



**LAND MANAGEMENT, ENVIRONMENT & SOLID-WASTE:
INSIDE EDUCATION AND BUSINESS IN CENTRAL ASIA
ERASMUS-EDU-2023-CBHE Project Number: 101129032**

MICRO-CREDENTIAL

**CIRCULAR ECONOMY FOR LAND AND WASTE
MANAGEMENT**

2.- Principles and Models of Circular Economy

Activity 1

Diagram exercise: biological vs technical cycles



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Learning objective

By the end of this activity, students will be able to distinguish between the **biological cycle** and the **technical cycle** in the circular economy. They will also be able to classify everyday materials according to the cycle they should follow and explain why some materials can safely return to nature, while others should remain within industrial systems.

Activity description

In the circular economy, materials do not all follow the same pathway. Some materials belong to the **biological cycle**, where they can safely return to nature through processes such as composting, biodegradation or nutrient recovery. Other materials belong to the **technical cycle**, where they should be kept in use through repair, reuse, recycling, remanufacturing or recovery within industrial systems.

For this activity, you will draw or complete a simple **Circular Economy Butterfly Diagram** showing the two main cycles:

Biological cycle – Nature loop

This cycle includes materials that can safely return to the environment and support soil, plants or biological processes.

Technical cycle – Industry loop

This cycle includes materials that should remain in human-made systems and be reused, repaired, recycled or remanufactured instead of being discarded.

You will classify different materials into the correct cycle and reflect on how these cycles can reduce waste and support better land and resource management.

Part 1 – Understanding the cycles

Before completing the diagram, read the descriptions below.

Biological cycle

The biological cycle includes materials that come from living systems and can safely return to nature if they are not contaminated. These materials can become compost, nutrients or soil amendments.

Examples may include:

- food waste
- fruit peels
- apple cores
- wood
- paper
- cotton

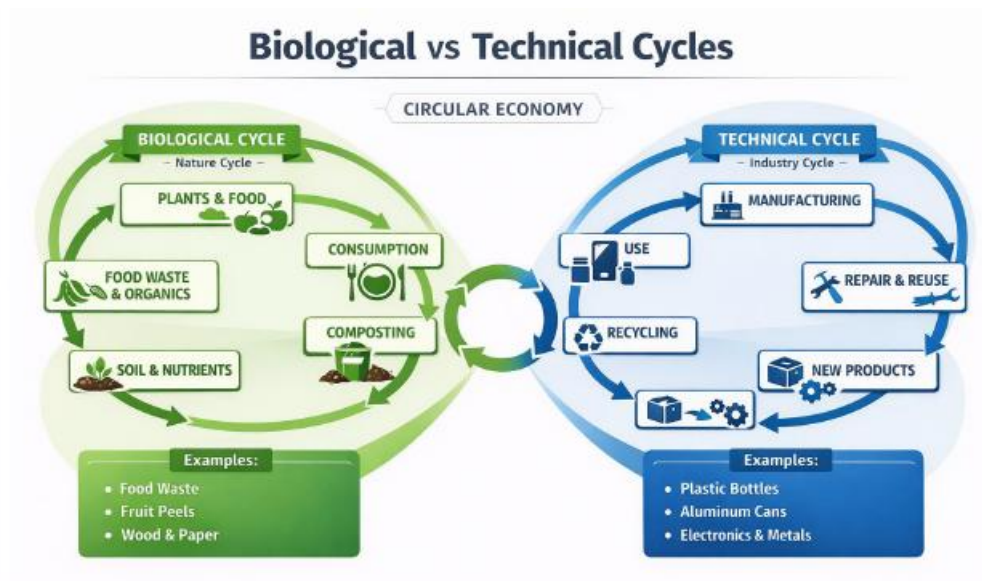
- agricultural residues

Technical cycle

The technical cycle includes materials that do not safely return to nature and should remain in industrial systems. These materials should be reused, repaired, recycled or remanufactured.

Examples may include:

- plastic bottles
- aluminium cans
- glass bottles
- metals
- electronics
- machinery parts
- smartphones



Part 2 – Classification exercise

Classify the following materials into the correct circular economy cycle.

Material	Biological cycle	Technical cycle
Food waste		
Plastic bottles		
Aluminium cans		
Apple core		
Glass bottle		
Wood		
Smartphone		
Paper		
Steel		
Cotton shirt		

Mark each material in the correct column. If you think one material could be difficult to classify, explain your reasoning briefly.

Part 3 – Diagram exercise

Draw a simple **Butterfly Diagram** with two sides:

On the **left side**, draw the **biological cycle**. Include arrows showing how biological materials move from plants or food production to consumption, then to organic waste, composting, soil nutrients and back to nature.

On the **right side**, draw the **technical cycle**. Include arrows showing how technical materials move from manufacturing to use, then to repair, reuse, recycling, remanufacturing or new products.

Add at least **five examples** to each cycle.

Your diagram may be hand-drawn or digital. It does not need to be complex, but it should clearly show the difference between the two types of circular flows.

Part 4 – Reflection questions

Answer the following questions in short paragraphs.

1. Why is food waste part of the biological cycle?

Explain how food waste can return to nature if it is properly managed.

2. Why should plastics and metals stay in the technical cycle?

Explain why these materials should not be released into the environment and how reuse or recycling can keep their value.

3. Can one material belong to both cycles depending on how it is designed or managed?

Give one example and explain your answer.

4. What example from your community could become part of a circular economy system?

Think about waste from your home, school, university, farm, market, workplace or city.

Bonus challenge

Look around your home, school, university or workplace. Identify **three items** that could become part of a circular economy system.

For each item, write:

1. the name of the item;
2. whether it belongs mainly to the biological or technical cycle;
3. what could be done with it instead of throwing it away.

Item	Cycle	Circular action
1.		
2.		
3.		

Expected output

Students should submit:

1. a completed classification table;
2. a simple biological vs technical cycle diagram;
3. answers to the reflection questions;
4. the bonus challenge, if completed.

The final work should show that students understand the difference between materials that can safely return to nature and materials that should remain in industrial systems through reuse, repair, recycling or recovery.