

R2.A1 TRAINING LESSON TEMPLATE

Please, eliminate the blue sentences while filling in the document.

Title	Types of plastics (microplastic)
Part of the training course referred to in this lesson	Part 1 <input type="checkbox"/> General information about sustainability and CE Part 2 Specific Information about: <input type="checkbox"/> Plastic sector
EQF level	Level 2 or Level 3, in case of doing the optional tasks.
Where the lesson was tested	
General Learning objective(s) according to the Bloom Taxonomy https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/	<input type="checkbox"/> Create ☞ Produce new or original work (design, assemble, construct, investigate, formulate) <input type="checkbox"/> Evaluate ☞ Justify a stand or decision (appraise, argue, defend, critique, select, support) <input type="checkbox"/> Analyze ☞ Draw connections among ideas (differentiate, organize, relate, compare, distinguish, test, experiment) <input type="checkbox"/> Apply ☞ Use information in new situations (execute, implement, solve, use, demonstrate, operate) <input type="checkbox"/> Understand ☞ Explain ideas or concepts (classify, discuss, describe, identify, locate, translate) <input type="checkbox"/> Remember ☞ Recall facts and basic concepts (define, duplicate, list, memorize, repeat)
Specific learning objective(s)	<p><i>Да разберат какво представляват пластмасите</i></p> <p><i>Да се запознаят с видовете пластмаси</i></p> <p><i>Да разберат какво прави пластмасите опасни за природата</i></p> <p><i>Да разберат какво са микропластмаси и какви са екологичните проблеми свързани с тях, както и как влияят на здравето на човека.</i></p>

<p>Cognitive, socioemotional and behavioural outcomes based on https://www.unesco.org/sites/default/files/2018-08/unesco_education_for_sustainable_development_goals.pdf</p>	<p>SDG 3 Good Health and Well-being</p> <p><u>Cognitive learning objectives:</u> The learner understands the socio-political-economic dimensions of health and wellbeing and knows about the effects of advertising and about strategies to promote health and well-being</p> <p>SDG 4 Quality Education</p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> - The learner understands the important role of culture in achieving sustainability. - The learner understands that education can help create a more sustainable, equitable and peaceful world <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> - The learner is able through participatory methods to motivate and empower others to demand and use educational opportunities. - The learner is able to recognize the intrinsic value of education and to analyse and identify their own learning needs in their personal development. - The learner is able to recognize the importance of their own skills for improving their life, in particular for employment and entrepreneurship <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> - The learner is able to contribute to facilitating and implementing quality education for all, ESD and related approaches at different levels. 2 - The learner is able to use all opportunities for their own education throughout their life, and to apply the acquired knowledge in everyday situations to promote sustainable development <p>SDG 12 Responsible Consumption and Production</p> <p><u>Cognitive learning objectives:</u> <u>The learner understands how individual lifestyle choices influence social, economic and environmental development.</u></p> <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> - The learner is able to envision sustainable lifestyles. - The learner is able to feel responsible for the environmental and social impacts of their own individual behaviour as a producer or consumer. <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> - The learner is able to plan, implement and evaluate consumption-related activities using existing sustainability criteria. - The learner is able to take on critically on their role as an active stakeholder in the market. 								
<p>Green skill(s) addressed</p>	<table border="0"> <tr> <td><input type="checkbox"/> Creative problem-solving</td> <td><input type="checkbox"/> Eco-design</td> </tr> <tr> <td><input type="checkbox"/> Monitoring skills</td> <td><input type="checkbox"/> Impact quantification</td> </tr> <tr> <td><input type="checkbox"/> Analytical skills</td> <td><input type="checkbox"/> Life-cycle management</td> </tr> <tr> <td><input type="checkbox"/> Pollution prevention</td> <td><input type="checkbox"/> Science skills</td> </tr> </table>	<input type="checkbox"/> Creative problem-solving	<input type="checkbox"/> Eco-design	<input type="checkbox"/> Monitoring skills	<input type="checkbox"/> Impact quantification	<input type="checkbox"/> Analytical skills	<input type="checkbox"/> Life-cycle management	<input type="checkbox"/> Pollution prevention	<input type="checkbox"/> Science skills
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<p>Duration</p>	<p>20 minutes</p>
<p>Structure and content of the lesson</p>	<p>Въведение</p> <p>Plastics are a group of materials, either synthetic or naturally occurring, that may be shaped when soft and then hardened to retain the given shape.</p> <p>Днес използваме пластмасови продукти многократно всеки ден. От фолиото за храна, бутилки, торбички до дограма и дрехи. Пластмасата може да бъде гъвкава или твърда, прозрачна или непрозрачна. Може да прилича на кожа, дърво или коприна. Да бъде превърната в играчки или сърдечни клапи. Има над 10 000 различни вида пластмаса. Пластмасите се получават главно от суров петрол, газ и въглища.</p> <p>Plastics are polymers. Полимерите са дълги вериги от повтарящи се молекули /наречени мономери/. The chain is made by joining, or polymerizing, at least 1,000 links together. Polymerization can be demonstrated by making a chain using paper clips or by linking many strips of paper together to form a paper garland.</p> <p>Наименованието на пластмасите се получава от представката поли- и химичното наименование на молекулата /мономера/.</p> <p>1 Видове пластмаси</p> <p>Известни са много видове пластмаси, но ние ще разгледаме само тези с най-масова употреба.</p> <p>PET polyethylene terephthalate - It is mostly used for food and drink packaging purposes due to its strong ability to prevent oxygen from getting in and spoiling the product inside. PET bottles are the most widely recycled plastic in the world</p> <p>HDPE Technical name - High-Density Polyethylene – it’s an incredible resistant resin used for grocery bags, milk jugs, recycling bins, agricultural pipe, but also playground equipment, lids, and shampoo bottles among others. HDPE is accepted at most recycling centers in the world, as it is one of the easiest plastic polymers to recycle.</p> <p>PVC - Polyvinyl chloride is the world's third-most widely produced synthetic plastic polymer. PVC is largely used in the building and construction industry to produce door and window profiles and pipes (drinking and wastewater). When mixed with other substances, It can be made softer and more flexible and applied to plumbing, wiring, and electrical cable insulation and flooring. Thanks to its versatile properties, such as lightness, durability, and easiness of processability, PVC is now replacing traditional building materials like wood, metal, concrete, rubber, ceramics, etc. in various applications. PVC is still hardly recyclable and should therefore be avoided, whenever possible.</p> <p>LDPE - It has the simplest structure of all the plastics, making it easy and cheap to produce. Used in plastic bags, six-pack rings, various containers,</p>

dispensing bottles, and most famously for plastic wraps, is not often recycled .

PP - Polypropylene is the second-most widely produced commodity plastic. Hard and sturdy, it can withstand high temperatures and is found in tupperwares, car parts, thermal vests, yogurt containers, and even disposable diapers.

PS - Polystyrene can be solid or foamed. It is a very inexpensive resin per unit weight and easy to create, for these reasons it can be found everywhere: from beverage cups, insulation, packing materials to egg cartons and disposable dinnerware. Perhaps better known by its commercial name – Styrofoam – it's highly inflammable and dangerous as it can leach harmful chemicals, especially when heated (which often happens because, as it's found in disposable take-out containers, people oftentimes microwave it to heat up the food inside it). Environmentally-speaking it's among the worst types of plastic: first, it is regarded as not biodegradable. Second, polystyrene foam blows in the wind and floats on water, due to its low specific gravity. Animals do not recognize it as artificial and may mistake it for food causing serious effects on the health of birds or marine animals that might swallow it. In addition, polystyrene is not accepted recycling programs. To sum up, it's a no-go.

OTHER PLASTIC - If plastic cannot be identified in the six types above-mentioned, then it will be included in group number 7. The best-known plastics of this group are polycarbonates (PC) used to build strong, tough products. Polycarbonates are commonly used for eye protection in the creation of lenses for sunglasses, sport and safety goggles. But they can also be found on mobile phones and, more frequently, in compact-discs (CD).

За да се осигури по-лесно разпознаване на пластмасите са приети международни стандарти за маркировка на изделията от пластмаса. Знака за маркировка е символът за рециклиране и цифра вътре в него, при възможност се изписва и буквено съкращение на пластмасата.



3. Защо пластмасите са опасни за природата

Пластмасите въпреки че се получават от природни продукти – нефт, газ, въглища те преминават през химични промени в резултат на различни химични реакции. За да бъде разградена материята се грижат микроорганизмите. Пластмасата, като продукт на химическата промишленост не може да бъде биоразградена. Единственото „разграждане“ на пластмасата става във времето, в следствие на нейното свойство стареене. Стареенето на пластмасата става под действие на

	<p>слънчевата светлина, при което тя губи своята еластичност, става чуплива и се раздробява на малки парчета. Поради това времето за разграждане на пластмасите е от 400 – 1000 години. В последните години се търсят варианти за създаване на биоразградими пластмаси и микроорганизми, които да разлагат полимерите.</p> <p>4. Микропластмаси</p> <p>Както споменахме по-горе пластмасата старее във времето, става чуплива и се разпада на малки парченца от тук се появява и микропластмасата.</p> <p>Microplastics, small pieces of plastic, less than 5 mm (0.2 inch) in length, that occur in the environment as a consequence of plastic pollution. Microplastics are present in a variety of products, from cosmetics to synthetic clothing to plastic bags and bottles. Many of these products readily enter the environment in wastes.</p> <p>Microplastic pollution has been detected in human blood (Damian Carrington, March 2022) for the first time, with scientists finding the tiny particles in almost 80% of the people tested. The discovery shows the particles can travel around the body and may lodge in organs. The impact on health is as yet unknown. But researchers are concerned as microplastics cause damage to human cells in the laboratory and air pollution particles are already known to enter the body and cause millions of early deaths a year.</p>
<p>References</p>	<p>Damian Carrington, March 2022 Microplastics found in human blood for first time</p>
<p>Interactive questions for R3</p>	<p>1. <i>Пластмасовите опаковки трябва да бъдат задължително маркирани със знак показващ вида на пластмасата</i> Истина Лъжа</p> <p>2. <i>Коя пластмаса е лека, лесно може да се разпилее от вятъра и не подлежи на рециклиране</i> PP PET PVC PS</p> <p>3. <i>Микропластмасата са изделия с малки размери продукт на нанотехнологиите</i> Истина лъжа</p>
<p>Keywords</p>	<p>Пластмаса, полимер, микропластмаса</p>

<p>Questions for reflection</p>	<p>1. Гледайте видеото с учениците и дискутирайте различният път на пластмасовите бутилки What really happens to the plastic you throw away - Emma TED-Ed</p> <p>2. Учениците прочитат статията у дома и в клас се провежда дискусия https://www.nature.com/articles/d41586-021-01143-3</p>
<p>Additional resources</p>	<p>https://www.aimplas.net/blog/plastics-identification-and-classification/ https://www.plasticsforchange.org/blog/different-types-of-plastic https://www.theguardian.com/environment/2022/mar/24/microplastics-found-in-human-blood-for-first-time How microplastics affect your health - YouTube</p>
<p>Icons & related info for the hints of the PowerPoint presentation</p>	<p><i>Please, insert here the icons and the related information that should pop-ups within the PPT as hints.</i></p>
<p>Author(s)</p>	<p><i>Desislava Tsokova, PGAZ – Vidin, Bulgaria</i></p>