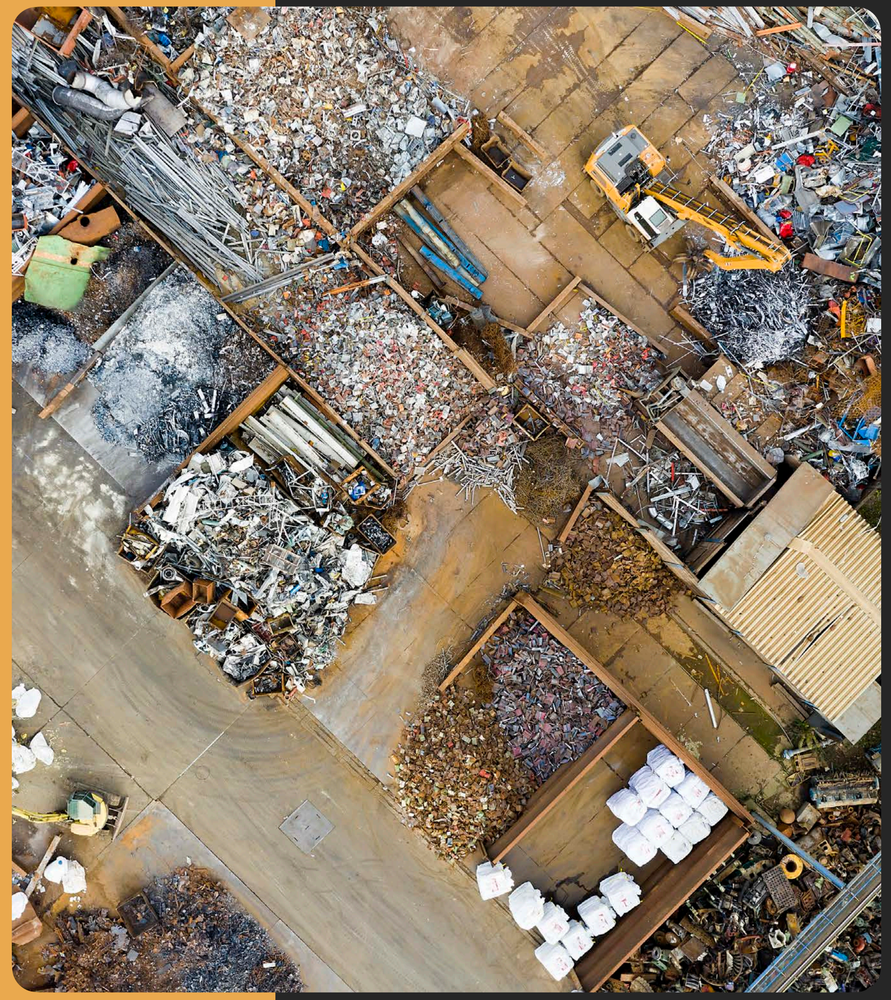
2024-2025
Walking Softer Education
4 - Material Waste
Management Solutions



Material Waste Management Solutions

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Learning Outcomes

- To examine and become familiar with a variety of existing solutions to the material waste problem
- Consider possibilities and barriers to implementing those solutions in our community

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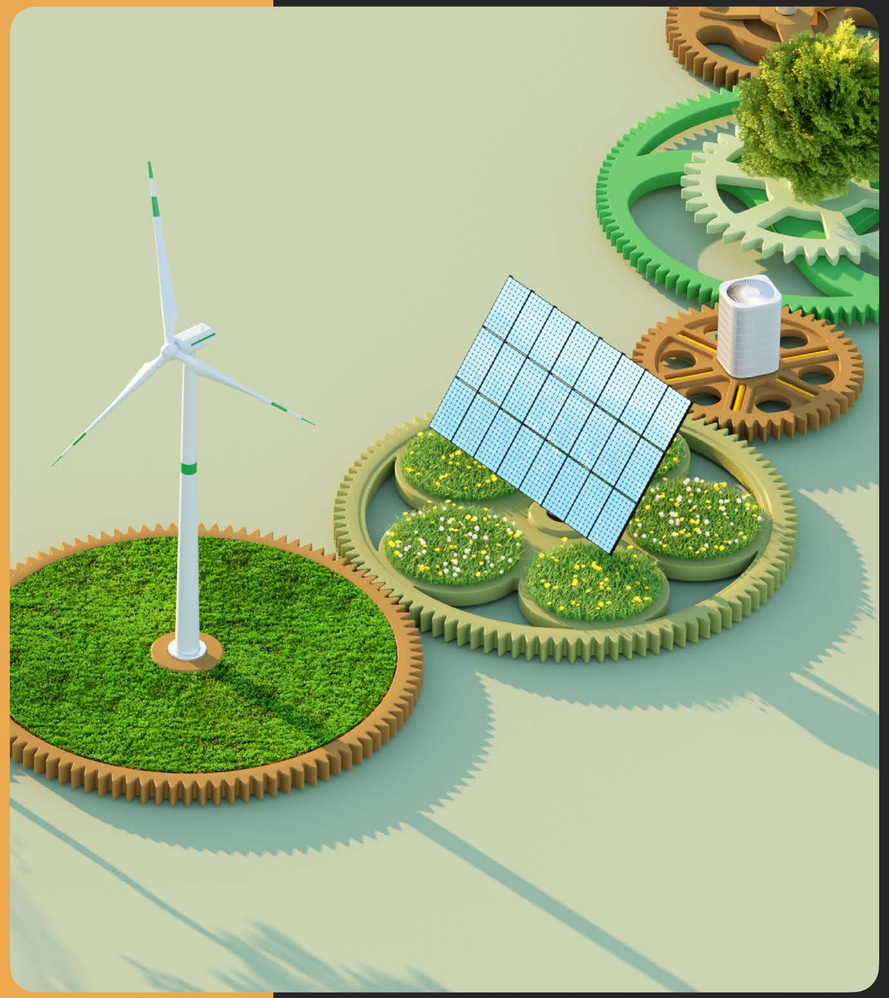

Agenda

1. Introduction to the “circular economy” concept
2. Modeling the circular economy
3. Designing your own circular products!

What is the Circular Economy?

Explaining the Circular Economy and How Society Can Re-think Progress | Animated Video Essay (4 mins)

https://youtube.com/watch?v=zCRKvDyyHml

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What is the Circular Economy?

- **Linear vs. Circular:** Linear systems are straight with a beginning and end, whereas circular systems can repeat and are cyclical
- **Building Capital:** In economics, capital refers to assets, such as money, tools, materials, equipment, and human capital that can increase productivity
- **Biodegradable:** Something that can decompose by natural earth systems such as bacteria, worms, or fungi
- **Technical Materials:** Non-biodegradable materials in products we make and use, such as plastics or metals
- **Material Inputs:** The materials that are needed to create products
- **Downcycling vs. Upcycling:** When something is downcycled, the inherent value of the materials decreases because it is typically used to make a lower-value product. Upcycling is when something can be used to create something of equal or greater value.

Circular Economy

Linear Economy

Smarter product use and manufacture	Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product.
	Rethink	Make product use more intensive (e.g. by sharing product).
	Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials.
Extend lifespan of product and its parts	Reuse	Reuse by another consumer of discarded product which is still in good condition and fulfills its original function.
	Repair	Repair and maintenance of defective product so it can be used with its original function.
	Refurbish	Restore an old product and bring it up to date.
	Remanufacture	Use parts of discarded product in a new product with the same function.
	Repurpose	Use discarded product or its parts in a new product with a different function.
Useful application of materials	Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality.
	Recover	Incineration of material with energy recovery.

Source: https://www.weforum.org/agenda/2022/05/the-circular-economy-how-it-can-be-a-path-to-real-change/

Reflections

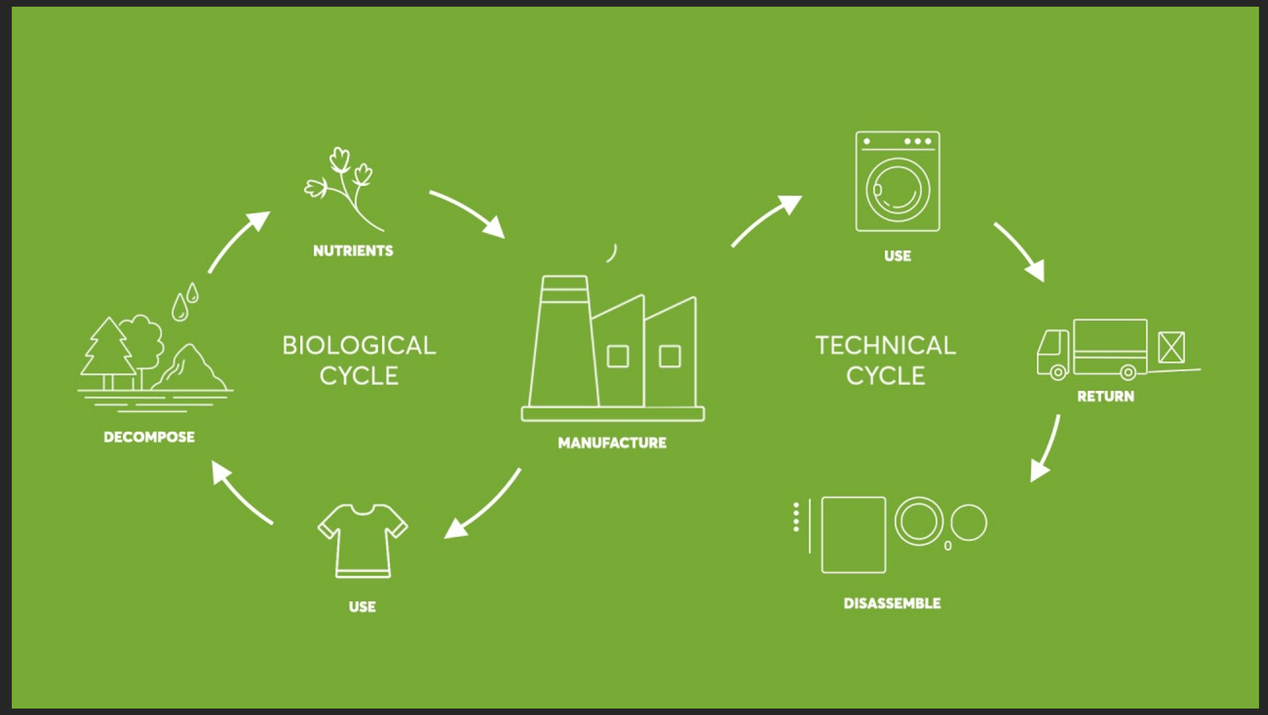
- Were you familiar with any of these R’s before seeing this diagram? If so, which ones?
- Does the location (on the circular-linear spectrum) of any of these R’s surprise you? Why?

Modeling the Circular Economy

- Split up into groups and further explore the possibilities of a circular economy
- Each group will pick an item in the classroom and create a model of how that item could be a component of a circular economy
- The model should include both visual and text elements.
- Some questions to think about while creating the model include:
  - What material inputs are needed to make the item?
  - Can those materials be upcycled?
  - How can those materials be a part of a circular economy rather than a linear one?
  - Are any of the materials biodegradable?
  - How can those materials contribute to building capital?
  - What infrastructure, money, and employment would be needed to make the item part of a circular economy?
- After creating models, each group will share with the whole group.

Circular Economy Concepts

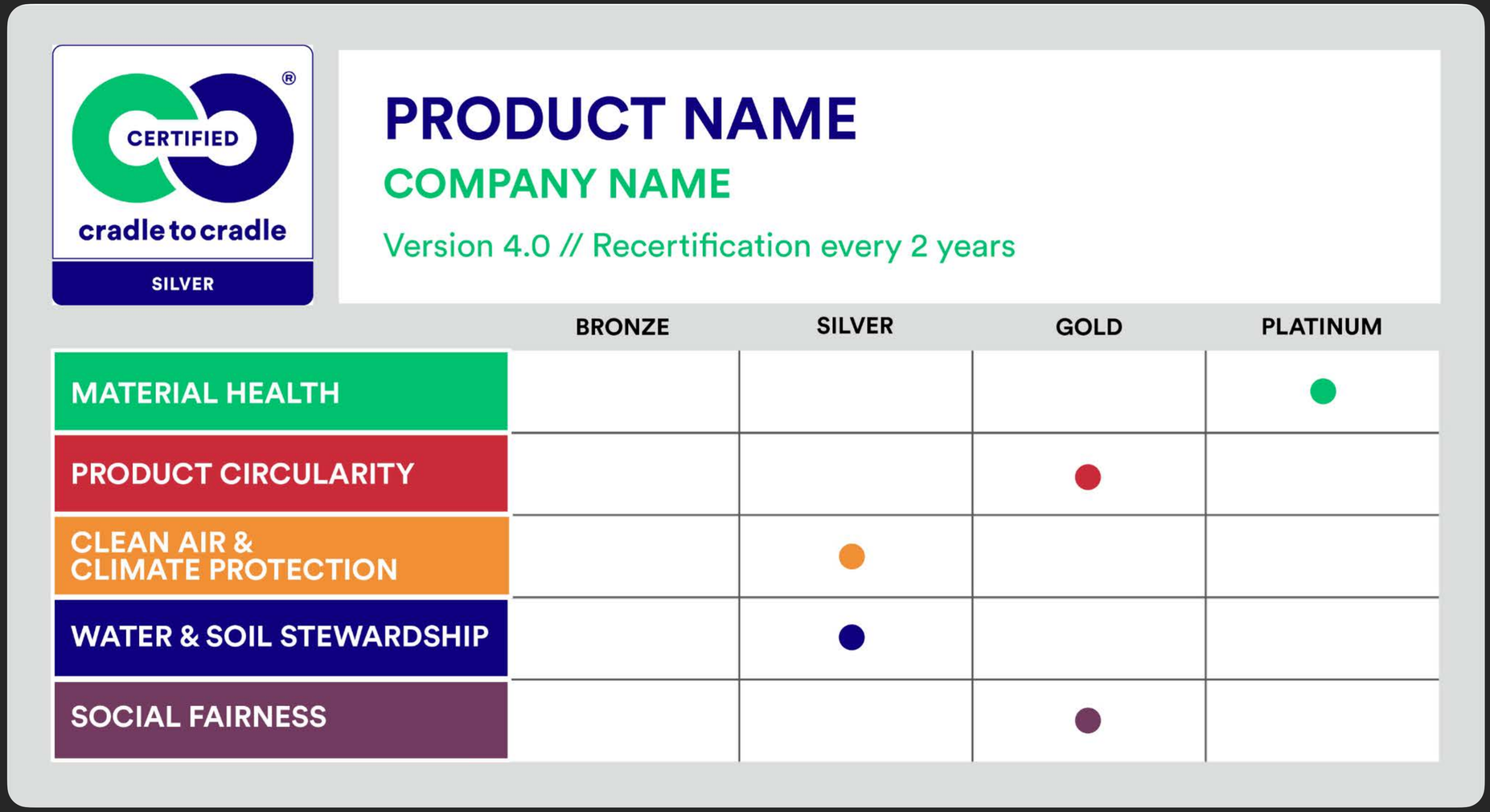
- “Design for disassembly”: Products are initially created with the intention of minimizing value loss at the end of their life, allowing for easy recovery of products, parts, and materials when they are disassembled or renovated.
- “Cradle-to-cradle”: Built on the principles of a circular economy and design for disassembly, “cradle-to-cradle” is a similar concept but much more stringent in its parameters. It is currently set up as a certification for products that meet five quality standards and are, therefore, circular. Watch this video to learn more about the C2C certification!



What is Cradle to cradle? (2 mins)
https://www.youtube.com/watch?v=zaLrT-LuvHg

Cradle to Cradle

Example of certification assessment:



Source: https://c2ccertified.org/

How can clothes be designed for disassembly?

- Use mono fibers to make clothes (e.g., 100% cotton, 100% hemp)!
    - Right now, the vast majority of textiles are made with blended fibers that cannot be separated, preventing them from being recycled.
- Use natural dyes! Many dyes are toxic and pollute and are circulated in the recycling process.
- Minimize hardware or make them easy to remove!
    - Hardware (like buttons and zippers) present challenges during the recycling process, so the fewer of them, the better, and if you do have them, make them easy to take off.
- Design with fewer seems! This way, larger pieces of clothing can be recycled rather than lots of small bits and pieces.
- Stitch rather than glue!

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Design your own circular products!

Design your own original piece of clothing with circular economy, design for disassembly, and cradle-to-cradle concepts in mind. The goal should be to design clothes that are as circular in nature as possible.

Design clothes by drawing, writing, or using digital platforms - whatever you choose, be sure to document what about your clothing helps it be more circular or what concepts of design for disassembly or cradle-to-cradle you used.

Additional Resources

- **What Is the Triple Bottom Line? | Business: Explained**: HBS Online - One way to understand a business's sustainability efforts is through a concept known as the triple bottom line.
- **Can the Circular Economy Solve Our Plastics Problem?**: Bloomberg Originals - Earthrise Studio's Alice Aedy explores a simple but radical solution to our broken recycling system.
- **Cash from trash: could it clean up the world?**: The Economist - The world is facing a growing waste problem, with 2 billion tonnes produced last year alone. Explore whether it is possible to clean up this mess by turning trash into cash.
- **This Zero-Waste Refill Store Should Be Everywhere**: Goodful - This zero-waste store lets you refill your home supplies like shampoo and deodorant while also selling plastic-free versions of everything from toothbrushes to razors.
- **Project Drawdown Climate Solutions Library**: Project Drawdown - Each solution presented here reduces greenhouse gases by avoiding emissions and/or sequestering carbon dioxide already in the atmosphere.

Contributors

Walking Softer would like to thank CJ O’Brien of the Surfrider Foundation, and Harshitha Venati for contributing to the material waste management learning materials.

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