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CIRCULAR ECONOMY

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1. INTRODUCTION

Debate topics
• Debate topic 1: Plastic packaging is vital in ensuring the hygienic preservation of foodstuffs. • Debate topic 2: All residents should be composting their waste. • Debate topic 3: 'Fast fashion' should be avoided at all costs.
Definitions
The **circular economy** aims to preserve the value of products and materials for as long as possible. As little waste is generated and as few resources are used as possible, and when a product reaches the end of its life cycle, it is used to create new value. As part of a **linear economic model**, resources are taken from nature and a product is then made, used and disposed of. Manufacturers turn no attention to whether or to what extent the product could be reused once it reaches the end of its life cycle. **Recovery** is the umbrella term for all of the processes that waste undergoes which primarily result in it being given a useful purpose, so that it replaces other materials (such as the natural resources that would otherwise be used) or is prepared so that it can replace other materials in production and in the economy more broadly. Recovery includes preparation for re-use, recycling and other forms of recovery (such as incineration with energy recovery). **Recycling** utilises waste. The waste is processed into products, materials or substances so that they can be used for their original or another purpose. Incineration (i.e. energy recovery) and processing as materials that are used as fuel or backfill are not classed as recycling. Examples of recycling are producing insulation materials from old clothes, terrace boards from plastic packaging and compost from food waste. Recycling has a narrower definition than recovery. **Re-use** utilises products or product components that have not yet become waste. Re-use means that a thing is used again for its original purpose. As such, re-use is a way of avoiding waste developing in the first place.

Introductory questions

1. What can you do to reduce waste?
2. What do you think is ‘fast fashion’ dangerous for the environment? How?
3. Why should we compost food waste?

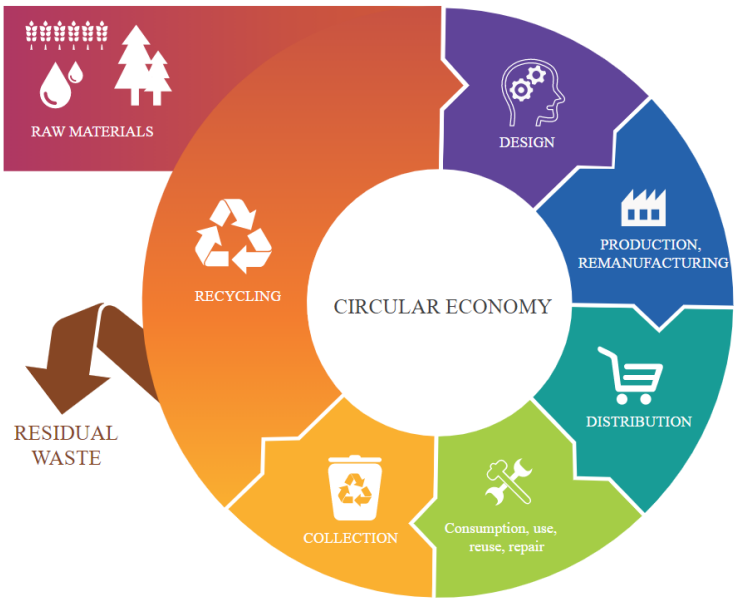
2. INFORMATION CARD

2.1 What does circular economy mean?

The circular economy as a concept is quite new, but its meaning is actually simple. This is best illustrated by comparing the circular economy with the ordinary, so-called straight-line or linear economy. Take a look at your pen. It probably required plastic, metal, ink, etc. to produce. Metal ore was mined and plastic was mixed with various other substances. Your pen may be made in China. Machines and energy were used to do this. The pens were then transported to shops all over the world, from one of which you got your own pen.

What happens to your pen when it runs out of ink? You probably throw it in the bin. And the pen ends up in a landfill or an incinerator. The life of a pen is straightforward: the raw material is collected, used and then thrown away.

If the pen was not thrown in the bin, but returned to the manufacturer, where all parts of the pen could be used to produce new pens (or other things), the life of the pen would be circular. In this case, from the outset, the manufacturer should think about how to make a longer-lived pen and how to reassemble old pens. The idea of a circular economy is that no material is lost; everything can be used over and over again.

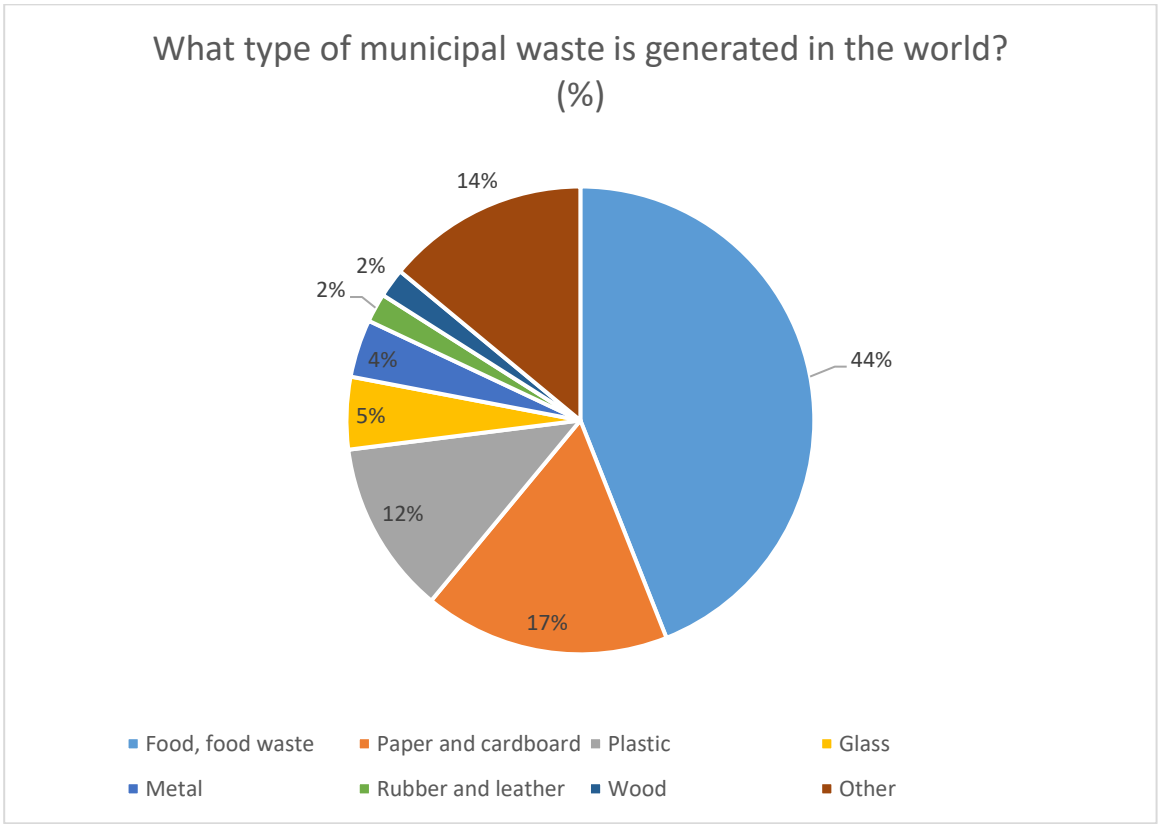


2.2 How much waste is generated in Estonia?

In Estonia, around 390 kg of waste is generated per capita per year, but in Europe, on average, this number is higher – over 480 kg per capita.

In 2018, more than 535,000 tonnes of municipal waste was generated in Estonia. The World Bank estimates that 2 billion tonnes of municipal waste is generated worldwide each year. Both in Estonia and in the world in general, it can be seen that more and more municipal waste is being generated. If we continue at the current pace, 3.4 billion tonnes of waste will be generated each year by 2050.

34% of the world's municipal waste is produced in countries with higher incomes (incl. Estonia), although according to the number of inhabitants, the share of these countries is only 16%. In high-income countries, the generation of municipal waste is much slower than in lower-income countries. This means that people who start with very low wages generally want to increase their consumption quickly in order to increase their wellbeing. However, when a society reaches a certain higher income threshold, consumption will be restricted again, for example, for worldview reasons (eco lifestyle, environmental concerns, etc.).



2.3 Sorting waste

Why do we talk use the word 'rubbish' in general conversation, but use 'waste' in official language? The word 'rubbish' indicates that these things cannot be reused, but are only suitable for disposal. The word 'waste' (materials which are left over from consumption) suggests that something else can be done with it.

In Estonia, separate collection or sorting of waste is mandatory. In general, waste is collected by type as follows: municipal waste, paper and cardboard waste, biodegradable waste, packaging. Which waste containers you have in your home depends on the region, the municipality and whether it is an apartment or a private house.

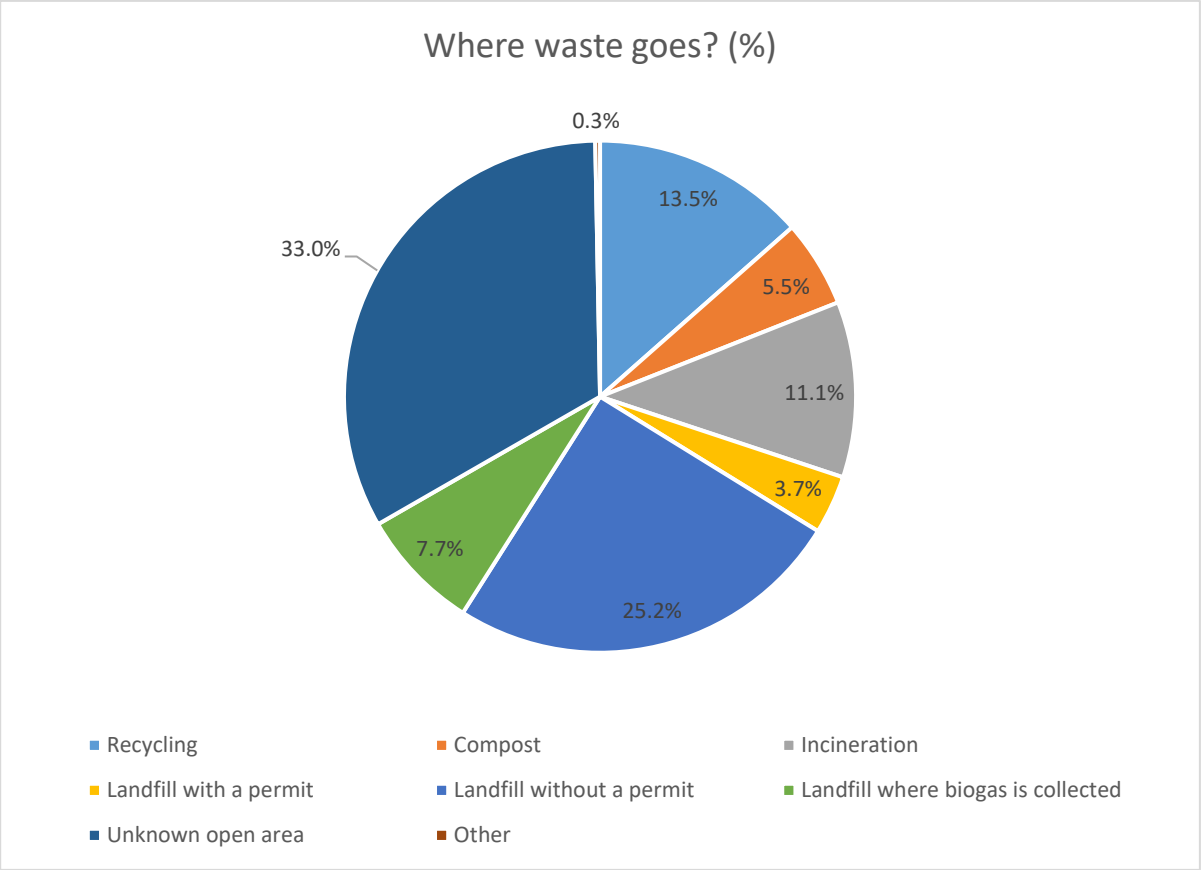
In recent years, it has been discussed in Estonia whether waste transport is currently perhaps too cheap and therefore some residents do not take waste sorting seriously. At present, waste trucks take away residents' paper and cardboard and clean packaging if they are collected separately from other waste.

Large waste items, such as broken furniture and metal, car tires and hazardous waste (paints, solvents, varnishes, etc.), must be disposed of separately. Computers and old electronics must be taken to waste collection points. All shops and service stations where batteries and accumulators are sold must also accept empty batteries and accumulators and have separate collection boxes for this purpose. Old medicines (especially prescription medicines) must be returned to the pharmacy.

2.4 How much waste goes into circulation?

In Estonia, 28.4% of household waste is recycled, meaning that these materials are reused. This is relatively low compared with other European countries – the EU average is around 46%. From 1 January 2020, at least half (or 50%) of municipal waste generated in Estonia must be recycled. Around 13.5% of the world's waste is recycled worldwide. It is worth noting that 5.5% of municipal waste is composted. More than half of the municipal waste collected in Estonia is incinerated, which produces electricity and heat. Therefore, in 2016, 56% of municipal waste was incinerated in Estonia, but in Europe only 26% on average.

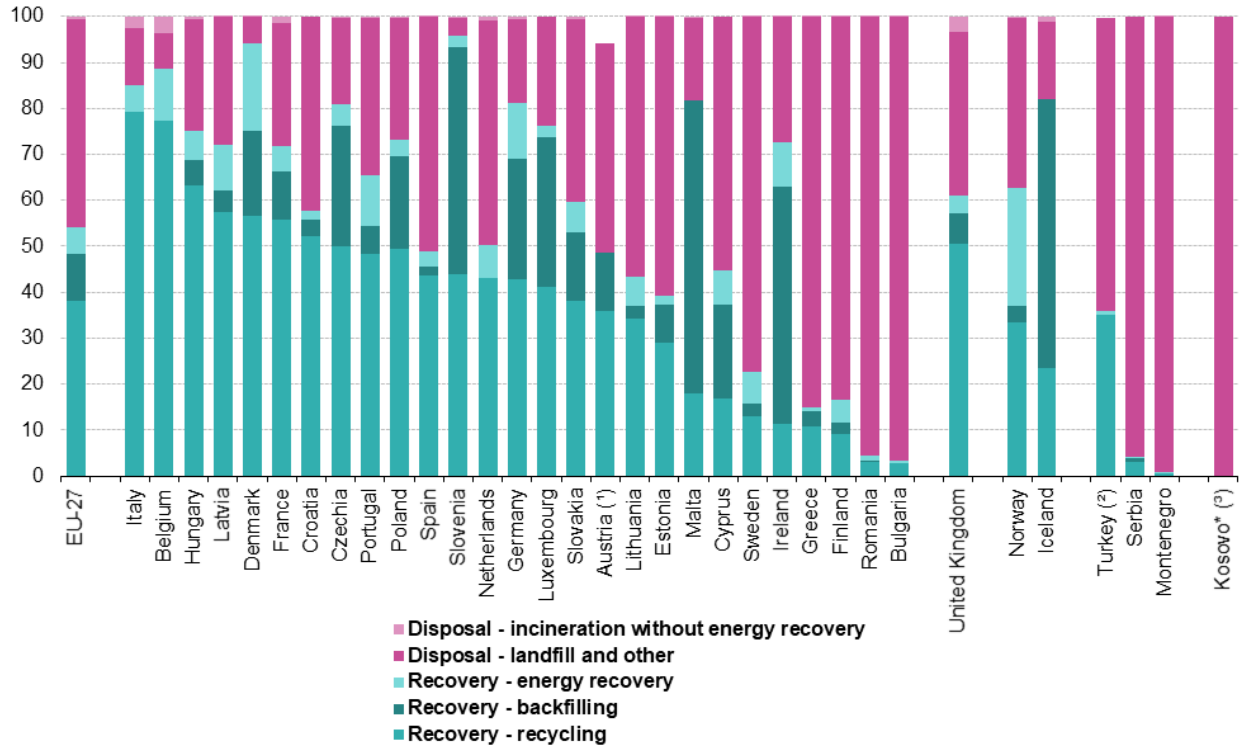
Compared with many other European countries, less municipal waste is landfilled in Estonia. According to European Union rules, no more than 10% of municipal waste should be stored (or landfilled) by 2030. If we look at plastic packaging separately, 26.5% is recycled in Estonia (the European average is 41.9%).



2.5 Waste treatment by type of recovery and disposal in EU?

In the EU-27 in 2018, more than a half (54.2 %) of the waste was treated in recovery operations: recycling (38.1 % of the total treated waste), backfilling (10.1 %) or energy recovery (6.0 %). The remaining 45.8 % was either landfilled (38.7 %), incinerated without energy recovery (0.7 %) or disposed of otherwise (6.3 %). Significant differences could be observed among the EU-27 Member States concerning the use they made of these various treatment methods. For instance, some Member States had very high recycling rates (Italy and Belgium), while others favoured landfill (Greece, Bulgaria, Romania, Finland and Sweden), see figure below.

Waste treatment by type of recovery and disposal, 2018
(% of total treatment)



(1) No data available for energy recovery and incineration without energy recovery.
(2) No data available for incineration without energy recovery.
(3) 2016.
* *This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.*
Source: Eurostat (online data code: env_wastrt)

eurostat

2.6 Which materials can be recycled?

Glass can be melted and reused almost infinitely. However, this consumes quite a lot of energy and it is not always possible to produce transparent glass because green and brown glass, for example, are mixed.

Metals can be recycled and reused very well. Waste includes mostly steel and aluminium cans. Aluminium beverage cans are recycled a lot because, although it is energy-intensive, mining aluminium ore (bauxite) is even more expensive.

Paper can be recycled, but not indefinitely. Each time the paper fibres become shorter and the paper quality decreases. For example, waste paper is finally used to press egg cartons.

The story is more complicated with plastic because there are many types of plastic material. Disposable plastic beverage bottles (or PET bottles) are quite easy to recycle and are therefore collected in Estonia as deposit packaging. However, most plastics, such as plastic bags, are generally not recycled because they are usually dirty and the recycling process is too expensive.

Fabric can be recycled, but unfortunately not much is done at the moment. It is estimated that only 1% of waste fabric is turned into new clothing. The problem is, for example, that fabric waste is not collected separately from other waste and can be costly to recycle.

2.7 Deposit packaging

In Estonia, most plastic, metal and glass beverage packaging can be returned via a vending machine and the deposit (10 cents per package) can be returned. This way, up to 90% of the deposit packages are collected.

The packaging then goes to recycling, for example, metal cans are taken to the UK. This system has been operating for 10 years now.

When more Estonians started buying drinks from Latvia, the possibility of a common deposit packaging system for Estonia and Latvia was discussed. This would mean that beverage packaging purchased from Latvia could be sold in Estonia and vice versa. According to the plan, the common system may start in 2022.

In many Western countries, including the United Kingdom and the United States, a similar type of system works in only a few regions. The type of beverage packaging collected and the amount of money returned differs. But in general, experience has shown that people are willing to bring bottles and jars to a collection point for money.

In the United States, large beverage producers such as Coca-Cola and Pepsi oppose the deposit system, although they occasionally provide money for smaller rubbish collection campaigns. Coca-Cola has also promised that by 2030, all of their packaging will be made from at least half recycled plastic. However, since 1987, no US state has been able to pass the laws of the deposit system. It is estimated that it would cost the beverage industry billions of dollars to set up a deposit packaging system, and they simply do not want to bear the cost.

2.8 How big polluter is the clothing industry?

No one is arguing that people don't need clothes. However, the global clothing industry, which has been growing for decades, now emits 1.2 billion tonnes of greenhouse gases a year. This is more than international air and shipping combined.

To calculate greenhouse gases, the amount of resources spent on fabric production, dyeing, sewing, storage, transport, etc. is estimated. It is estimated that 4% of the world's clean drinking water is used to produce the fabric needed for an entire year.

Fast fashion means, for example, that the Zara brand brings 500 new types of clothing to customers every week. People now buy 60% more clothes than in 2000. However, it is estimated that as many as 40% of purchased clothes remain in the closet and are not worn. New things are introduced very quickly. Half of all fast fashion products will end up in a landfill within less than a year. Less than 1% of used clothing material goes to the production of new clothes.

As used clothing and excess fabric are not widely recycled, an estimated €450 billion a year is wasted. For comparison, the Estonian yearly state budget is around 12 billion euros.

In 2015, 97% of the raw materials in the clothing industry were completely new and 53 million tonnes of fabric fibres were produced. 73% of this later went to landfill or was incinerated.

2.9 Which fabric is more environmentally friendly?

63% of the world's fabrics produced annually are synthetic fibres, 26% cotton and 11% other. Broadly speaking, fabric fibres can be divided into two groups: manmade fibres and natural fibres.

Manmade fibres include manmade fibres whose raw material cellulose is obtained, for example, from spruce, beech and eucalyptus trees. Synthetic fibres covered by manmade fibres (polyamide, polyester, acrylic) are produced from petroleum.

Synthetic fibres are very durable and light, but they do not absorb much moisture, give a stimulus and become topical. Around 1900 microfibers are released from a synthetic garment in one wash, which can reach the sea. The production of cellulose-based fibres (viscose, modal, lyocell) requires quite a lot of chemicals. If the work in the factory is not well organised, some chemicals can harm workers or end up in nature.

Natural fibres are cotton and flax, but also animal fibres such as wool. Growing cotton and producing fabric from it requires a lot of water; moreover, quite a lot of pesticides or chemical plant protection products are used. Organic cotton has fewer pesticides, but they are still used. Cotton absorbs moisture well and is comfortable against the skin but wrinkles easily and can become mouldy. Wool retains heat very well, but wool needs careful maintenance. While 278 hectares are needed to produce 1 tonne of wool fibre (from sheep), only around 1 hectare of land is needed for 1 tonne of cotton fibre.

2.10 The clothing industry provides jobs

It is estimated that the clothing industry employs more than 300 million people worldwide. The clothing industry generates huge revenue for many countries around the world.

Although clothing production has moved from Europe to Asian countries with larger populations and cheaper labor, in 2012 there were still 1.8 million workers in the textile and fashion industry in Europe. For example, 79% of Bangladeshi, 52% of Cambodian and 43% of Sri Lankan exports are clothing.

The majority of workers in the fabric and clothing industry are women – an estimated 68% worldwide, but in some countries, it can be as high as 90%. In lower-income countries, the fabric and clothing industry is generally considered suitable for women and often does not require much skill. The skills required for work are studied on site. In some countries, this is one of the few opportunities for women to work and earn a salary.

However, working conditions and wages are a very big problem. Factories work overtime, workers are not allowed to rest, it is often hot, there are too many workers and the site might be dangerous. In 2013, the Rana Plaza garment factory collapsed in Bangladesh, killing more than a thousand people. H&M clothes were made there, for example.

It may still be the case that children are employed in factories. According to 2014 data, employees in the clothing industry in Bangladesh, Cambodia and Sri Lanka earned less than 90 euros per month. But in Spain, a worker in the same field earned at least €752.

2.11 Plastic and plastic waste

Plastics are synthetic materials whose name comes from the fact that these materials are flexible, mouldable ('plastic'). Fossil fuels are used in the production of plastics.

In 1869, the first semi-synthetic plastic was produced, using cellulose to replace ivory in the production of billiard cues. Plastic was cheaper and also more sustainable. Today, there are many types of plastic: such as PET, which is used to make beverage bottles; thermoplastics that withstand heat; bioplastics made from corn, etc.

The triumph of plastics began as early as World War II – it seemed that wonderful materials had been discovered that were easy and cheap to produce, could make absolutely anything and were safe to use. From the late 1960s, plastic things began to take on the meaning that they were something cheap and counterfeit. But the production of plastics grew. Nowadays, most of the things around us are made of plastic, at least to some extent. In 2018, researchers reported that 91% of the plastic produced worldwide has not been recycled or destroyed. This means that virtually all of the plastic produced in the last 50-60 years is still on the planet.

Disposable plastic products are increasingly being banned worldwide, for example, disposable plastic bottles, straws, cotton swabs, etc. are banned in the European Union from 2021. By now, we know that very small plastic particles (micro- and nano-plastics) are everywhere – in the Arctic ice, in the oceans, in tap water. Researchers are still investigating whether and to what extent human and other animal health will be affected.

2.12 Prohibited and taxed plastic bags

Along with the ban on disposable plastic items, the use of plastic bags has been restricted in various countries. It has been calculated that one plastic bag is used for only 12 minutes but will remain in the environment for a thousand years. It is estimated that 500 billion plastic bags are used each year. At the same time, the average American uses around 400 plastic bags a year, while the average Dane uses only four.

Many countries have set a price for (thinner) plastic bags – they are no longer available free of charge in shops. You need to pay for plastic bags in Estonian shops. In France, for example, plastic bags have been banned since summer 2016. It sounds harsh, but it means that shops are not allowed to use the thin, transparent plastic bags (less than 10 litres and less than 50 microns thick) usually seen on fruit counters. Plastic bags are also banned in India and several African countries.

Ireland introduced a price of 15-euro cents for thin plastic bags in 2002. In 2007, this was raised to 22 cents. In 2012, statistics showed that while initially one resident used almost 350 plastic bags per year, after the introduction of a fee for plastic bags, one resident used 14 plastic bags per year.

Although plastic bags are only part of plastic pollution on whole, biologists have found evidence that plastic bags are deadly to marine animals and birds who might eat them or are being trapped.

2.13 What to use instead of plastic?

Scientists, engineers and designers around the world are looking for completely new alternatives to the use of plastics, especially in food packaging. At Samara University of Technology in Russia, researchers have made drinking cups made from pureed fruits and vegetables. The drinking cup is edible – the taste will be like the fruit from which it is made. Boiling water can be poured into the cups. These vessels must initially reduce astronauts' food packaging waste. Indonesian start-up company Evoware has made food wrapping material from seaweed. For example, a hamburger can be eaten with such a wrapper. This seaweed material can be used, for example, to make instant noodle seasoning bags that dissolve safely in hot water. The necessary seaweed can be grown in coastal water. In addition, the company makes fig resin shampoo packaging that can be composted.

However, a London team invented a device that can be used by restaurants and hotels on site to pack, for example, ketchup or shampoo in small Delta packages. Packages are edible and biodegradable but because they contain liquids, they do not last long. In Sweden, testing is underway with containers made of cellulose. For example, a soup manufacturer can place freeze-dried vegetables and flavours in a container. The consumer adds hot water to the container, the container expands into a soup bowl and can be composted after eating. One US company is passionate about detergent capsules that dissolve in a washing machine. The company would also like to package food, such as rice and pasta, which is cooked in water, in similar polymer packaging. They do not give any additional flavour and authorities consider such polymers to be safe in food. In addition, efforts are being made to invent packaging that simply consumes less material or that can be returned and reused.

2.14 Is it really biodegradable?

At the 2019 Song and Dance Festival, disposable tableware made of cellulose and corn was used instead of plastic disposable dishes. 180,000 portions of soup were distributed at the festival. It was later revealed that all of these containers, which were called biodegradable, were sent to Finland for recycling instead.

In fact, not all items that the manufacturer calls 'biodegradable' or 'compostable' are in fact easily degradable. Instead of petroleum products, bio-based plastics are made from maize or sugar cane, for example. However, not all items made from bio-based plastics are biodegradable, but may need to be recycled in the same way as regular plastic.

Bio-based plastic items that really break down in compost are marked with, for example, OK Compost or The Seedling. But these labels also mean that items cannot be composted at home, but need to be composted industrially. Industrial composting takes place, for example, at the Jõelähtme, Väätsa and Paikuse landfills and the Pärnamäe waste station – household biowaste is also transferred to them. There is space for composting – the shredded compost is mixed often and kept moist and rich enough to decompose quickly and properly. In such compost, the temperature rises as high as 70 degrees.

It is not really worth composting bioplastics at home because it is not possible to ensure such a high temperature or mix the compost so often. It is also worth remembering that biodegradable objects in a landfill do not decompose because there are no necessary conditions.

2.15 Food waste

An estimated 88 million tonnes of food are wasted in Europe each year – an average of 173 kg per person. Food is wasted in farms, production, shops, restaurants and homes.

At the same time, it is perhaps surprising to some that Estonia is quite high on the 'food waste list': in Estonia, a total of 265 kg of food per person is wasted per year; more is wasted in only three countries (Cyprus, Belgium and the Netherlands). In Latvia and Lithuania, the figure is only 110-119 kg. More than half (53%) of all food is wasted at home – food is simply thrown away.

A more detailed study of what is happening at home found that one person generates 54 kg of food waste at home during the year, of which 19.5 kg is wasted food. Estonian school canteens

waste 1400 tonnes of food a year or around 9 kg per student. In most cases, either too much food was cooked or students took more food on their plate than they could actually eat.

People should differentiate between 'best before' and 'use by' dates, as they have different meanings. 'Best before' means that the food can be eaten after the stated date, but it may no longer have the best taste or texture. It is certainly not dangerous to eat.

'Use by' means that the food is fit to eat until that date, but after that, it is quite likely to become bad soon, even if stored properly in the refrigerator.

2.16 Composting biowaste

According to the data of the Statistical Office of the European Union, only 14 kg of bio-waste per capita is recycled in Estonia per year. However, the average of the 28 Member States of the European Union is 81 kg per capita. Although separate collection of waste by type (incl. bio-waste) is mandatory in Estonia, it is not yet possible to compost large-scale bio-waste industrially in Estonia (also see Information Card 13). There is growing talk that households should compost bio-waste themselves.

In Estonia, a pile of compost is still kept in private houses and farms in the corner of the garden – potato peelings, weeds and other food residues thrown there will soon become valuable fertiliser for plants. A survey conducted in 2015 showed that half of the residents who collect bio-waste separately put it in a bio-waste container. These are emptied by waste companies. Less than half of people compost in their garden corner and only 6% compost in a personal or apartment-owned composter.

If in a private house you can have a garden with a compost bin, then in apartments it is a bit more complicated. However, a survey conducted in autumn 2019 showed that at least half of apartment associations would like more information about composting. Several Estonian companies have also developed compost bins that can be used inside apartments.

2.17 Food packaging

The purpose of food packaging is to protect and preserve food until it reaches the consumer. Most food packaging is made of plastic, which is easy to produce, light and hygienic. The type of packaging depends on the food, for example, whether the food is better preserved in vacuum or gas packaging. Microbes cannot develop in airtight containers and the taste and appearance of food do not change.

On the other hand, disposable plastic packaging is not widely recycled (see Fact Sheet 5), decays only after hundreds of years (but is still unexplored; also see Fact Sheet 10) and, in most cases, simply ends up in landfills or in nature. Certain types of plastic start to emit hazardous substances when heated, and food colours used on packaging can also be a problem. For example, PET bottles filled with water and soft drinks must not be left near a stove or in the sun, as toxic substances will be released. Otherwise, the drinker feels the 'plastic taste' of the drink.

Glass food packaging is usually much heavier and can break during transport. However, recycling glass and metal cans is much easier (see Information Card 5).

More and more so-called packaging-free shops are being established in the world, where it is possible to buy food by weight in your own bag or container. For packaging food at home, cloths covered with beeswax, for example, are also used, in which cheese and sandwiches can be wrapped.

3. STORY CARD

3.1 Reet Aus decided to do something with scraps of fabric

Have you seen someone wearing a shirt with a big arrow on the street or at school? You may already know that this was designed by Estonian fashion designer Reet Aus (born in 1974 in Tallinn).

In five years, 60,000 arrow shirts have been produced and, according to several people in fashion, it is one of the most recognisable and popular Estonian fashion shirts. The arrows are made of scrap fabric – pieces of leftover fabric – and therefore the shirt consists of pieces of around 30 cm. These pieces must be cut out by hand and sewn together.

In the mass production of fast fashion garments, it is quite common to have approximately

18-20% fabric or more. Reet Aus began to look at how to make the best possible use of the fabric scraps. To do this, he visited factories in Bangladesh, researching how clothes are made and also watching how fabric waste ends up in landfills. She confessed it has been very difficult to see. "I went to my hotel room, closed the door and thought I won't go out anymore," she says. "But then I realised that when I go with emotion, I can't do anything. We need to focus on what I can do."

Now, Aus has created software and the principles by which companies in the clothing industry can start using fabric waste. The arrow shirts made in Bangladesh, but so are the 2014 Song and Dance Festival shirts. Denim bags made from fabric scraps are sold in Rimi, but other clothing collections made from fabric waste can be found in various department stores and design shops.

3.2 Big brands destroy their unsold products

British fashion brand Burberry, also considered a luxury brand, burned more than €35 million worth of clothing, accessories and perfumes that could not be sold in 2017. This was not the first time – around €100 million worth of goods have been destroyed in five years.

Why did Burberry do this with its own products? On the one hand, like many other luxury fashion brands, Burberry needs to produce more and more goods to increase sales and earn more profit for the owners.

On the other hand, customers expect luxury brand products not to be easily accessible to everyone, otherwise they will lose the feeling of having bought something really 'luxurious'. Burberry also feared that stolen items would be sold or would reach the market so cheaply that the brand is considered less valuable.

Environmentalists were angry about this because it was a waste of everything. Burberry is by no means the only one who does this. In spring 2019, French journalists discovered that Amazon destroys many products they have not been able to sell. Moreover, the French Prime Minister announced that such action would be banned in the country within the next four years. Amazon also responded quickly and promised to donate unsold goods to charity from now on.

3.3 Eco-friendly bamboo cups scared people

If you want to buy a coffee, it is usually placed in a disposable coffee cup. As plastic is used inside the cup so that the coffee does not seep through as well as in the lid, it is generally not recycled, but ends up in an incinerator or a landfill. Or in nature if the cup is not properly disposed of in the bin.

More and more reusable coffee cups made of steel, plastic, glass or even bamboo are being sold. In Estonia, Ecoffee brand bamboo tops are most often seen, which were initially also advertised as biodegradable. These cups have many beautiful patterns, which probably makes them even more popular.

In summer 2019, a German consumer organisation tested whether the bamboo cups on the market are actually biodegradable and safe to humans. It turned out that such cups do not really decompose. The cups are produced as follows: the bamboo is ground into a powder and glued together into a cup. Bamboo 75%, glue 25%. The German study showed that pouring hot coffee into a cup releases substance from the glue that irritate the body and are harmful in large quantities. In conclusion, it was recommended to completely avoid bamboo cups and choose a steel cup instead.

Bamboo cup manufacturers disagreed with the results and claimed that the substances are released within the normal range. Ecoffee also updated the information on its website and now recognises that cups are not biodegradable and that the drink should not be too hot. The Estonian Veterinary and Food Board stated that the producer must state correctly and clearly how the cups should be used, and these instructions should also be followed by the user.

3.4 How a youngster started living a waste-free life

Student Liisa Aavik became more widely known in autumn 2018 when she spoke on Estonian Television about how she has lived without waste for a year. Around the same time, she also started to keep a blog 'Closed Circle', where she writes about this in more detail.

Liisa says that she always considered herself an environmentally friendly person. After a conversation with a friend who went to a packaging-free shop several years ago, she realised that she might not be so environmentally friendly after all. Until now, she had not thought that it was not enough to simply pick up rubbish from the ground, but that it would be better to reduce or even prevent the generation of waste. The truth is that a large part of packaging waste comes with us when we go shopping because most of the food is carefully packed in plastic.

On the TV show, Liisa showed how she goes to the store to buy food with different sized bags, jars and boxes in which to put food. Sometimes salespersons are surprised to see this. "It is very important not to start asking in the shop if you can get it in this jar maybe… You have to say: Hello! Please give me 200 grams of this cheese in this jar. And then no one says anything!" encourages Liisa.

3.5 Cup circuit created confrontation in Tartu

In summer 2019, four Tartu bars agreed to start selling drinks to customers in reusable plastic cups.

The concern of the bars was that customers tended to break the glasses or leave the bar with a glass. Disposable plastic cups were often left floating on the street instead, especially when a customer went from one bar to another during the evening. These four bars ordered 10,000 reusable plastic cups from China with all four logos on them.

The idea was simple: when a customer buys a drink, it is poured into a cup and the customer pays a deposit of 2 euros in addition to the price of the drink. When they return the cups to the bar, they also get 2 euros back. In August, they started to serve drinks in these new cups.

In autumn, however, officials from the city of Tartu announced that cup circulation like this cannot be arranged. According to them, the problem was that people wanted to walk between these bars and have a drink from a cup. However, alcohol use on city streets is not permitted. Otherwise, the officials had nothing against the circulation of cups. The decision came to bartenders very unexpectedly; they wanted the cup circuit to apply to all bars in the city.

In this story, two understandings collided: the bartenders were worried about waste, but officials about public policy rules. By November 2019, the city and the bartenders had not yet found a solution to the problem.

3.6 Plastic bag – from the savior of nature to killer

The plastic bag was made in the early 1960s in Sweden by the company Celloplast. When trade after World War II began to redevelop, it was most common in shops to place goods in a paper bag. As more and more people started buying, more and more paper bags were needed and it was necessary to cut down trees for production.

In Celloplast, a polyethylene plastic bag with handles was allegedly invented, precisely to save trees. It was lighter than a paper bag back then, but able to carry a load 1000 times heavier than its own weight. Another advantage was that, unlike a paper bag, which gets wet, the plastic bag was durable and reusable.

In the late 1970s in Europe, the paper bag was predominantly exchanged for the plastic bag. From 1982, when two larger US supermarket chains decided in favor of plastic bags, the plastic bag became popular worldwide. It is estimated that 2 million thin plastic bags are used per minute worldwide.

The inventor of the plastic bag is thought to be Swedish engineer Sten Gustaf Thulin, who worked at Celloplast. "It seemed strange to my father that people were just throwing plastic bags away," said his son Raoul Thulin in an interview with the BBC. "He always carried a folded plastic bag with him. Nowadays, as we know, we are encouraged to take a bag with us when going shopping. He did this already, of course, in the 1970s and 1980s." In fact, it is not certain whether Thulin invented the plastic bag entirely himself. Apparently, several Celloplast employees were behind it, though it was agreed that the plastic bag patent application would be filed on his behalf.

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4. QUESTION CARDS

QUESTION CARD 1	QUESTION CARD 2	QUESTION CARD 3	QUESTION CARD 4
Would you be prepared to not upgrade your phone for the latest model solely because it would be damaging to the environment? Why?	Why should you avoid buying clothes from 'fast fashion' chains?	Why do you think 'fast fashion' chains are so popular and widespread?	To what extent does sorting rubbish affect your ecological footprint and impact on the environment? What about if you don't sort it?
QUESTION CARD 5	**QUESTION CARD 6**	**QUESTION CARD 7**	**QUESTION CARD 8**
Is it more environmentally friendly to opt for a plastic bag or a paper bag when shopping? Why?	Who should be responsible for reducing the amount of plastic packaging we use? a) Consumers themselves: they should opt for goods that aren't pre-packaged or favour glass or paper over plastic. b) Food producers: they should be able to package goods without having to resort to plastic.	It's been calculated that 40% of the clothes people buy never get worn. Do you think that's true of Estonia, too? Why?	Why aren't 'eco' products always the best option? Give an example.

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QUESTION CARD 9	QUESTION CARD 10	QUESTION CARD 11	QUESTION CARD 12
"I'm not rich enough to buy cheap things." What does that sentence mean?	Why do Western countries send a large proportion of their sorted waste (including plastic packaging) to less affluent Asian countries for reprocessing?	Is 40 euros expensive for a T-shirt? Why?	The clothes you're wearing today – where were they made? Does it make any difference to you where they came from? Explain why or why not.
QUESTION CARD 13	**QUESTION CARD 14**	**QUESTION CARD 15**	**QUESTION CARD 16**
In your view, would buying unpackaged food from a store be mission impossible? Discuss how you could try living for a week packaging-free.	Do students in Estonia obsess about material possessions and want a lot of things or not? Why?	What could the drink bottles of the future be made from?	In your view, would it be possible to compost biowaste in apartment buildings? What would be the benefits? What might get in the way of it happening?

5. WORKSHEETS

Topic
CIRCULAR ECONOMY
Resolution
Choose the debate resolution

Prepare a set of arguments and group them into those that are clearly PRO the resolution, AGAINST the resolution and those arguments that can be used by both sides. Enter them in the appropriate places in the table.

PRO	DEBATABLE	CON

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Prepare arguments for the discussion. One group of students prepares arguments supporting the resolution, the other one has contradictory arguments. Use the proposed scheme.

ARGUMENT NO. 1.

Argument	Foreseen rebuttals of the other group	Answers to rebuttals

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ARGUMENT NO. 2.

Argument	Foreseen rebuttals of the other group	Answers to rebuttals

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Worksheet for the public

Name and surname: ……. Class: ……. Team: proposition/opposition

During the debate, hear and observe carefully the speeches of the debates from the other team. Then, evaluate which speech convinced you the most and which areas of your opponents' speech should be improved.

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1. In terms of **argumentation (**e.g. the quality of the arguments presented, credibility of the data and scientific evidence) in the rival team I was most convinced by the speaker No. .....

Reason:

……

……

……

2. In terms of **the style of presentation and communication with the audience** (e.g. confident, persuasive, authentic and dynamic posture, moderate gestures, assertive voice variety, good eye contact with the audience, use of moderate humor, friendly and professional approach to all participants, effective use of body language) in the rival team I was most convinced by the speaker No. .....

Reason:

……

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……

Indicate the element of the rival team's performance that requires improvement. Justify your answer.

……

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Reason:

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Circular Economy

Recommendations for teachers on using teaching materials

The educational package "Circular economy" was developed within "Oxford debates for the education of young people in the field of mathematics and science" project.
It is a key material, facilitating the achievement of primary project goals, including increasing reasoning skills and interest in STEM, which in the future may result in taking up a scientific career.
When preparing students for the debate, one should not neglect the development of such skills as communication excellence, argumentation or public speaking. Students should improve their ability to persuade effectively, argue properly, reason accordingly and speak out correctly. Composition of texts, using rhetorical means in oral statements, speaking in accordance with the rules of language culture, text interpretation, public speaking and presentation of texts, discussions and negotiations are of equally high importance.
In order to achieve the abovementioned goals, the implementation of thematic educational packages should be preceded by classes dedicated to preparation for debating as such. This can be accomplished in consultation with teachers of other subjects and the class teacher. The development of basic communication skills can be included in the class teacher's work plan, and the prepared lesson plans can be used during regular classes. Auxiliary materials can be found in the following documents:

- Warm-up practice – Frameworks for implementation of Oxford debates in STEM in school practice ;
  This document includes the following exercises: active listening, public speaking and debating skills and lesson plans.
- Methodological Guide for Teachers. ODYSSEY: Oxford Debates for Youths in Science Education

The teaching material pack includes the following:

- Student worksheet for drafting arguments,
- Information, story and question cards
- links to additional materials
- scientists' video.

Ideally, 2-3 hours should be taken per pack in order for the students to grasp the essentials of fact-based debating. The first lesson should focus on what debating entails (assuming that the

students have no experience of it). The second lesson should make use of the materials in one of the themed packs. For the second lesson there are two possible lesson plans - A) can be used if the students are already well familiar with the topic and/or debating, B) is more structured and better from starting from the very beginning. The third lesson should then include an actual debate. If you don't have enough time to give feedback on the debate during the lesson, you can do so during the following lesson.

Albeit the environmental topics within the materials are covered quite broadly, depending on your region you might need to give your student some additional information (links to newspapers, homepages, videos) regarding your own locally relevant topics. For example, the invasive species for biodiversity package in your region might be completely different or perhaps the energy can be produced by means other than the ones that have been covered in the materials (perhaps instead of oil shale in your region geothermal energy, oil or coal plays an important role).

Below you will find lesson plans you can use, adapting them to your group and your particular aims. Once the debates have been held, we look forward to your feedback on the themed packs and other materials. Enjoy some lively debating!

Lesson Plan 1: Introduction to Debating

During the first lesson, the students are introduced to the format of debates. We recommend that you practise drafting arguments and thinking about likely counter-arguments and how to rebut them. The student worksheet included in the pack will be of help.

Lesson aims:

By the end of the lesson, the students know:

- what debating is; and
- what an argument is.

By the end of the lesson, the students understand:

- how a debate is structured.

By the end of the lesson, the students are capable of:

- drafting, supporting and rebutting arguments.

Lesson preparation:

- Remind yourself of what you learnt during your debate training.
- Print out the student worksheets.
- If you wish to, laminate the worksheets (so that they can be re-used if the students write on them with felt-tips).

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Lesson Plan 2, Option A: An Introduction to Circular Economy

For the second lesson you can prepare the materials of circular economy. Remind the students of what they have learned so far in regard to them, explain the key terms and their definitions and set out the problem. You could also have the students watch the scientist's video lecture that forms part of the teaching materials. Look at the information, story and question cards together, which you will also find among the teaching materials. Point out that the students can use these cards, as well as their own notes, during the debate. You don't need to discuss the actual topic yet – simply provide an overview of the themed pack. At the end of the lesson, choose a specific topic for debate to continue with in the following lesson. As a home task, get the students to search for extra information. Links can also be added as part of the additional information for the topic in the e-school for them to investigate.

Lesson aims:

By the end of the lesson, the students know:

- the key terms associated with the topic and their definitions; and
- the nature of and background to the problems.

By the end of the lesson, the students understand:

- the structure and use of the materials in the themed pack.

By the end of the lesson, the students are capable of:

- navigating their way through the materials in the themed pack.

Lesson preparation:

- Prepare the video lecture (which you will find among the teaching materials).
- Print out the relevant information, story and question cards and cut them to size as indicated.
- Add links for the given topic to the e-school for the students to investigate at home.

Lesson Plan 2, Option B: An Introduction to Circular Economy

Divide the class up into groups of three, who are then given topics for debate. Note: Keep one topic of debate as a spare – don't give it to the students.

Activities prior to preparing for the second lesson (i.e. up to the home task):
Distribute the information and story cards among the students so that each group has one of each. Depending on the age of the students, familiarity with the topic etc you can decide on if

you a) give each group all the cards; b) decide to divide the cards between the groups; or c) give each group just a specific selection of cards. You as the teacher know your student's abilities the best. Depending on your students you can have them work on the cards as a group by discussing all the cards together (this is preferred) or even have them divide the cards between them. The links provided in the additional material should also be made available to the students online ahead of the lesson. Get the students to familiarise themselves with the topic on their cards. Set them the following task:

On your own, read your information and story cards. Read them through first, then take a look at some of the sources listed in the additional materials (such as watching a video or reading an article). Then note down the following about the card:

- *What are the 2-4 most important facts on the card?*
- *Look at the topic of debate given to your group. Decide whether the facts you have noted down support the topic or rebut it.*

During the lesson:

Have the students sit in their groups. Give each student two minutes to introduce to their group their card and the facts listed on it. Here, the students need to explain to the other members of their group what decision they came to regarding the facts, i.e. whether the facts support the topic or rebut it.

Remind the whole class what they have learned so far about the themed pack, repeat the key terms and their definitions and help the students link the information from their cards to the information they have obtained from the other members of their group. If needed use the "worksheet for the public" in the end of student's thematic packages where other students who listen to the debate can evaluate which speech convinced them the most.

Watch the scientist's video lecture (or other videos among the teaching materials that seemed the most interesting to the students) during the lesson.

By this point, the class should be quite familiar with the topic. Use the question cards to repeat what they have already learned from the information and story cards. Ask the students questions and let them take a standpoint in regard to them. If the classroom space allows, you can even do this physically – for example, dividing the room in two using tape on the floor, with one side being 'Yes' and the other side being 'No', and having the students choose one or the other depending on their standpoint. Give all of the students on the same side of the line 30 seconds to decide what their main argument is and why they think so.

Also take a couple of minutes to discuss whether the topic seems straightforward or complicated to them, giving them the chance to air their views and argue over them. Allow them the opportunity to say what the most interesting thing they have learned during the lesson is.

At the end of the lesson, inform the students what the topic of debate for the next lesson will be (i.e. the one you previously held back as a spare). Point out that the students can use the

cards they looked at in the lesson, as well as their own notes, during the debate. Ask the students to start working on worksheet 1 and worksheet 2, so they can try to create the arguments, rebuttals and answers. At this point they can try it out for themselves and you can support them as they find out what is most difficult for them.

As a home task, get the students to search for extra information. Links can again be added as part of the additional information for the topic in the e-school for them to investigate. The students should finalize the worksheets as groups as a home task (away from other groups that could otherwise hear their arguments).

Lesson aims:

By the end of the lesson, the students know:

- the key terms associated with the topic and their definitions; and
- the nature of and background to the problems.

By the end of the lesson, the students understand:

- the structure and use of the materials in the themed pack.

By the end of the lesson, the students are capable of:

- navigating their way through the materials in the themed pack.

Lesson preparation:

- Select the themed pack to investigate.
- Print out the relevant information, story and question cards and cut them to size as indicated.
- Put together three-member groups.
- Distribute the topics of debate among the groups. Note: Keep one topic as a spare.
- Distribute the cards within the groups.
- Add links for the given topic to the e-school for the students to investigate at home.

Lesson Plan 3: debate on „Avoid ‘fast fashion’ at all costs“

The third lesson sees the students start debating. Randomly divide the students up into ‘Yes’ and ‘No’ camps. You can use the information, story and question cards and the students’ own notes on the student worksheet as supporting material. The duration of the Odyssey debate class format is 45 minutes, but factor in the time it will take to give feedback (giving it in the following lesson if possible). You can get the rest of the class involved in assessing the performance of individual debaters by getting the students to listen to them carefully and make notes during the debate. Worksheet 1 and Worksheet 2 are for the help for the teacher.

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Lesson aims:

By the end of the lesson, the students understand:

- how a debate is structured; and
- their role in the debate.

By the end of the lesson, the students are capable of:

- applying topic-appropriate knowledge in a debate format;
- expressing themselves clearly and comprehensibly (including in terms of their diction);
- predicting counter-arguments; and
- supporting their own arguments and rebutting others.

Lesson preparation:

- Set up the classroom for the debate, rearranging the desks and chairs as necessary.
- Prepare the required information, story and question cards (using ones that have not already been used if possible, or printing out new ones).
- Prepare the student worksheets (using ones that have not already been used if possible, or printing out new ones).

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WORKSHEET NO 1 – answers

PRO	GREY AREA	CON
Why should you avoid buying clothes from 'fast fashion' chains? The global clothing industry has been expanding for decades and now generates 1.2 billion tonnes of greenhouse gases a year. That's more than international air and shipping traffic combined. In calculating greenhouse gas emissions, the amount of resources needed to produce and dye the fabric, sew, warehouse and transport the clothes and more are taken into account. It's been estimated that 4% of the world's clean drinking water is used to produce the amount of fabric needed every year. 'Fast fashion' means that a brand like Zara comes out with 500 new types of clothing for its customers every week. People are currently buying 60% more clothes than they were in 2000. However, it's been calculated that 40% of the clothes people are buying never get worn. Half of all 'fast fashion' ends up in landfill in less than a year. Less than 1% of used material goes towards producing new clothes. In 2015, as much as 97% of the raw material used in the clothing industry was completely new, from which 53 million tonnes of textile fibre was produced. Of this amount, 73% was later burnt or disposed of in landfill.	Is 40 euros expensive for a T-shirt? Why? The answer of course depends on how much money a person has: one man's cheap is another man's expensive. If you take into account that said 40-euro T-shirt was made outside of the EU and that the workers who made it got fairly paid for doing so and work in humane conditions and that the profit from the shirt won't simply go into the parent company's pocket, then buyers are more likely to be willing to pay that sort of price for a single T-shirt. People today have become very environmentally conscious, and this has had a knock-on effect on 'fast fashion' chains as well, which are now offering their clients alternatives like sustainably produced lines of clothing. At the same time, if cheap labour was used to make the T-shirt, they work in poor or even dangerous conditions and the factories where the shirts are made don't meet environmental protection requirements, then 40 euros for a T-shirt is both expensive and wasteful in the way it uses our natural and human resources.	Why do you think 'fast fashion' chains are so popular and widespread? There seems to be no drop-off in the number of people buying 'fast fashion', especially among young people and students, who are more price-sensitive but still want to look fashionable. At the same time, there are now 'fast fashion' brands which are very different in style, offering something for everyone. 'Fast fashion' chains offer a wide choice and allow you to add to your wardrobe quickly and affordably. Need a new outfit for that party tonight? They've got it.

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WORKSHEET NO 2 – examples of argument

ARGUMENT	FORESEEN REBUTTALS OF THE OTHER GROUP	ANSWERS TO REBUTTALS
Avoid 'fast fashion' at all costs, because the clothing such chains offer has an enormous ecological footprint. The clothing industry generates 1.2 billion tonnes of greenhouses gases annually – more than international air and shipping traffic combined. It also generates huge amounts of waste material in production and from people's homes, with half of all 'fast fashion' estimated to end up in landfill in less than a year. Therefore, such fashion should be avoided if we want to reduce our impact on the environment.	The majority of 'fast fashion' manufacturing has been relocated to developing countries, where working in the clothing industry may be the only way for poorer people to put food on the table.	Conditions in many of the industrial companies operating in developing countries are terrible, often even dangerous, not to mention exhausting because of the long working hours.
	People today have become very environmentally conscious, and this has had a knock-on effect on 'fast fashion' chains as well, which are now offering their clients alternatives like sustainably produced lines of clothing, sustainable manufacturing and responsible production.	'Fast fashion' chains may have become socially and environmentally responsible, but the information they share on their websites and elsewhere does not necessarily reflect the manufacturing situation as a whole. Such chains offer clothes labelled 'sustainable', but it is they themselves who declare them sustainable. This means that third-party oversight is often lacking in regard to how they are manufactured.