



Escola Secundária
Campos Melo

Erasmus+ Project

"Creation and Integration of STEAM Model in General Education"

Infographics and legislation and about Circular Economy

English class students group work



Erasmus+



ESCOLA SECUNDÁRIA CAMPOS MELO
NAME: Ana Beatriz; Maria Raposo; Sofia Batista

Class: 11ºA No.: 1; 21; 24

Handout
Date:



Research work on Circular Economy - deadline - 24th march

Group work - Instructions

- Take a good half an hour to READ through the topics given online;
- Divide the work among the group members to do the research;
- Join the information and complete the tasks given;
- At the end verify your work;
- Font - Comic Sans 10;
- The last step is an individual task.

Step 1 (20 points)

A. Linear Economy - what it is; what its consequences are:

The linear Economy is a traditional model based on "take-make-consume-waste" approach to using resources. The raw materials are transformed into a product and after it ends its life cycle is thrown to waste. "Take-make-consume-waste" mentality is based on the extraction of resources, the production of goods and services and the disposal of post-consume waste.

The consequences/disadvantages are:

- That the production of goods is at the expense of the productivity of ecosystems;
- Excessive pressure on these ecosystems jeopardises the provision of essential ecosystem services, such as water, air and soil cleaning;
- The collection of raw materials leads to high energy and water consumption, emissions of toxic substances and disruption of natural capital such as forests and lakes.

B. What is the worst disadvantage on this model of Linear Economy? Justify your answer.

Is the production with scarce materials, because like indium and chromium, are limited materials, we need them for a lot of activities and industries, and without them (for example) our ecosystem is scarce.

Step 2 (40 points 30+10)

A. Circular Economy - what it is - history - when - reasons for its appearance - its evolution

What is Circular Economy?

Answer: Circular economy is the transition from the linear production model of goods and services, to a circular model.

History and When

- Answer: Early in 1966 Kenneth Boulding raised awareness of an "open economy" with unlimited input resources and output sinks, in contrast with a "closed economy", in which resources and sinks are tied and remain as long as possible a part of the economy. Boulding's essay "The Economics of the Coming

Spaceship Earth" is often cited as the first expression of the "circular economy", although Boulding does not use that phrase.

- The circular economy was further modelled by British environmental economists David W. Pearce and R. Kerry Turner in 1989. In *Economics of Natural Resources and the Environment*, they pointed out that a traditional open-ended economy was developed with no built-in tendency to recycle, which was reflected by treating the environment as a waste reservoir.
- In the early 1990s, Tim Jackson began to pull together the scientific basis for this new approach to industrial production in his edited collection *Clean Production Strategies*, including chapters from pre-eminent writers in the field, such as Walter R Stahel, Bill Rees, and Robert Constanza.

Reasons for its appearance

Answer: The reason for its appearance is the scarcity of natural resources; the high raw material prices and the higher raw material price fluctuation.

B. What is the best advantage of this economic model? Justify your answer (35-50 words)

Answer: The best advantage of this economic model, to me, is the reduction of dependence on fossil fuels such as coal, gas and oil; because if people don't use as much fossil fuels as they used to, the planet will become more sustainable for us to live. With the reduction of dependence on fossil fuels, the amount of carbon dioxide emissions will reduce, making our lives and the planet a little bit greener; and making our economy a little bit more sustainable.

Step 3 (40 points)

A. The European Union and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model (4 at least - identify its aim)

Key aims

1. Protect companies against resource scarcity;
2. Price volatility, helping to create new printing opportunities and innovative and more efficient ways of producing and consuming;
3. It will create local employment for all skill levels, as well as opportunities for integration and social cohesion;
4. It will save energy and help prevent irreversible damage caused by the use of resources at a rate that exceeds the Earth's capacity to renew them, in terms of climate, biodiversity and air, soil and water pollution.

Legislation examples

1. 2019 (ROADMAP FOR CARBON NEUTRALITY 2050): Resolution of the Council of Ministers no. 107/2019, of 1 July, approves the Roadmap for Carbon Neutrality 2050;
2. 2019 (LEGISLATION ON SINGLE-USE PLASTICS): Law No. 76/2019, which determines the non-use and non-availability of single-use plastic crockery;
3. 2015 (CIRCULAR ECONOMY: CYCLES LOOPS AND CASCADES): ISWA (International Solid Waste Association) report on paper and recycling restrictions in the circular economy;

4. 2019 (LEGISLATION ON ALTERNATIVES TO PLASTICS): Law No. 77/2019 on the provision of alternatives to the use of single-use plastics.

Step 4 (30 points)

A. Portugal and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model (2 at least - identify its aim)

Key aims

1. Design products, services and business models that prevent the production of waste and pollution of natural system;
2. Maintain products and materials in use, at their highest economic value and utility, for as long as possible;
3. Promote the regeneration of the material resources used and the underlying natural systems;
4. Reduce the material and energetic intensity of the production process.

Legislation examples

1. The current national political framework for the circular economy is the "Action Plan for the Circular Economy in Portugal", approved through the Resolution of the Council of Ministers no. 190-A / 2017, of 23 November, whose objective is to define a national strategy for the circular economy based on the production and disposal of waste and the concepts of reuse, repair and renovation of materials and energy;
2. In order to outline strategies for approaching the circular economy by municipalities of the RLVT, it is essential to know how their skills are. These are fixed in Laws 15/99 and 169/99.

Step 5 (30 points)

A. Create an infographic on Circular Economy illustrating your research (it should contain - a definition of circular economy; its main advantages; a visual model of circular economy; you choose what else to insert ... (no need to complicate!))

<https://venngage.com/blog/what-is-an-infographic/>

Step 6 (individual task) (40 points)

A. After having done this research work, as a representative of the young generation, what is your opinion on the subject Circular Economy? Is it important? Write a minimum of 100 words on the subject.



ESCOLA SECUNDÁRIA CAMPOS MELO

NAME: _____ Class: _____ No.: _____

Inês Silva, David, Gui L., António, Bia

Handout

Date: _____



Research work on Circular Economy - deadline - 24th march

Group work - Instructions

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Step 1 (20 points)

A. Linear Economy - what it is; what its consequences are.

The term Linear Economy designates an economic model followed since the Industrial Revolution, which has a basic principle of the disposal of products after their use. According to this model, all products have a linear cycle.

It starts with the extraction of raw materials, the processing and transformation into products, their distribution and sale, their use, and finally their disposal as waste. In this model, therefore, there is no provision for the reuse of products so, what used to be products or goods, basically become garbage.

In fact, the intensive use of natural resources has historically been done without concern for environmental impacts, and without paying attention to the possibility of reusing resources that can be reused. By making this disposal in the raw form of garbage, biological, technological and other materials are mixed, making it difficult to separate and reuse.

This waste then ends up in landfills, incinerators, or even dumped without any rules. Therefore, there is a loss of resources that could be reused, recycled, and returned to the production process.

B. What is the worst disadvantage on this model of Linear Economy? Justify your answer.

(35-50 words)

The biggest disadvantage of the linear economy model is that it is a very unsustainable model, since both natural resources and energy sources are not unlimited, it is quickly depleted, in addition to the negative consequences for the environment.

For the reasons shown, and as an alternative to the linear model, a new model emerges, defined for the circular economy, to make the economy and life on the planet more sustainable.

Step 2 (40 points 30+10)

A. Circular Economy - what it is - history - when - reasons for its appearance - its evolution.

Circular economy is the transition from the linear production model of goods and services, to a circular model. It is an economic system aimed at eliminating waste and the continual use of resources.

Circular systems employ reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a close-loop system, minimising the use of resource inputs and the creation of waste, pollution and carbon emissions. The circular economy aims to keep products, equipment and infrastructure in use for longer, thus improving the productivity of these resources.

It was imposed during the 1970s and began to gain visibility in Europe with the proposal to analyze new circular flows from the restoration and renewal of materials.

The circular economy appeared due to the fact that the linear economy is not efficient since the increasing of the world population. People are increasingly looking for raw material and many of them being limited and according to the linear economy what is used is thrown away but as garbage is being produced more and more, they have arranged the model of the circular economy which main objective is the least possible amount of waste.

B. What is the best advantage of this economic model? Justify your answer (35-50 words)

The circular economy has many advantages and it is estimated that it can generate savings of more than 600 billion euros, which is very positive for all companies. The environment is also very advantageous since the objective is to spend and pollute as little as possible from nature, as this economy aims to make the products stay in the market for as long as possible by reusing the products thus there is a huge decrease in the pollution rate.

Step 3 (40 points)

A. The European Union and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model(4 at least - identify its aim)

Key aims:

- 1. Promote the rational use of resources:** when it is not possible to reduce consumption, or to reuse a product, try to seek the cascade use of materials, making them remain or as long as possible in the economy;
- 2. Design out waste:** if we look at the natural world, we will see that there is no idea of waste - everything that is discarded by one organism is used by another. So the concept of waste is a human creation, and therefore we can evolve the design of products and systems so that it is deconstructed. The proposal would be to emulate natural systems, choosing materials that can be fully recovered, unlike the current recycling alternatives, which operate on consumer goods that were not designed with this care;
- 3. Build resilience by encouraging diversity:** ecosystems become more resilient (able to adapt to changes without losing their characteristics) as they diversify. The same should apply to technological products;
- 4. Think systemically:** just as in ecology, circular economics recommends that analysis should not be restricted to an understanding of the functioning of each element, but rather to the assessment of the interrelation of the parts, focusing on the flow of matter and energy, and on how each part relates to others and how they relate to the whole;

Legislation examples:

1. **Legislation on alternatives to plastics (77/2019):** This law determines the obligation to provide consumers with alternatives to the distribution of ultralight plastic bags and plastic cuvettes at points of sale of bread, fruits and vegetables.
2. **Legislation on single-use plastics (76/2019):** This law determines the non-use and non-availability of single-use plastic tableware in all establishments, other locations and non-sedentary activities in the restaurant and beverage sector and in commerce retail.
3. **Fund for Innovation, Technology and Circular Economy (86-C / 2016):** This decree-law creates, depending on the Government member responsible for the Economy area, the Fund for Innovation, Technology and Circular Economy, hereinafter referred to as the Fund.
4. Amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment

Step 4 (30 points)

A. Portugal and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model (2 at least - identify its aim)

Key aims:

1. Volatility in the price of raw materials and limitation of supply risks
2. New customer relations, recovery programs, new business models
3. Improving the competitiveness of the economy - "first mover advantages"
4. Contribute to the conservation of natural capital, reduction of emissions and waste and combating climate change

Legislation Examples:

1. National reform plan, aims to enhance the territory
2. The commitment to green growth aims to promote efficiency in the use of resources and contribute to sustainability.

Step 5 (30 points)

A. Create an infographic on illustrating your research (it should contain - a definition of circular economy; its main advantages; a visual model of circular economy; you choose what else to insert ... (no need to complicate!)

- <https://infograph.venngage.com/ps/R6cCIIePLXY/coping-with-stress-during-a-crisis-infographic>



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Step 1 (20 points)

A. Linear Economy - what it is; what its consequences are

It is a traditional model based on 'take-make-consume-waste' approach to using resources. The raw material is transformed into a product and after it ends its life cycle is thrown to waste. This model has some consequences such as:

- Virgin materials are extracted at a faster rate than they can be replenished;
- Once discarded, products are treated as waste and are often incinerated or placed in landfill, leading to the loss of valuable and scarce natural;
- Unsafe ways of handling waste also lead to hazardous substances leaching into soil, water and air;
- Both the manufacturing and transportation of products lead to pollution and extensive energy use that can be avoided in the circular economy.

B. What is the worst disadvantage on this model of Linear Economy? Justify your answer. (35-50 words)

The worst disadvantage is that if this model is not replaced, the world will approach a tipping point where it will lose the capacity to sustain itself. This is an awful disadvantage of this model and that's why it's so important for us to change this type of economy from a linear economy to a circular one.

Step 2 (40 points 30+10)

A. Circular Economy - what it is - history - when - reasons for its appearance - its evolution

Circular economy is an economic system aimed at eliminating waste and the continual use of resources.

It employs reuse, sharing, repair, remanufacturing and recycle to create a close-loop system, minimizing the use of resource inputs and the creation of waste, pollution and carbon emissions.

In 1966 Kenneth Boulding raised awareness for an "open economy" with unlimited input resources and output sinks.

The contemporary understanding of the circular economy and its practical applications to economic systems evolved incorporating different features and contributions from a variety of concepts sharing the idea of closed loops.

It was further modelled by British environmental economists David W. Pearce and R. Kerry Turner in 1989.

In 1976 Walter Stahel and Genevieve Reday sketched the vision of an economy in loops (or circular economy) and its impact on job creation, economic competitiveness, resource savings and waste prevention.

B. What is the best advantage of this economic model? Justify your answer (35-50 words)

The best advantage of this economic system is probably the fact that it aims to reduce waste. When they talk about reducing waste, they talk about recycling things meaning they use things for longer periods of time not helping the economy but the environment as well.

Step 3 (40 points)

A. The European Union and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model(4 at least - identify its aim)

Key aims

1. economic prosperity,
2. Environmental quality;
3. Sustainable development;
4. Social equity.

Legislation examples

1. Amending Directive 2008/98/EC on waste;
2. Amending Directive 1999/31/EC on the landfill of waste;
3. Amending Directive 94/62/EC on packaging and packaging waste;
4. Amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment.

Step 4 (30 points)

A. Portugal and Circular Economy - legislation - resolutions - legal documents - read through them and find the key aims (4 at least); refer some examples of legislation towards a circular economy model(2 at least - identify its aim)

Key aims

1. Reorganize and coordinate production and consumption systems in closed circuits, seeking to preserve and improve natural capital;
2. Increase the reuse of products, namely those covered by the extended responsibility of the producer and others for mass consumption (eg. school textbooks);
3. Decrease of waste production;
4. Contribute to the design of products with multiple useful lives (less obsolescence)

Legislation examples

1. Resolution of the Council of Ministers of Portugal no. 108/2019
2. Resolution of the Council of Ministers of Portugal no. 190-A / 2017

Step 5 (30 points)

- A. Create an infographic on Circular Economy illustrating your research (it should contain - a definition of circular economy; its main advantages; a visual model of circular economy; you choose what else to insert ... (no need to complicate!))

(The link to see our infographic is the one below)

<https://infograph.venngage.com/ps/OARS6HSgqH0/circular-economy>

Step 6 (individual task) (40 points)

A. After having done this research work, as a representative of the young generation, what is your opinion on the subject Circular Economy? Is it important? Write a minimum of 100 words on the subject.

Inês Coelho

The topic circular economy is a complex one with lots of varied information related to it. It is very important and relevant nowadays, and it is important to fully understand it despite all the work it takes to achieve that.

Since the moment we start to change our linear economy to a circular one we notice immediate changes on our daily basis and also on our way of thinking. Embracing this type of economy is a big step forward on our transformation into an eco-friendly-person.

This type of economy helps to reduce global warming and a lot of other problems so it's remarkable the impact that has on the improvement on the most different parts of our life and world. Starting with this type of economy means starting a new life and obviously starting to be a different person.

Please let's give it a try in order to save our planet and economy obviously.

Madalena Caetano

Circular Economy is a recent concept on planet Earth, even more recent in Portugal and is something very important for the present but even more for the future.

As the name implies it is circular, that is, it will have no end, it will be a cycle. A cycle of production, use, waste, recycling and reuse of a product. If we do not recycle / reuse these products, waste will be harmful to the planet and if we think about the amount of things that, we humans use and waste, some day the planet will be just waste.

So circular economy is very important and we should have thought about this in practice earlier.

Inês Marques

In my opinion, the circular economy is way more effective than the linear economy. The linear economy only focuses in producing something and after using it for a short period of time people usually throw it away while the circular economy focuses in producing something but also recycling it and nowadays recycling is one of the best things someone can do because it helps a lot the environment. This concept helps improve the productivity of various resources. The circular economy is very important because it can help reduce the levels of pollution by reusing products while keeping the original quality of the product leaving everyone satisfied.



Why did the circular economy appeared?

The reason for its appearance is the scarcity of natural resources; the high raw material prices and the higher raw material price fluctuation.



Main advantages on Circular Economy:

- Creation of new green industries and jobs
- Reduced dependence on importation of raw materials
- Avoidance of environmental damage caused by resource extraction
- Less pollution entering the earth's life support systems

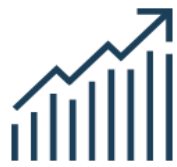
Definitions:

Circular Economy
Circular economy is the transition from the linear production model of goods and services, to a circular model.

Linear economy
Linear economy is a traditional model based on "take-make-consume-waste" approach to using resources.



Circular Economy



What is the circular economy?

A circular economy is an economic system aimed at eliminating waste and the continual use of resources. This model is the transition from the linear production model of goods and services, to a circular model.



What's your point?

A circular economy argues that waste must be transformed, through innovation, into potential by-products or other materials, which promote reuse, recovery and recycling.



Benefits of Circular Economy

- ↪ Promotes eco-innovation
- ☐ ↪ Creates business opportunities for new products and services
- ☐ ↪ Keeps products, materials and resources in the economy for as long as possible
- ☐ ↪ Creates new business models
- ☐ ↪ Reduces dependence on fossil fuels



Benefits of Circular Economy

- ☞ Minimizes waste generation
- ☞ Conserves natural capital
- ☞ Decreases carbon emissions
- ☞ Contributes to the fight against climate change



Goals

Thus, the aim is to develop new products and services that are economically viable and ecologically efficient, rooted in ideally perpetual cycles of upstream and downstream conversation.

The results are minimizing resource extraction, maximizing reuse, increasing efficiency and developing new business models.





Advantages:

- Promotes eco-innovation;
- Creates business opportunities for new products and services;
- Keeps products, materials and resources in the economy for as long as possible;
- Reduces dependence on fossil fuels;
- Minimizes waste generation;
- Conserves natural capital;
- Decreases carbon emissions;
- Contributes to the fight against climate change.



What is?



A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.



WHY NOW?

- Scarcity of natural resources;
- High raw material prices;
- Higher raw material price fluctuation.

Circular economy

 Everything you need to know 



Step 6 – what is my opinion on the subject circular Economy? Is it important?

Circular Economy is a strategic concept that takes into account the reduction, reuse, recovery and recycling of materials and energy, which is why, in my opinion it is important for our life and we need it, not only to prolong the life of products as well as to reduce waste, encourage selective collection, separation and recycling. This allows, for example, the reduction of pressure in the environment, greater security in the supply of raw materials, increased competitiveness and the promotion of innovation, growth and employment and with this our nature and society is grateful. So in my opinion, I think this economy is very important, not only because of the impact it has today, but also because of the positive aspects it all has.

Work done by: Maria Raposo

In my opinion Circular Economy is very important because one of the goals is to extend products lifetime and recirculate all materials without producing any waste, which I think it's one of the best advantages, since the waste and the resources intensive exploitation are two of the reasons for our planet to be in the state it is in now. The Circular Economy is also important because with the increase of a product lifetime, the production of that same product will decrease. Therefore, the amount of carbon dioxide released by the factories into the atmosphere will decrease, which will have a positive impact on the planet. With the increase of a product lifetime, people can actually save money for what really matters, like food, instead of wasting it on unnecessary things that are of no use in the person's daily life. So, in conclusion, I really think circular economy is life changing.

Work done by: Ana Beatriz Lopes

In my opinion, I think the circular economy is important because it brings us many advantages. A very important one are the measures for waste prevention and the promotion of ecological design or reuse can mean net savings of 600 billion euros, or 8% of annual turnover, for companies in the EU and the 2-4% reduction in total annual greenhouse gas emissions. The circular economy can also bring benefits such as reducing pressure on the environment; greater security in the supply of raw materials; increasing competitiveness and promoting innovation, growth and jobs (creation of 580 000 jobs in the EU). It can also provide consumers with more durable and innovative products. I therefore conclude that the circular economy is a good opportunity for companies to give something back - helping to "relieve" pressure on our planet's resources through the reuse of materials.

Work done by: Sofia Batista

Name: António Nabinho nº3 11ºA

Step 6 (individual task) (40 points)

In my opinion, the circular economy does not have a fixed objective, it is an economic model that has been reorganized and focused on the coordination of production and consumption systems in closed circuits. It is important because its "objectives" are to protect the environment, like, valuing those who help protect it, their own laws value territories, promote the use of biodegradable resources and all this contributes to sustainability, I think this economy should adopted in all countries. Although it also has its cons, if it is well applied, these cons become pros.

Name: Beatriz Morais Laranjinha n°4 11°A

Step 6 (individual task) (40 points)

Circular Economy is a strategic concept of reducing, reusing, recovering and recycling materials and energy. Replacing the end-of-life concept of the linear economy with new circular flows of reuse, restoration and restoration.

Environment is something that our generation needs to care about, because are us that will make changes in future. Some of this changes are being made by circular economy such as greater security of resources and less dependence on imports, thanks to a reduction in demand for primary raw materials; reduced environmental impact, including a drastic reduction in greenhouse gas emissions; economic benefits, including new opportunities for growth and innovation, as well as savings related to more efficient management of resources.

In my opinion, circular economy it is important, because it is a way to solve environmental problems, and its actually working ,with small gestures we all can help.

Name: Inês Fonseca da Silva n°14 11ºA

Step 6 (individual task) (40 points)

Current consumption patterns and climate change require finding solutions that can be an alternative to the traditional linear economy. All because, in the last 100 years, the rising needs of the world's population have had a huge impact. For example, we started using 34 times more natural or synthetic materials, 27 times more minerals and 12 times more fossil fuels. For me this represents one of the main reasons for how important the circular economy is in our society.

The growing demand has consequences and, for that reason, it is necessary to develop new approaches that converge in a system around the concept of circularity. The challenge is simple, with this economy system we can extend the life of products, reduce waste and encourage selective collection, separation and recycling. This is an increasingly pressing goal, given that the world economy has been built on the basis of a linear business model - extract-transform-use-reject - which is at risk due to limited availability of resources.

I conclude that the circular economy which is based on three fundamental principles that are eliminating waste and pollution from the start, keeping products and materials in use and regenerating natural systems, is very important and represents one of the main issues that needs to be discussed today!

Name: Guilherme Luciano n°14 11°A

Step 6 (individual task) (40 points)

For me the circular economy is very important because, unlike what we find in the linear economy, circular is more advantageous because we can recycle the products that we use daily.

In my opinion the circular economy is more advantageous because the world is less polluted and we can also use the "garbage" that people waste and recycle products to use again for other things.

Unlike the linear economy, we can't recycle anything and with that we realize that we're polluting the world, we soon adopted a different way (circular economy) to help the world and reduce the pollution.

But the only thing I can't agree with is that some countries have not yet accepted this form and economy.

And we all need to accept this new economical form to decrease the pollution.