Circular Economy
Age Range: 11-16 years

INTRODUCTION TO THE CIRCULAR ECONOMY

This lesson plan will introduce students to the concepts of the linear and the circular economy.

LESSON OBJECTIVES

Students will be able to:

- Understand the differences between the circular and linear economy
- Highlight the benefits of the transition to the circular economy
- Explain the three main principles behind the circular economy

SUMMARY OF TASKS

PART 1 – INTRODUCTION

- Watch the video *'The Circular Economy'*[1] (3 mins) – created by the Ellen MacArthur Foundation.
- Ask students what they currently understand about the terms linear and circular economy. This can be through using an object such as a biro pen as a prompt, asking questions such as

What is the pen made of? Where do these materials come from? Are they renewable?	How could you change the design of the pen to be more circular? And how would this be more circular? (an example could be to produce replacement ink cartridges – like a classic fountain pen?
What would you do with the pen at when it runs out of ink and is no longer useful?	
Do you think this is a good example of a product which fits with the ideas of the circular economy?	Would a pencil be a better choice of object when considering a circular economy?

- Explain the linear and circular economy diagrams and the three main principles of the circular economy from the 'Introduction to the Circular Economy' fact sheet. This can be aided by the 'Linear and Circular Economy' activity.

PART 2 – DISCUSSION

- Split students into small groups/pairs and complete the 'Introduction to Circular Economy' activity.
- Watch the video '*Re-thinking Progress: The Circular Economy*'[2] (4mins)
- Come together as a class to discuss the responses in the activity and the video. Questions such as the following could be used as prompts:

Do you think people would buy more or less products in a circular economy compared to linear economy?	How would a change to the CE impact energy use?
Which economy would produce more waste and why?	Which economy would require more future research?

RESOURCES/ EQUIPMENT

- 'Introduction to the Circular Economy' fact sheet
- 'Linear and Circular Economy' activity
- 'Pros and Cons of the Circular Economy' activity

HOMEWORK/ EXTRA ACTIVITIES

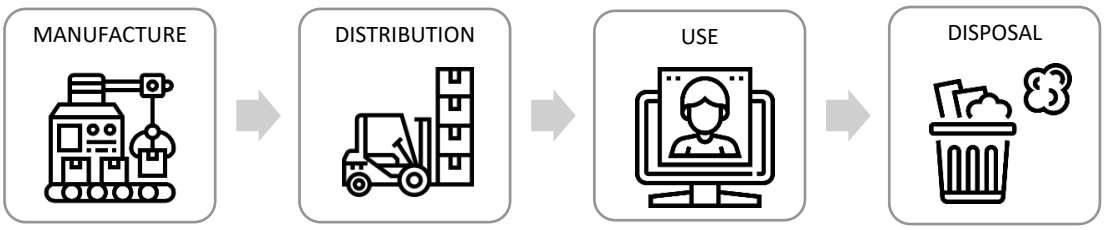
- Circular Economy and Entrepreneurship Game.[3] Created by a collaboration between education consortiums in Finland. All instructions are available in English.

[1] https://www.youtube.com/watch?v=A5wn_iinbxw
[2] https://www.youtube.com/watch?v=zCRKvDyyHml
[3] https://circula.fi/en/

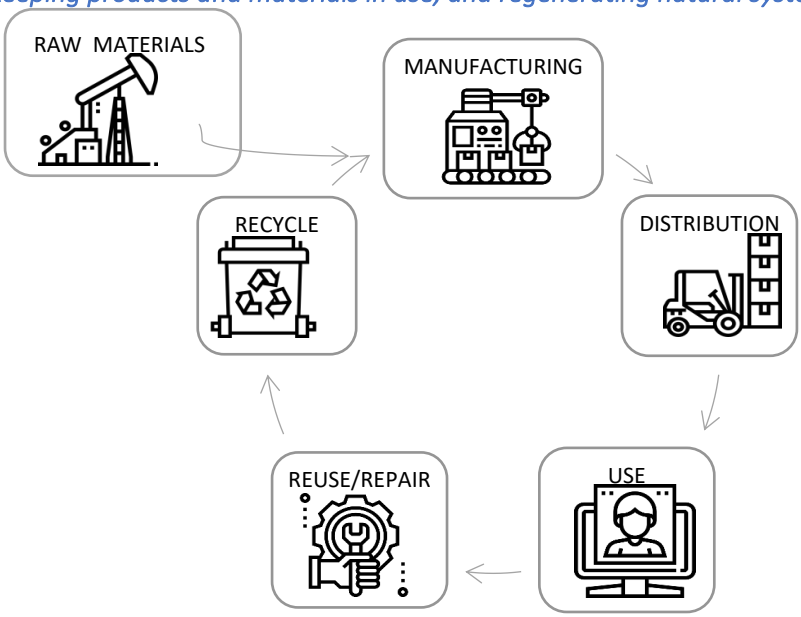
FACT SHEET: INTRODUCTION TO THE CIRCULAR ECONOMY

FACT SHEETS HAVE BEEN DESIGNED FOR TEACHER USE TO AID CREATING OF TEACHING RESOURCES, OR THEY ARE FREE TO BE REPURPOSED FOR STUDENT USE.

PART 1 - LINEAR ECONOMY - Traditionally society has had a primarily linear economy, often described as being a throwaway society. This is not a sustainable practice, as new materials (metals, wood, plastics etc.) must be continuously provided to make products which are used and then disposed of into landfill once people have finished using them. The products made are often made and sold as cheaply as possible. The disposal of products can create a lot of toxic and polluting waste, dangerous to human health and the environment.



PART 2 - CIRCULAR ECONOMY – The circular economy is proposed as an alternative to the linear economy. The Ellen Macarthur Foundation, a thought leader in the circular economy use the following definition: *A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.*[4]



[4] https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy

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The circular economy is full global systems change, changing how products are made, distributed, used and designed. There are three main principles in the change from the linear to the circular economy:

1. Designing out waste and pollution
    - Make products which can be disassembled to avoid them ending up in landfill
    - Less and more sustainable packaging
    - Ensure biological materials are returned to nature
    - Use renewable energy sources to power the economy
2. Keep products and materials in use for as long as possible
    - Designing products so they last longer
    - Fix something when it breaks rather than throwing it away and buying a new one
3. Regenerate natural systems
    - Ensure that valuable nutrients are returned to the soil and the wide ecosystem to enhance the natural resources
    - Source raw materials in a sustainable manner
    - Reduce reliance on newly mined/extracted materials as this will decrease energy consumption and CO_2 emissions.

The 6 R's approach to designing products and behaviours are very often linked to the circular economy and these can be explored further in their own fact sheet.

The circular economy also includes looking at different models for business, including sharing and renting products, i.e. changing consumer behaviours.[5]

ADDITIONAL RESOURCES

Reading:
i. https://www.ellenmacarthurfoundation.org/assets/downloads/sme/19_CE100-SME-booklet_print.pdf
ii. https://www.greenbiz.com/article/5-business-models-put-circular-economy-work
iii. https://theconversation.com/what-a-sustainable-circular-economy-would-look-like-133808

Videos:
i. https://www.youtube.com/watch?v=zCRKvDyyHmI
ii. https://www.youtube.com/watch?v=dcVu20XQ5og
iii. https://www.youtube.com/watch?v=X6HDcubgxRk

Note: Icons made by https://www.flaticon.com/authors/eucalyp from https://www.flaticon.com

[5] OECD (2019), *Business Models for the Circular Economy: Opportunities and Challenges for Policy*, OECD Publishing, Paris, https://doi-org.ezproxy.nottingham.ac.uk/10.1787/g2g9dd62-en.

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Further to this lots of educational videos have been produced by the Ellen MacArthur Foundation: https://www.youtube.com/channel/UCQAC2otE5_agzHZPnk3mE5w

ACTIVITY: LINEAR AND CIRCULAR ECONOMY

Instructions

Please see the web page for more information about the circular economy.

This activity is intended to aid students in understanding the main processes in the linear economy and the circular economy.

This activity is intended to be used alongside the 'Introduction to the Circular Economy' lesson plan.

Task

If you are based in a classroom, please provide student with a copy of each of the diagrams below – or students could copy and create their own diagram into an exercise book.

1) Ask students to complete the blank phrases in the diagram

Note: Icons made by https://www.flaticon.com/authors/eucalyp from https://www.flaticon.com

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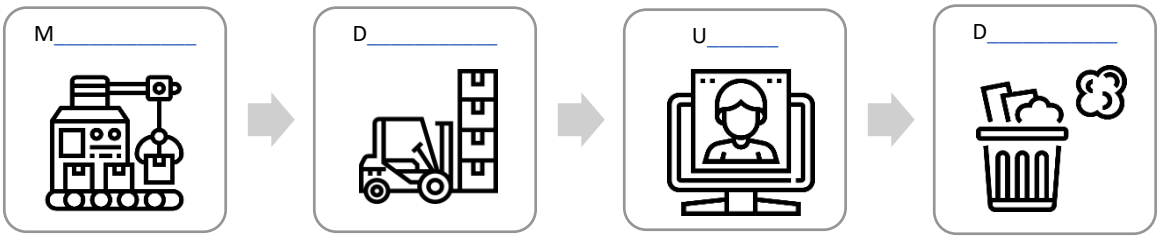
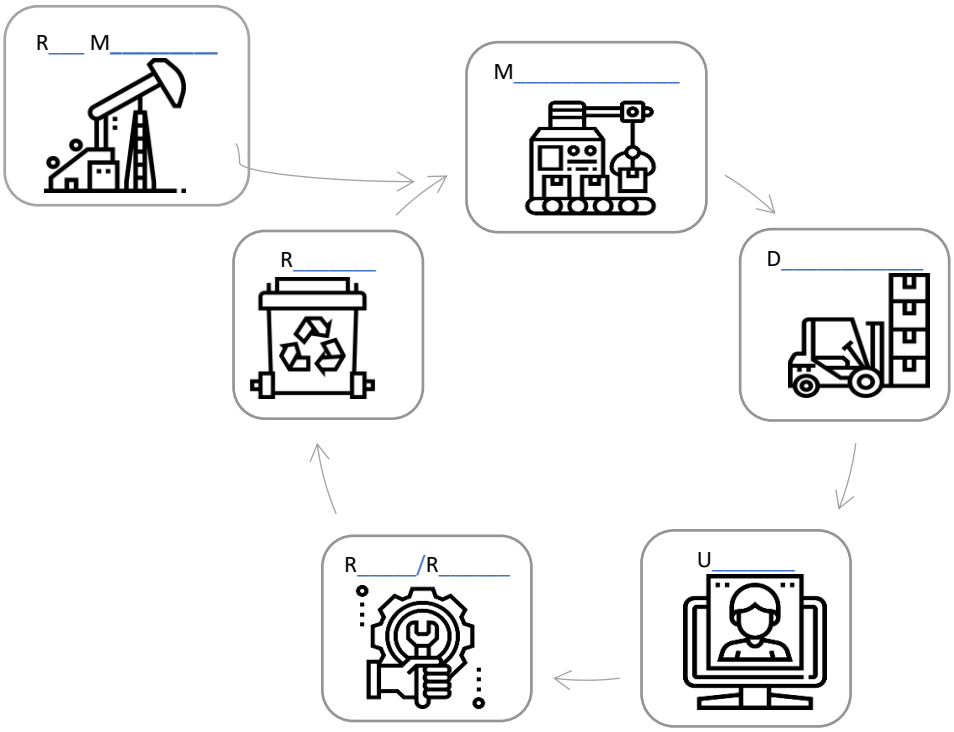
L_____ ECOMOMY



C_____ ECOMOMY



ACTIVITY: PROS AND CONS OF THE CIRCULAR ECONOMY

Instructions

Please see the web page for more information about the circular economy.

This activity is intended to aid students in understanding the differences between the linear economy and the circular economy and highlight the main principles and benefits of the circular economy.

This activity is intended to be used alongside the 'Introduction to the Circular Economy' lesson plan.

Task

If you are based in a classroom, ask students to complete the activity in two stages:

1) Ask students to list as many issues and difficulties as which they can think of which are a result of the traditional linear (take-make-waste) economy
2) Then students should think about how the circular economy may provide benefits to overcome each of the issues with the linear economy listed. Students could also be asked to think about which of the three main aspects of the circular economy each benefit would fall under. Either:
    - Designing out waste and pollution
    - Keep products and materials in use for as long as possible
    - Regenerate natural systems
3) Students can then think of any benefits of the linear economy, and issues with the circular economy.

Some starter statements which could be used as prompts are:

- Would require many changes to the way products are made and people behaviour (Difficulties of CE)
- Avoid the production of waste by using materials which are more easily recyclable (Pro of CE)
- Way things have always been done and people are used to it (Pro of Linear Economy)
- Uses up lots of non-renewable resources, of which there are a limited amount available (Issues with the Linear Economy)

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	LINEAR ECONOMY	CIRCULAR ECONOMY
ISSUES AND DIFFICULTIES		
PROS AND BENEFITS		