



"The goods of today are the resources of tomorrow at yesterday's resource prices."

Walter Stahel,
Product-Life Institute

Exploring the Circular Economy

Seeing The Bigger Picture - Lesson 2

Subject

Economics, Geography, Environmental Systems, Biology, Sociology, Business, Citizenship, Design Technology

Learning Outcomes:

- to compare living systems with man-made systems
- to critique our materials economy
- to begin to investigate an alternative model: the circular economy

Preparation:

- Print off, cut out and sort the cards one set per group, divide the cards into two groups: 'natural' items and man-made items (note: treated water belongs to the man-made group)

- Sit the students in small groups
 - Give each group an A3 sheet of paper for taking notes
 - Load or print the PowerPoint slides, *Exploring the circular economy*
- Preload the YouTube video, *Rethinking Progress* (by the Ellen MacArthur Foundation)

Recommended Classroom Setup:

This activity is best done with groups of 3 or 4 students, standing or sitting at a large table. Students will need to see the screen or the slides so you can help guide them in the early stages of the lesson.

You will need audio for the video.

Total Time:



Age Range:



Teacher's Introduction - *Seeing the Bigger Picture* - Lesson Plan Series

This lesson is part of a series of lessons which introduce students to a different way of thinking about how our economy could work: a circular economy. The series builds up exactly how a circular economy is different from the status quo, and looks at the economic, environmental and social advantages of a new approach.

This particular lesson is one part of a series. The whole series looks like this:

- (1/5) Challenging common conceptions
- (2/5) Exploring the circular economy (this lesson)
- (3/5) Understanding the challenge of 'finite' resources
- (4/5) Designing for a circular economy
- (5/5) The circular economy and modern agriculture

This is a group-based activity in which students will explore the basic characteristics of the linear and the circular economy.

In the last activity, your students were asked to challenge some common 'solutions' (such as 'reduce, reuse, recycle') to environmental problems. The argument is that most problems are, in some way, connected, so solutions to environmental problems affect the economy, and so on. This **systems thinking** approach is fundamental to understanding how our economy could work, for economic, societal and environmental gain.

***Systems thinking** is the process of understanding how component parts of a system can best be understood in the context of relationships with each other and other systems, rather than in isolation. Systems thinking focuses on cyclical rather than linear cause and effect. There is more about systems thinking in other work produced by the Ellen MacArthur Foundation (see <http://www.ellenmacarthurfoundation.org/programmes/education>)*



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This lesson was produced by the Ellen MacArthur Foundation, which exists to accelerate the transition to a circular economy. The Ellen MacArthur Foundation works with business, government and academia to build a framework for an economy that is restorative and regenerative by design.

More educational resources on circular economy can be downloaded for free from www.ellenmacarthurfoundation.org

20
mins

Learning Activity

Hand out the man-made cards and ask students to arrange the cards to tell the story of the life of a plastic bottle. This is best done in groups of 3 or 4. Your students will need a wide table.

You may want to support them through the first few cards – the PowerPoint helps you to do that. You could ask, for example, where plastic comes from. When someone answers ‘oil’, show them the oil rig card and tell the class that that is their starting point. Then ask what happens to the oil next, which will likely lead into the oil being taken to a refinery, perhaps via a boat.

The activity tends to take 20 minutes. Most groups will end up showing a lengthy, wasteful linear process (as shown in slide 4). Ask them at the end of the activity to describe the system to you – look for words like ‘linear’ and ‘wasteful’. Ask why the waste card is depicted as a burning note.

Note: There are four power station cards, four factories and four treated water cards. These all go together. The treated water (at high energy cost) is used to cool the power station. Students may ask whether a line should connect recycled plastic back into the loop. While this is certainly possible, and does take place, the effect is limited: most recycled material cannot be recycled indefinitely. This process is typically referred to as ‘downcycling’ – where the material quality is degraded. **Is there another approach to this problem?**

Discussion

Doing this activity with a plastic bottle as the product to outline is relatively simple. Ask your students what this system would look like if the product were more complex, for example, a mobile phone.

15
mins

Learning Activity

When the class has finished with the linear activity, give them the ‘biological’ cards and, as in the previous activity, ask them to arrange them in a manner that makes sense. They will realise there is a food chain at the heart of the system. Bacteria live off everything.

Help your students to the key conclusion that there is no waste in natural systems – one species’ waste is another species’ food. (Except for some waste in the form of lost heat!).

A crucial point is that with every cycle, the system is strengthened.

Discussion

Ask the class to consider how we could design a system that is strengthened with every cycle, and which designs out waste.

Learning Activity

20
mins

Watch the Ellen MacArthur Foundation video, 'Rethinking Progress' (4 minutes):

<https://www.youtube.com/watch?v=zCRKvDyyHml>

Use the final slides to discuss the concepts introduced in the video, and to build up a bigger picture of the circular economy and work through the example of a washing machine.

Conclusion

5
mins

Conclude by asking students to define the circular economy, comparing this with the working definition on the final slide.

Take Action for the Global Goals

As an educator you have the power to channel students' positive energies and help them believe that they are not powerless, that change is possible, and that they can drive it.

How To Take Action - Right Now:

- **Write** to your local government representative, **tell** them how the circular economy can help achieve the Global Goals and **ask** them what action they are taking toward Goal 12 specifically.
- Make a 30-second **video** or design a **poster** about the circular economy and its links to the **#GlobalGoals** and **share** it with World's Largest Lesson on Facebook or Twitter @theworldslesson @circulareconomy



How To Take Action - Deeper Engagement:

- For deeper learning and impact, students can also take part in **projects** to make change for the Goals in their local communities.

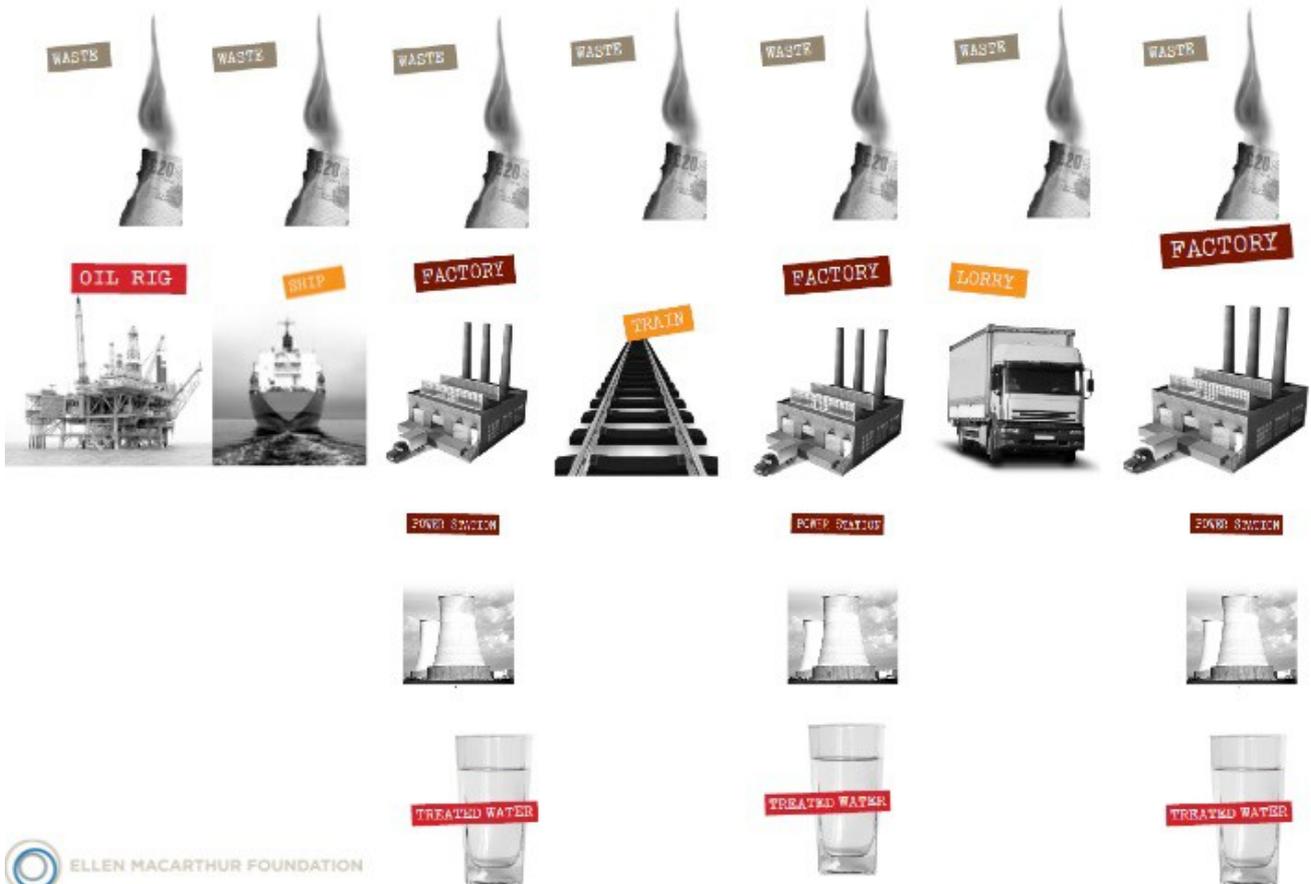
Visit the "**Take Action**" page on our website: www.globalgoals.org/worldslargestlesson and find organisations, resources and lesson packs to help you get started.

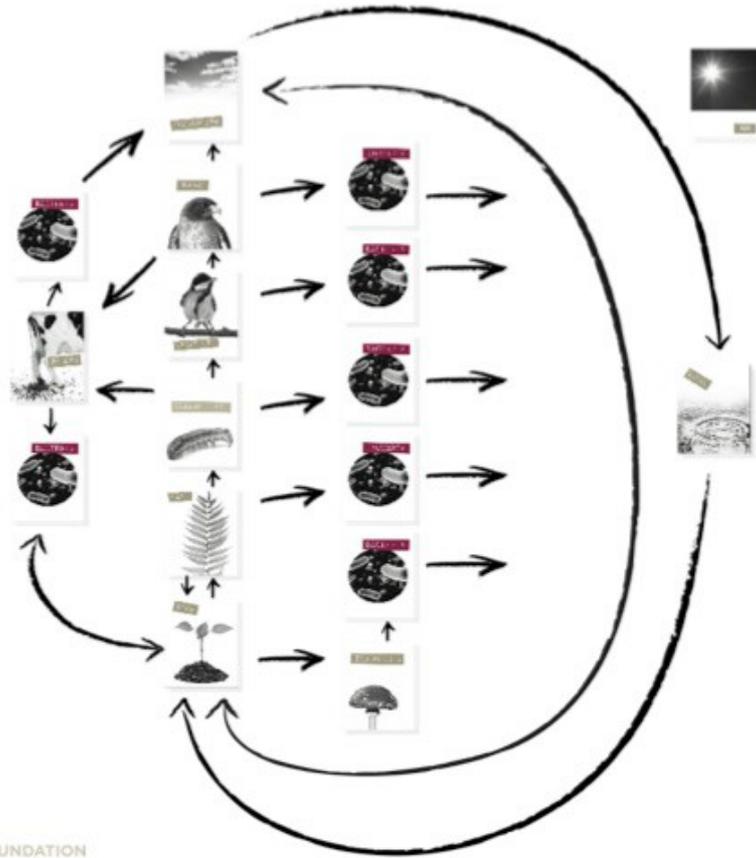




Exploring the circular economy

Global Partners of the Ellen MacArthur Foundation:





WATCH RETHINKING PROGRESS

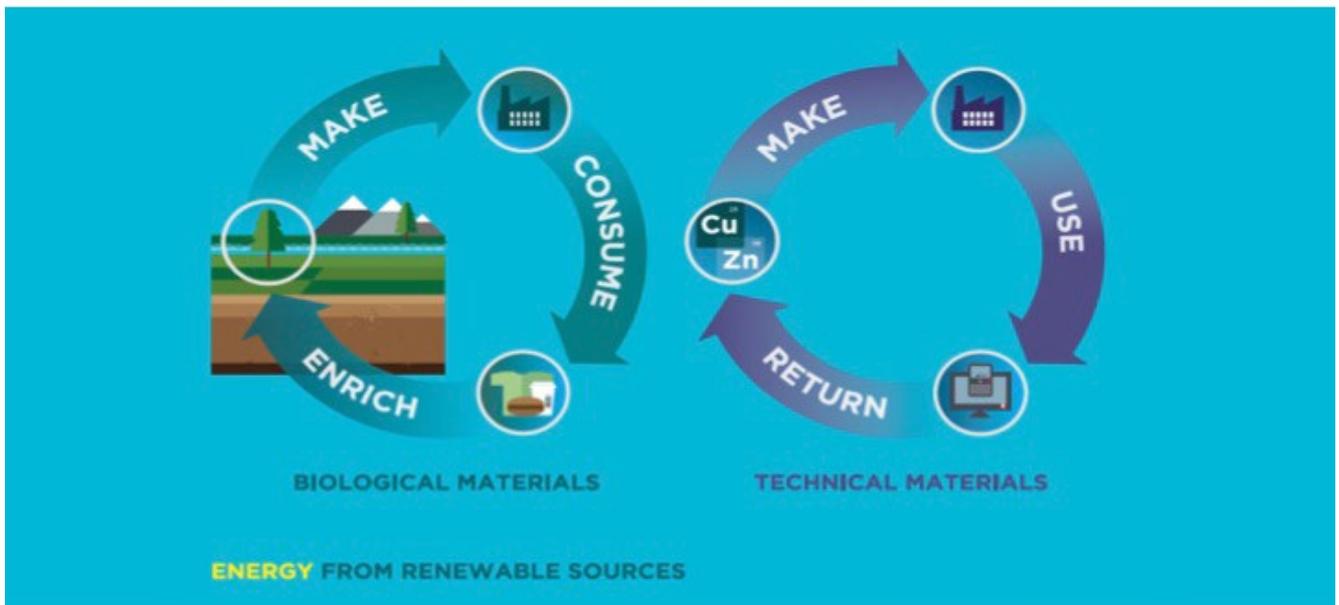


WHAT DO YOU THINK OF THIS QUOTE?

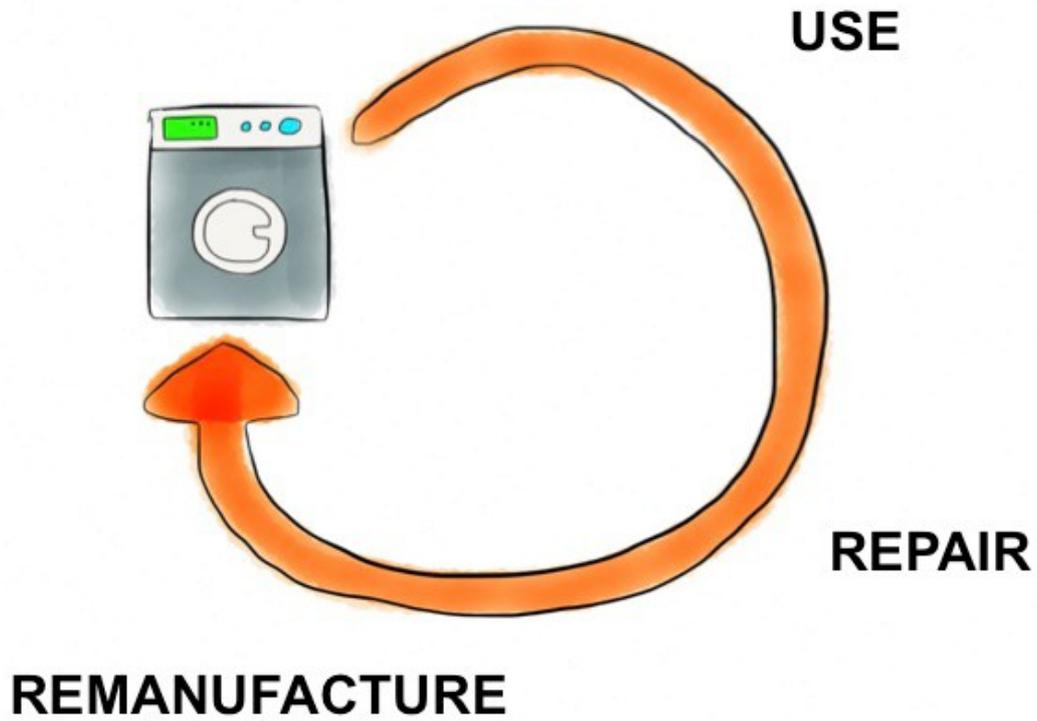
“The goods of today are the resources of tomorrow at yesterday’s resource prices”

- WALTER STAHEL

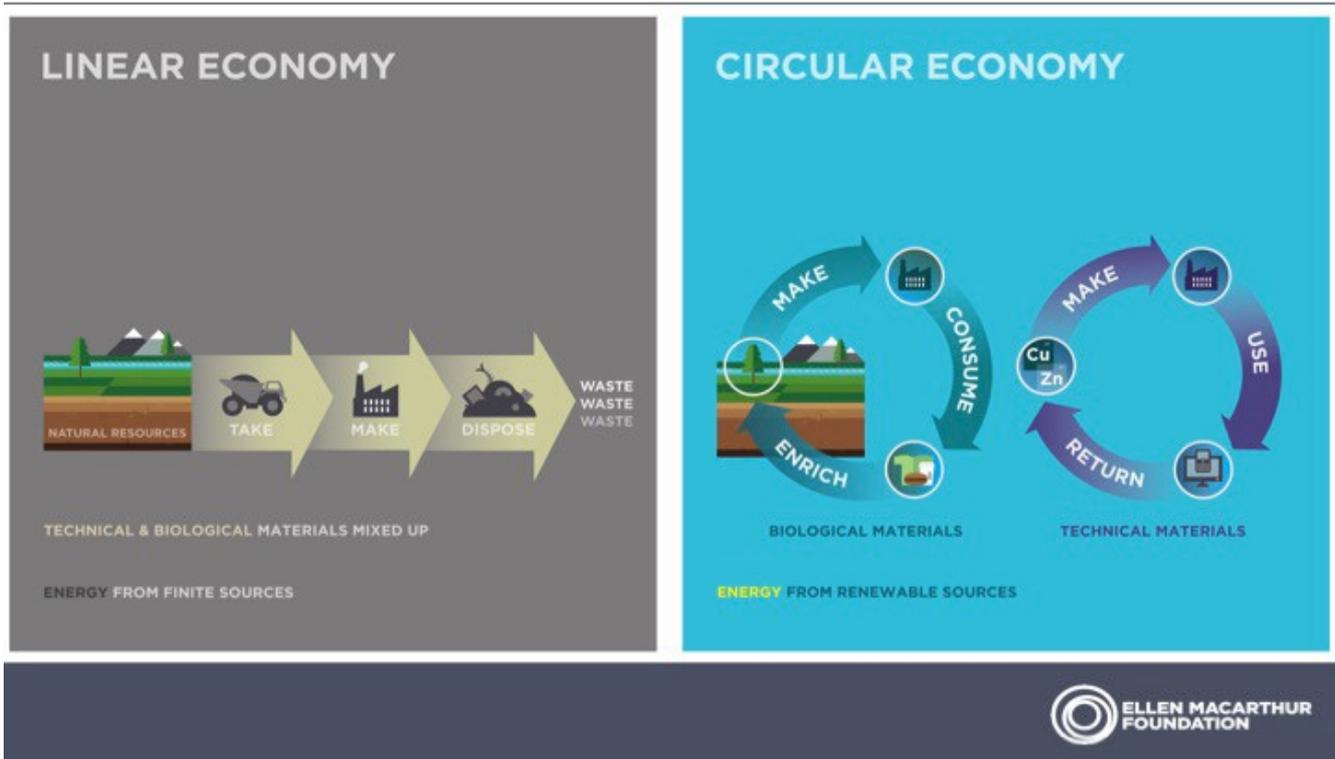
THE CIRCULAR ECONOMY



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THE LINEAR AND THE CIRCULAR ECONOMY



THE CIRCULAR ECONOMY

In a sentence, describe the circular economy...

THE CIRCULAR ECONOMY

The circular economy offers the opportunity to move away from our "take - make - dispose" model, by ensuring, through careful design and innovative business models, that technical and biological materials continuously flow, safeguarding valuable resources and restoring natural capital.

Appendix 2 - Slide Notes for Exploring the Circular Economy Presentation

SLIDE NUMBER	NOTES
1	<p>This PowerPoint was produced to help you teach the linear/circular card activity. The activity is best done in groups of 3 or 4 students. This PowerPoint should have come with corresponding cards to print off. If you don't have them, visit www.ellenmacarthurfoundation.org to download your free set. Watch this video for a quick summary of this activity: http://tinyurl.com/jj82l62</p>
2	<p>Refer to the lesson plans for advice on running this activity. Basic instruction: Ask the students to use the cards to describe the process of producing a plastic bottle.</p>
3	<p>Refer to the lesson plans for advice on running this activity. Basic instruction: Ask the students to arrange the cards in an order that makes sense. They might want to draw connecting lines.</p>
4	<p>We recommend you first view Rethinking Progress (available on YouTube – URL below). URL: https://www.youtube.com/watch?v=zCRKvDyyHml</p>
5	<p>Q: How might that work? Q: Are there any examples of this working already?</p>
6	<p>This image is a simplified graphic demonstrating the circular economy: an industrial system that is restorative by design or intention. Ask the students what they see. Note two cycles of materials: Biological materials are made from things that grow and which ultimately can go back into the soils (perhaps by composting, or through anaerobic digestion) and improve it. They are natural materials that can be safely disposed of in a manner which allows the soil to regenerate; thus they must not contain any toxins. Technical materials are metals, polymers, etc. They are materials designed to continually flow at high quality in closed industrial cycles.</p>
7	<p>How might the circular economy work? Take washing machines as an example. What if you never actually owned the machine, but paid a subscription for its use? If that were the case, the manufacturer would have a vested interest in ensuring the machine worked long-term. (i.e. durable design – design for repair) When the customer was finished with the machine – perhaps ready to upgrade – the manufacturer reclaims the machine, remanufactures the parts and puts it back out on the market. Q: what are the advantages of this approach to (a) the manufacturer? (b) the customer? Q: do you know of examples where this already happens? Remember, resource prices and energy prices are volatile, creating uncertainty for businesses...</p>

SLIDE NUMBER	NOTES
8	These two simplified graphics show the difference between a linear economy and a circular economy. Ask the students to note the differences between the two systems
9	Listen to feedback, challenge undefined terms, come to a class definition.
10	This is a definition we use. Q: How does your definition differ? Q: Which phrases have you used that are missing from this statement? Q: Do you prefer this statement, or yours? Why?