique promoted by the environmental activist artist Baguio Jojet Mondares they created beautiful works of art that were exhibited in the school hall and transmitted the messages to the entire school community.

When in doubt, do some ART

Another way of consolidating the key messages was by creating small artworks from recycled materials and giving them as gifts to different institutions and public spaces. This way, our school celebrated the behavior change and took a responsible attitude by assuming it in the larger community. Key messages were added to the works to encourage recycling and the reduction of the amount of waste.

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Smart Trash Bins

On the level of high school students, encouraging recycling and creating a selective collection infrastructure was implemented differently. The smart approach came from the robotics volunteer team that created a sensor-based waste bin prototype. The product made within the project is one of our solutions for the appliance of an intelligent waste management strategy that wants to increase the quality of life and well-being at the individual and community levels. The adaptation to the technological context, as well as the promotion of intelligent methods and their implementation in educational activities, are the main factors in the development of students' key competencies and the strengthening of active civic responsibility. Our product meets visually impaired people, identified by the project as a vulnerable category. When passing the hand over the built-in sensor, a specific sound is generated, which offers the possibility of optimal use for them too. The role of the smart trash can is to measure and monitor the amount collected, and the digital component ensures that the approach meets the needs of a dynamic and efficient society.

Due to its interactivity and viability, the product can be an innovative tool for the future. The data processing potential, the possibility of applying this product internationally in the context of globalization, and the implementation of new waste management strategies, make it a prototype for niche design products. The smart trash can allows you to adapt the settings and diversify the selection criteria as needed. Thus, it can monitor the amount of plastic and metal, paper and glass, the waste category can be modified to the specifics of the operation of various institutions.

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The prototype got rewarded at the National Contest " Made for Europe" with the first prize, gaining this appreciation from over one hundred projects. Schools from all over the country presented their products made during various Erasmus partnerships. It made us hope that the daring school project can meet the entrepreneur market and change from a theoretical approach to practical implementation on the larger scale of the community.

Events

Our school also participated in the European Researchers' Night event promoting the rewarded smart waste bin between other scientific projects. People from our community could notice how digital skills can merge with active citizenship and generate innovative solutions. It was a beautiful opportunity for the students to join the local entrepreneurs' group and to stand beside other institution representatives, motivating young people to act as a duty.

Sustainability

By raising awareness about the human impact on the environment, approaching the complex problem of plastic pollution, organizing different workshops, and creating digital and printed resources, designing intelligent solutions for a better tomorrow, our school has developed a strategy that will influence not only the present activities but will also offer the landmarks for the future students. The most important goal is beyond addressing the community of Liviu Rebreanu College but to be a source of inspiration for other school communities.

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School Strategies #5

Școala Gimnazială Romuli, Romania

Objectives

At Romuli Secondary School, the objectives pursued are:

O1-Creation of a selective collection infrastructure.

O2-Encouraging the adoption of positive behaviors regarding waste collection and minimization of waste generation.

Collection infrastructure

For the achievement of the number one objective- „creating a selective collection infrastructure, within the workshop"- we build from recyclable materials, cardboard, paper and wood garbage bins were made for the selective collection of waste in each classroom. On this occasion, the students learned that not only is the separate collection component important, but it is also ideal to try to reuse the waste, to find a new use for it before throwing it away. „The workshop does not waste, it reuses!" During the tutoring classes, the students were trained and workshops were conducted, regarding the importance of selective collection, ensuring the logistical base both at primary school and secondary schools.. The activity was monitored by the members of the recycling patrol in our school, all volunteers. This was possible with the help of electronic weighing devices that made a calendar of activities, highlighting the quantities of waste collected weekly.

From the beginning, the goal was to transform school into a functional unit of selective waste collection, because good habits are learned by children since they are young. Behaviors that develop in childhood and teenage years accompany us throughout life.

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How do we know that our program will be successful or not?

1. Creating an implementation infrastructure - in each classroom were placed at least 3 garbage bins for paper, for plastic / metal and household waste, as well as on the hallways on each floor. For waste that is generated less often e.g. glass, or small electronic waste such as batteries and light bulbs, we placed baskets in an area visible and accessible to everyone.

2. Information and training - in this case we have included both students and teachers, as well as the auxiliary staff in the school, so that after the end of the project everybody would stay motivated to collect separate waste.

3. Creating the recycling patrol that are the schools ambassadors, but which ensure the continuity of the project.

4. Training of the staff- participation in the training sessions, why is it important not to mix the waste, how should it be handed over to the collection companies.

5. Legal obligations and sanctions that can be applied. Separate waste collection is not just an eco trend, it is a duty by law.

Going through all these stages, making all the activity easy and attractive, achieving a fierce promotion of the recycling program through posters and announcements that catches the attention of those who forget from time to time what they have to do – all of those ensure our success. Thereby, we believe that recycling plays a major role in the relationship with nature, on the breathed air, on the animals and implicitly on our health.

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Positive behaviors

Regarding the 2nd goal pursued in achieving the strategy in our school -- Encouraging the adoption of positive behaviours in terms of waste collection and minimizing waste generation -- it's our duty, of those who believe that environmental education is needed, to try to transmit this belief to children as well. And not only to our own children , but to all those with whom we come into contact. Because the little ones are like a sponge that absorbs any information, they intuitively love nature and want it clean, not full of garbage. In achieving this objective we involved the teacher, of kindergarten, the teachers of primary school and the teacher of social education, to transmit the spirit of civic. They have prepared materials in the form of stories dedicated to children, by age categories, which have the role of educating on waste electrical and electronic equipment and how they must be recycled correctly, in a creative and playful manner, in the form of text and graphic design.

From stories such as:

1.**Țup, the saviour of winter** – by Alex Donovici – we find out what impact the garbage thrown by people has on the animals in the forest. The adventure starts on the threshold of winter, when the little flyers find that the cold is too long overdue. What's more, it looks like it's getting hotter and hotter, for some unknown reason. However, when the Gelu turkey enters the scene with a new necklace made of coloured PET stoppers, things start to get clearer. Țup – the lark, snow – the mysterious bird, Buhu – the owl, the Tor raven and the Lightning snail come into action and decide to save the forest and give people a lesson.

2. **The teddy bear recycles** – by Alexandra Wadhwani- For kinder garden, 2-5 years old, this story in verse aims to teach children what each of these three exhortations that have become slogan means: reduce, reuse, recycle.

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3. **Let's collect the garbage** – Junior Publishing House – some what resembles an encyclopaedia and contains a lot of interesting information about how garbage appears, what are its categories, how it can be recycled, how it can be reduced. We also find out what a working day of those who collect the garbage looks like, what happens in the recycling factories, how household garbage can be composted, or what recycled glass turns into. It's a treasure.

4. Eco-themed cartoons- **Captain Planet**, **Teddy Bear Watercress and Cleaning Day**, **Oliva Verde – What is recycling?**

All these activities carried out with the little ones contributed to the implementation of our project. Children can learn from an early age how to sort waste, respect the environment, and consume less. Ecological education for kinder garden is nature deserves our respect!

In the meantime: reduce, reuse, recycle! and we will all benefit.

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School Strategies #6

Prof.Muharrem Ergin Ortaokulu, Istanbul, Tukey

We as the members of Prof. Muharrem Ergin Middle School keep that saying in mind The First Lady of our country said 'It will be too late for everything if we don't pass human-centric approach beyond egocentric approach. Therefore, I invite you to take part in solutions to environmental problems'

"Zero Waste" is a goal defined as waste management philosophy that involves preventing the wastage, using the resources more efficient, reviewing the reasons for waste formation, preventing or minimizing waste formation, and collecting and recovering waste at source separately.We know that in the recycling and recovery process of wastes disposal without evaluation causes serious resource and energy losses.

The project aims to control waste within the framework of sustainable development principles and to leave a clean and developed Turkey and a livable world to future generations.

How is the process for Zero Waste in our school ?

Create Your Team

Zero Workteams are set uptomonitor the process from installation to application and monitoring of the waste management system.

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Plan

Zero Waste Management System is carried out before the application of the waste management system for the most effective structuring.

Arrange Traning and Carry Into Practice

Required equipment is provided and placed in appropriate places. Trainings are organized for employees and practitioner storaise awar eness about the application. The produced wastes are collected in the waste box esplaced. Wastes according to their types are collected in temporary storage area. The collected wastes are delivered to environmentally licensed facilities forrecycling.

Watch, Record, Revise

Regular monitoring of the application is carriedout. Measures are taken for failures and updates are made if necessary. The practical out puts such as the amount of waste collected and sent to the facilities and the gain sobtained are recorded.

The system of waste collection

The first step was to prepare the system of waste collection in our school. Recycling bins for batteries, paper, glass, electronics, plastics were put in our school corridors and two bins for each class for organic and paper,glass and plastics. Every day after the classes finish, people in charge collect them and put the place so that municipal employees can take them.

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Start using waste!

Other things that we do is about our Technology and Design lesson. Students with the help of teachers started to use waste materials to create new objects during the classes and end of the term in summer , they present their products in the exhibition in our school. Students from different schools, teachers, people in town, district director of national education and also other employees and staff visit and see the exhibition so that we can disseminate all the things about our strategy and project.

Results

By taking part of this project and our waste management strategy, we became a member who helped achieve those ;

- From the collected waste, 356 million kilowatt-hours of energy was saved, equivalent to the use of 1.5 million families for one month and 130 thousand families for one year.

- With the Zero Waste Project, water savings equivalent to 1 month's use of 16 million families were achieved. It has also been calculated that the 437 million cubic meters of water saved is equal to the amount that 175 thousand Olympic swimming pools will receive.

- In addition, 52 million cubic meters of storage space with a height of 1 meter and a width of 7 thousand football fields were also saved.

- 265 million trees saved.

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- With the project, 3 million tons of greenhouse gas emissions were prevented, 265 million trees, equivalent to 1.5 million decares of forest area, were saved.

- 62 million barrels of oil equivalent to 70 million vehicle tanks of gasoline and 409 million tons of raw materials were saved.

- With zero waste, last year, 4 million tons of paper, 1.1 million tons of plastic, 470 thousand tons of glass, 75 thousand tons of metal, 280 thousand tons of wood, 80 thousand tons of textiles, 18 thousand tons of waste vegetable oil, 19 thousand tons of electronic goods and 1.2 million tons of organic and recyclable mixed wastes were collected separately at the source and recycled.

With our strategy and the project we are in, we try to help our kids, parents , community, workers, staff and any person to :

- Increase productivity,
- Increase performance with the help of clean environment,
- Reduce costs as waste is avoided,
- Ensure the reduction of environmental risks,
- To have a sense of “sensitive consumer” as it contributes to the development of environmental protection,
- To have the title of “Environmentalist”

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SECTION 2

When we talk about waste management, we all think about what we need or what we can do with waste. And if we call them waste, the first impulse is to throw them away, dispose them. Well, that should be our last option. Let's try to call these "things that we don't use anymore", unwanted or unusable and see what we can do with them.

UE defines waste as "any substance or object which the holder discards or intends or is required to discard".

Waste management includes all the activities that are required to deal with these no more wanted objects or substances, from the point of collecting to recycling and monitoring.

The waste hierarchy is a set of options we must consider when dealing with unwanted things. So, it is a tool and can be seen as a strategy. Regardless of the type of waste we are dealing with, this tool (WH) offers us 5 options: prevention, re-using, recycling, recovery and disposal.

Waste Hierarchy

The options we have when dealing with waste are based on the environmental impact and sustainability. The hierarchy consists of the following steps, in order of priority:

1. Reduce: Minimize the amount of waste generated by reducing consumption and improving resource efficiency.
2. Reuse: Extend the life of products and materials by using them again, without processing or modification.
3. Recycle: Process waste materials into new products, conserving resources and reducing the need for new materials.
4. Recovery: Use waste as a source of energy, such as through incineration or landfill gas extraction.
5. Disposal: Send waste to landfill or other disposal facilities as a last resort, when the other options are not feasible or have been exhausted.

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PREVENTION

The generation of waste can be prevented in many instances and in others can be reduced. So, it is in our power to prevent waste generation, at least a part of it.

To not consume goods at all has the less impact on the environment but it is not possible in almost all of the cases. We can, and some of us already do it, to refuse to buy goods which have negative environment impact. Think of all the communities that forbid the use of plastic on their territories.

We can prevent waste generation if:

- We reduce the amount of waste generated by purchasing only what is needed and avoiding excessive packaging.
- We reuse and recycle.
- We educate others about the importance of reducing, reusing, and recycling to reduce the amount of waste generated.
- We buy goods with a longer life span.
- We support businesses and policies that prioritize waste reduction and sustainability.

Start this change with:

1. a trash audit, meaning it is time to acknowledge WHAT YOU'RE WASTING
2. food, STOP WASTING FOOD,
3. plastic, STOP WASTING PLASTIC.

Enough time spent for aknowledgeing the importance of prevention will build a solid base for the ultimate goal ,which is a cleaner enviroment as a legacy!

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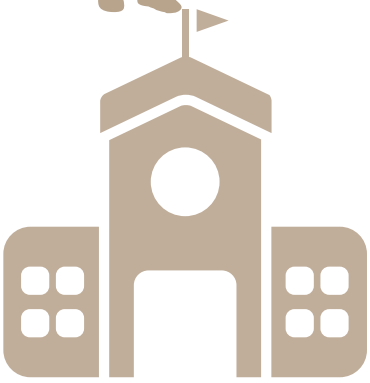
PREVENTION TIPS

....can :

- avoid single-use food and drink containers and utensils,
- buy secondhand items and donate used goods,
- shop local farmers markets and buy in bulk to reduce packaging,
- buy less food to prevent food waste,
- try to improve an old school bag with patches and badges, to have a new look,

...can:

- teach at English classes about the difference between needs and desire, in that way, students can prevent waste generation by reducing consumption,
- apply digital or online assessments to reduce the paper consumption
- curb the use of paper like mail, receipts, magazines.



... can:

- develop a strategy for the reduction of the quantity of plastic used in school,
- forbid single-use plastic bags in schools,
- organize swap events in school to exchange uniforms, schoolbooks, and auxiliaries,
- buy for school goods /objects with long service life.

... can:

- organize swap events, where people bring staff over and trade items with others,
- forbid single-use plastic bags in town,
- buy for community goods /objects with long service life.

Zlarin is a Croatian island in the Adriatic Sea where the use of plastic is forbidden.

(1) SMILO // Zlarin (Croatia) - Toward better green waste management - YouTube

Bye bye plastig bags campaigns

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REUSE

Reuse is taking old items that you might consider throwing away and finding a new use for them. Reuse only includes products or components being used in the purpose for which they were concived. It is one of the best ways to stop waste generation, and there are tons of opportunities to put it into practice every day. This process returns the products that have become waste to distribution again. Reuse is often combined with repair, rehome and restore.

Have you heard of "library of things"? It is a concept developed some years ago, and means exactly as the name says, a library but not for books, for any other things that people buy and use it only, let say, once a year, such as household appliances, sport equipment,.

Buying second hand things is a type of reusing. Giving to charity unwanted clothes is a type of reusing. In this way we save a lot of our planet resources.

Example of waste reuse are:

1. Donating clothing, furniture, or other household items to charity or thrift stores, instead of throwing them away.
2. Using old containers, such as glass jars or plastic containers, for storage or organizing purposes.
3. Repurposing discarded materials, such as pallets, for use in furniture or construction projects.
4. Reusing paper and cardboard by printing on both sides or using scrap paper for note-taking.

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glass bottles and jars

cardboard, metal and plastic boxes

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jeans exchange

REUSE

Find your size and style!

reuse and rehome your book with bookmobile

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recover and reuse

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TIPS

REUSE

...can.:

- try to mend things before deciding to throw away the old ones
- use reusable bags for gym equipment,
- use washable kitchen and bathroom towels,
- pack school snack in a reusable bag with reusable food and drink containers,
- share party decorations and supplies with classmates,
- use reusable bottles and cups,
- exchange textbooks and school equipment.

...can:

- teach about reuse and how to reuse things daily,
- talk with students and parents about needs and desires,
- make a personal reusable mug for school tea and coffee,
- reuse single-side printed paper for scratch paper,
- reuse containers and other materials for storage and crafts in classrooms,
- make a small library of magazines and books in the classroom,
- use rechargeable batteries.

...can:

- organize swap events for school uniforms, textbooks, school bags, and sports equipment,
- take a piece of furniture in the recycling yard and renovate it with the students,
- reuse jars, bottles, and tins for tea herbs, jam, and olive oil made in school society
- reuse and adapt scenography, costumes, and props for school plays
- create an inclusive room for students to share all sorts of social games

...can:

- set up a system to swap, share or borrow items that are infrequently used (DVD-s, books, tools, furniture, parties and sports equipment)
- support second-hand shops,
- organize food festivals with local recipes from leftovers
- encourage local food producers to donate small or damaged fruits and vegetables to the public kitchen.

RECYCLE

Recycling is the process of converting waste materials into new materials and objects.

Many actions can be done towards recycling, by individuals. If we are careful with our household waste, and recycle all materials that could be recycled, a lot of waste can be introduced again in the process of making new goods, and in this way is used less energy and less natural resources than in the process of using raw materials. So, besides being economical this proccess offers a big boost to our environment.

In the home, some common materials that should be recycled include:

- Paper – such as newspapers, magazines, and cardboard packaging,
- Metal – such as cans, metal food containers, and foil,
- Plastic – such as bottles, carrier bags, tubs, food containers, and wrappers
- Glass – such as bottles, jars, and food containers.

Recycle is also used by artists all aver the world to create art using waste as materials, in this way they save resources and also send a message to raise awareness.

It gives us the tools to stop climate change and biodiversity loss together.

THINGS THAT CAN BE RECYCLED

- Paper/CardboardPlastics
- Glass
- Aluminum
- Batteries
- Electronics
- Food
- Lawn Materials
- Used Oil
- Household Hazardous Waste
- Tires
- Metal
- Miscellaneous

WATCH

https://www.youtube.com/watch?v=6jQ7y_qQYUA
https://jtotoraitis.lt/sekme-jaunuju-dizaineriu-konkurse/

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Recycling domestic items into someting new

Smart waste bin

Taking part in national recycling projects

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Making clothes for the fashion show using bottle caps

Recycling old jeans into cushions as a "Thank you" gift to the medical workers during Covid-19 pandemics

Classroom items made of recycled paper

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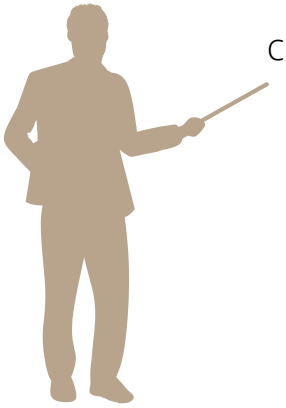
TIPS

can:

- collect soda cans and plastic bottles to obtain some money
- make a shopping bag using an old T-shirt,
- have a peer meeting for a public discussion about recycling,
- initiate a school competition for the most planet-friendly class in school,
- invite parents to be a part of the carried activities.



can:

- subject integration,
- recycle classroom items used in everyday teaching,
- carry out the activity „Abandoned City!,
- participate in local, national, and international competitions that are carried out about recycling,
- invite parents to take part in various competitions about recycling,
- participate in international and local projects that raise awareness of recycling,
- have recycling rules and bins for recycling in every classroom.

can:

- develop a strategy for reduction of the quantity of plastic used in school
- forbid the single-use plastic bags
- forbid plastic bottles
- arrange special places for recycling bins
- arrange alive corners
- make equipment for the playground

can:

- make an agreement of no plastic shopping bags in everyday life
- use DIY ideas for home equipment
- recycling old furniture
- wear second- hand clothes

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RECOVERY

Waste recovery refers to the process of reclaiming or extracting valuable materials or resources from waste or discarded materials, in order to reduce the amount of waste going to landfills, conserve natural resources, and reduce the environmental impact of waste disposal.

RECOVERY is when most of the material thrown as garbage is used and processed in ways other than being destroyed. When it is not possible to reuse or recycle objects - such as mobile phones, computers, televisions and other electronic gadgets, all of which may contain toxic elements, recovery is a good option.

Although recovery is not meant for the individual user or households, but intended mainly for industries, individuals have an options in the field of recovery: composting.

Circular Economy is a concept which use materials considered initially waste but used as raw materials in producing other good and is a good example of recovery.

The circular economy is a model of economic growth that aims to minimize waste and conserve resources by keeping materials in use for as long as possible. In a circular economy, waste is designed out of the system, and products and materials are designed to be recovered, refurbished, and reused, rather than discarded as waste. This creates a closed-loop system, in which resources are continuously cycled, minimizing the need for virgin materials and reducing waste. Waste recovery plays a critical role in the circular economy by recovering valuable resources from waste, reducing the need for new materials, and closing the loop on waste management.

https://www.istac.istanbul/en/clean-istanbul/waste-management/recovery-and-compost-production

https://www.istac.istanbul/en/clean-istanbul/energy-generation-from-waste/waste-to-energy

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Compost Factory in Romania

Biogas production at Waste Water Plant in Bistrita

Circular Economy – Olive oil plant – Greece

ŪKAI

The company ŪKAI is a great example of circular economy because in making its product it uses recycled plastic bottles that are withdrawn from water. Besides, the recycled plastic bottle yarns are made in fabric that doesn't use water, chemicals and reduce the CO2 emissions and energy usage. It means that by wearing ŪKAI socks you are making lower impact to the Earth. ŪKAI factory meets ecological values and produces sustainable and durable products.

Circular economy – ŪKAI – Lithuania

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Composting in the city Istanbul

Composting in school – Turkey

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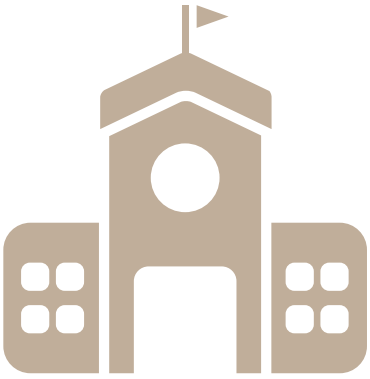
TIPS

Students can:

- Use paper, plant matter, food scraps and other organic materials to create compost, which can fertilize gardens, agricultural fields and municipal projects.

Teachers can:

- teach at English classes about the importance of recovery.
- Give research assignments about what they can do .
- tell students how landfills affect the planet's air and water
- teach about how to conserve landfill space
- carry out the activity „Abandoned City!



School can:

- Organize a workshop about how to compost.
- Put some compost buckets in school canteens for organic wastes.
- Create a small garden with the compost students made.
- Take the students to a factory to see recovery process.
- Have compostable napkins and dishes in the canteens

Municipalities can:

- Organize a workshop about how to compost.
- Put some compost buckets in school canteens for organic wastes.
- Create a small garden with the compost students made.
- Take the students to a factory to see recovery process.
- Have compostable napkins and dishes in the canteens

Disposal

The last option from the Waste Hierarchy is DISPOSAL. The items that should not have found any uses in the first four stages are disposed of. The disposal stage comprises anything that can not be reused, recycled or recovered. This includes incineration (without energy recovery) and landfill. According with UE definitions "Landfill is the deposit of waste into or onto land. It includes specially engineered landfill sites and temporary storage of over one year on permanent sites. The definition covers both landfill in internal sites, i.e. where a generator of waste is carrying out its own waste disposal at the place of generation, and in external sites. Landfill is often simply referred to as deposit." Statistics Explained (europa.eu).

Landfills nowadays are well engineered facilities, where compaction is maximized, and environmental impacts are minimized, even gs from breaking down the waste is collected. But sooner or later those landfills reach their capacity, and our efforts should be focus on reducing the amount of waste disposed.

Incineration is a process of waste disposal which involves combustion at high temperatures. This option reduces the needs for landfills, could generate energy, but besides that it is not very affordable, generate pollutants into the air, and discourages prevention, reuse, recycle and recovery of waste.

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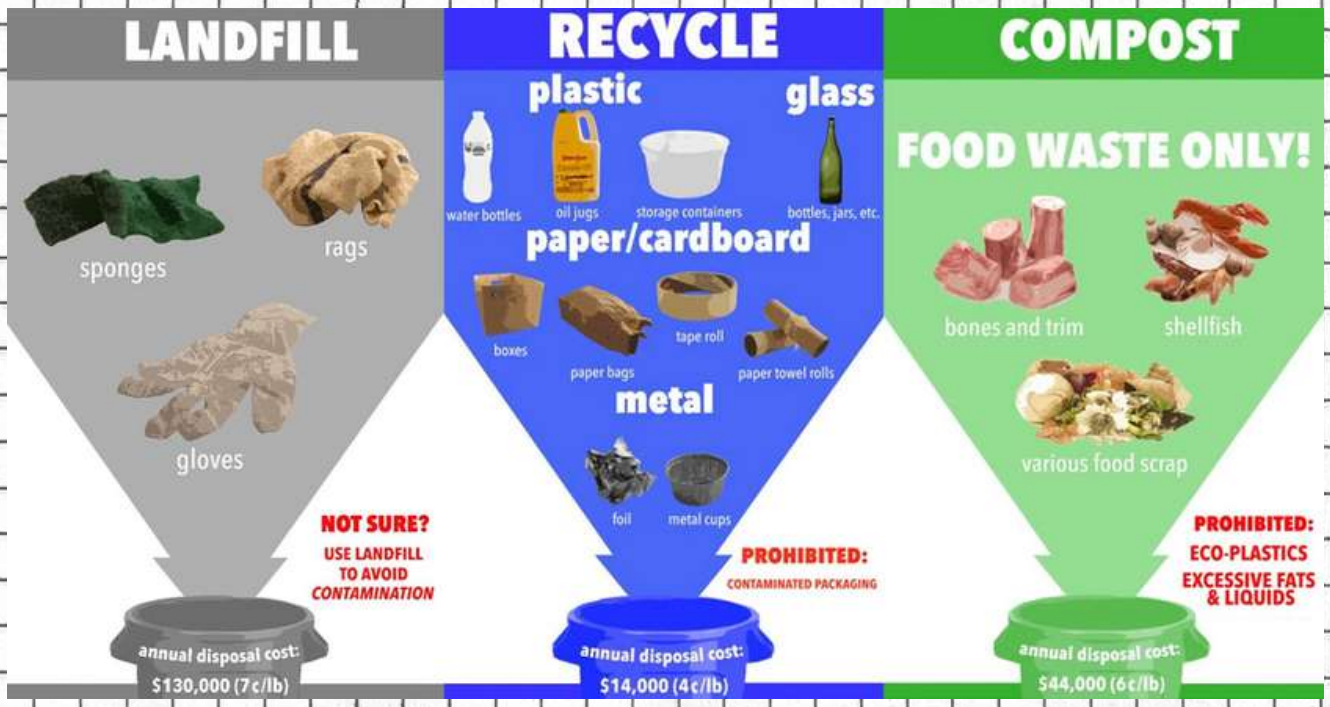
Disposal

Over 78% of school waste could be diverted from the trash to organics composting and container/paper recycling collection programs.
50% of school waste could be managed via organics composting programs that accept food waste, liquids, and nonrecyclable paper.
The single-most common material generated by schools was food waste—23.9% of the total waste generated.
Recyclable paper (cardboard, white office paper, and mixed paper) accounted for 23.5% of the total waste generated by schools.



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TIPS

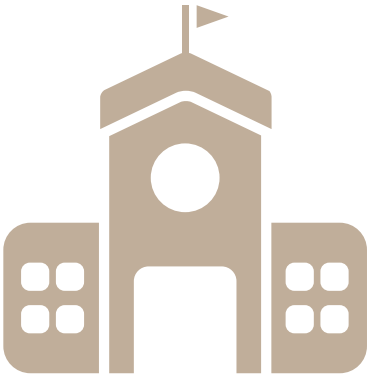
Disposal

Students can:

- collect waste selectively,
- reduce the amount of waste generated,
- give the old items a new life.

Teachers can:

- inspire students a better understanding of the school recycling program and how they can effectively participate, you need to get them to understand what they are tossing out and where it belongs,
- emphasize the necessity of the disposal to the kids as well as the danger that is leaving through for humanity, if we don't follow the ecological steps,
- show to students their own disposing routine so the students can take an example from these.



States can:

- develop a strategy for the reduction of the quantity of plastic used in school,
- forbid the single-use plastic bags,
- add recycling bins to Public areas,
- write a column in the local newspaper,
- form a recycling Club,
- encourage people to use their creativity,
- develop the collection points so the amount of garbage that is collected will fast be elaborated,
- launch new projects, especially about schools that concern about disposal, its methods and how it can provide us a better future,
- enact laws about compost, landfill, incineration, and of course recycling and reusing.

CONCLUSION

Sustainable development is a continuous and controlled social change aiming to secure opportunities for a good life for present and future generations. Around the world, actions are taken to make a shift in the consumption pattern and to encourage people to conserve and enhance the world's resources. In this endeavor, we all have a small part to play, and small steps taken collectively can lead to achieving the goal.

In this respect, before taking a decision regarding any substance which is discarded after primary use it is necessary to appeal to the waste hierarchy as a tool used in the evaluation of the process that protects the environment, improve economy and consider the needs of the society. This hierarchy sets priorities based on sustainability.

This waste management hierarchy consisted of prevention, reuse, recycle, recovery and disposal indicates the preference for action to reduce and manage waste and aims to extract the maximum practical benefits from products and to generate the minimum amount of waste.

Sustainable development is possible, and individuals can make a contribution.

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Smart Waste Management for Smarter Cluster Schools

an Erasmus+ Project