

DesignWorkshop 2

Physical Interfaces for AI Assistants

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Circular Design and Smart Material Choices - 17.06.2024



Circular Design

Recap DW1:

Linear Economy

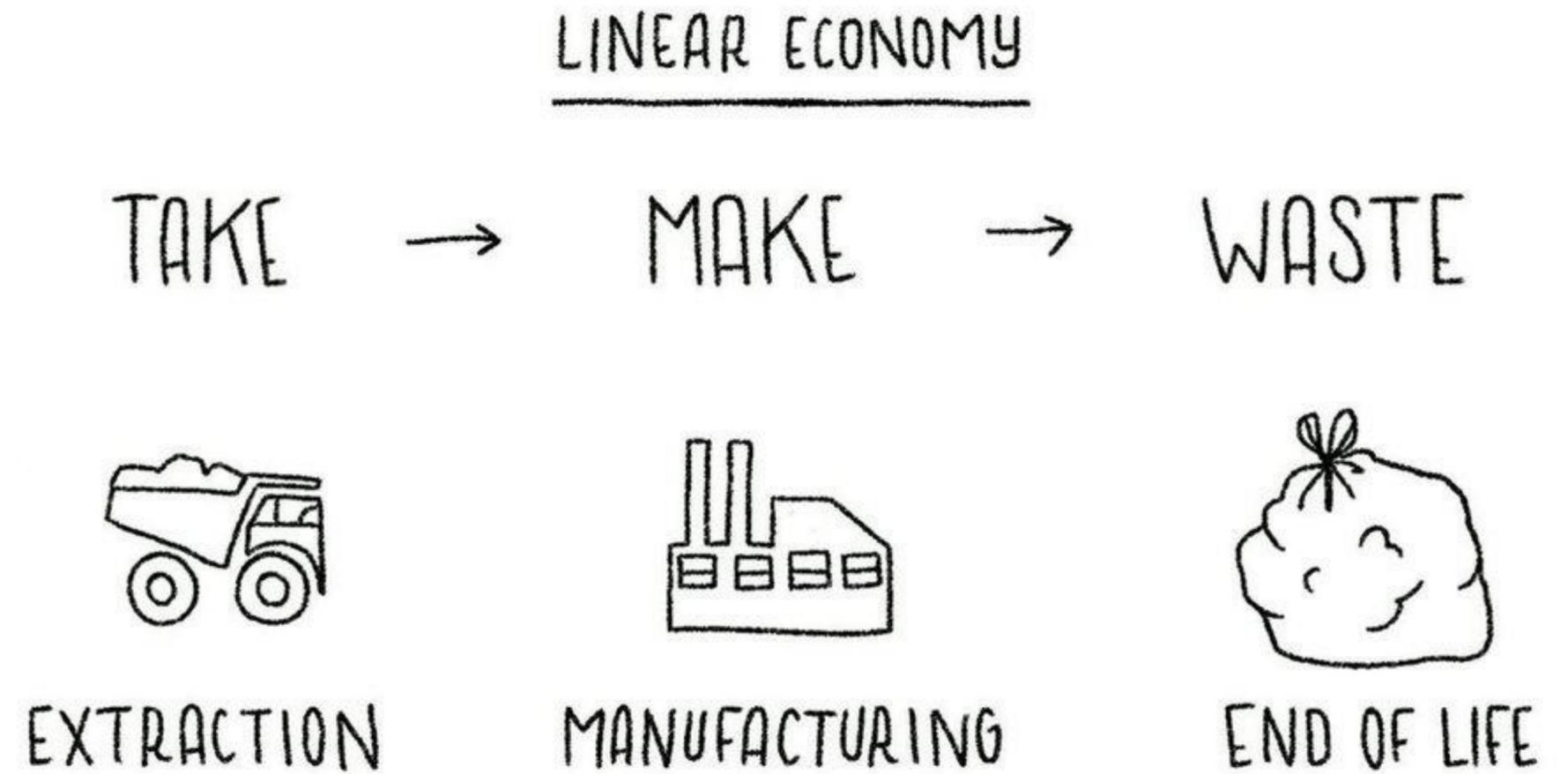
Take resources from earth

Make products to use

Waste them after use

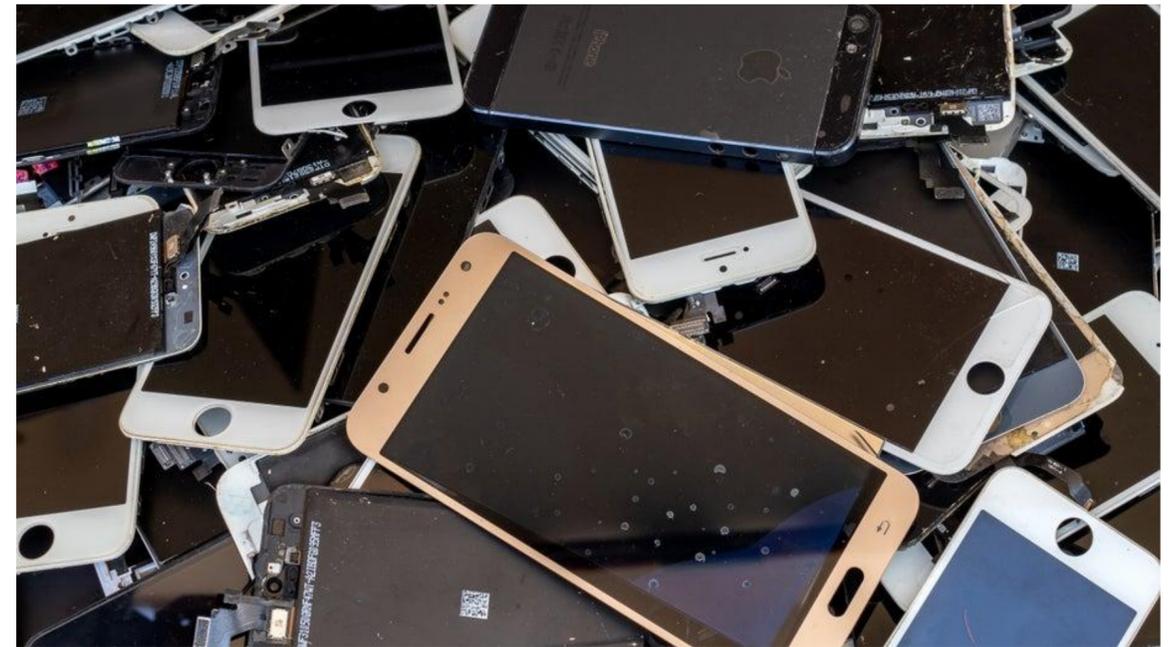
Value of input is lost + neg.
environmental impacts

Waste emerged as a cultural
practice



Planned Obsolescence

- „Obsolete“: out of date
- Origin: Worldwide economic depression (1929–1941)
- At that time a good idea: Bring current products out of date to sell more new products
- Basis: Companies make profit by selling a product
- Result: Obsolete products which turn into waste



B. London (1932). Ending the depression through planned obsolescence. Retrieved from https://upload.wikimedia.org/wikipedia/commons/2/27/London_%281932%29_Ending_the_depression_through_planned_obsolescence.pdf on 15.01.2022
<https://www.mecum.com/lots/KA0316-245967/1925-chevrolet-superior-series-k/> on 15.01.2022
Poravute Siriphiroon. Retrieved from <https://t3n.de/news/ewaste-day-2021-elektroschrott-smartphones-fairphone-1412388/> on 15.01.2022

Problem E-Waste

Electronic waste is one of the fastest growing streams of waste globally – more than 50 million tonnes of e-waste is generated each year, averaging 7 kg per person[1]. Despite clear potential for reuse or remanufacturing due to the high value of materials within them, including precious metals, less than 20% of e-waste is formally collected or recycled. Instead, e-waste sits idle in homes, ends up in landfill or is exported (sometimes illegally) to developing countries.

[1] <https://www.statista.com/topics/3409/electronic-waste-worldwide/#topicOverview>

Global Challenges

Land Use

Lithium mining in Chile

- One electric car needs 20-30 kg of lithium
- 2,2 million liters of water are needed to produce one ton of lithium
= only lithium: 44.000 liters / e-car (at least)



Tom Hegen (2021). Retrieved from <https://www.tomhegen.com/collections/the-lithium-series-i> on 23.01.2022
<https://www.deutschlandfunk.de/lithium-abbau-in-suedamerika-kehrseite-der-energiewende-100.html> on 23.01.2022
<https://www.volkswagenag.com/de/news/stories/2020/03/lithium-mining-what-you-should-know-about-the-contentious-issue.html> on 23.01.2022

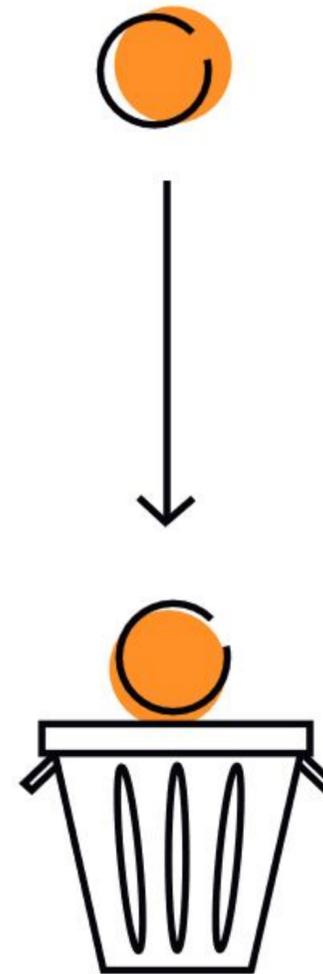
From linear to circular

Linear Economy: Short use periods, high inefficiency, lots of waste

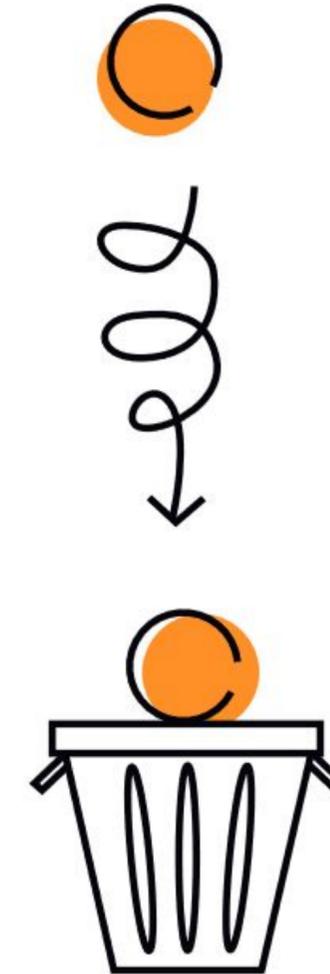
Recycling Economy: Current status Germany, part of waste is recycled

Circular Economy: Minimize waste, materials & products are reused and recycled

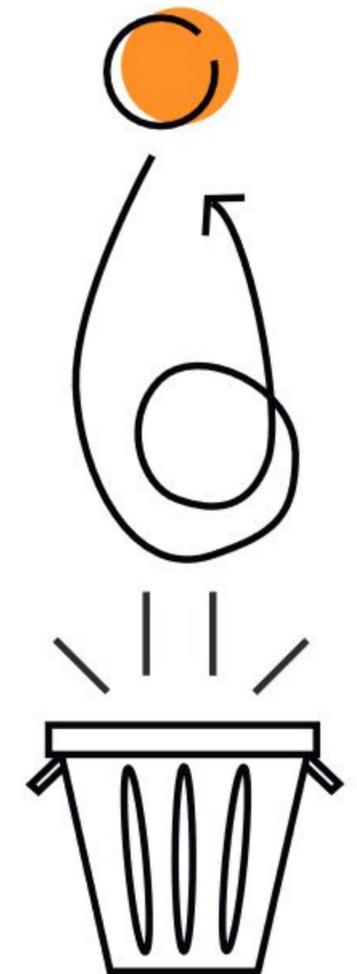
Linear Economy

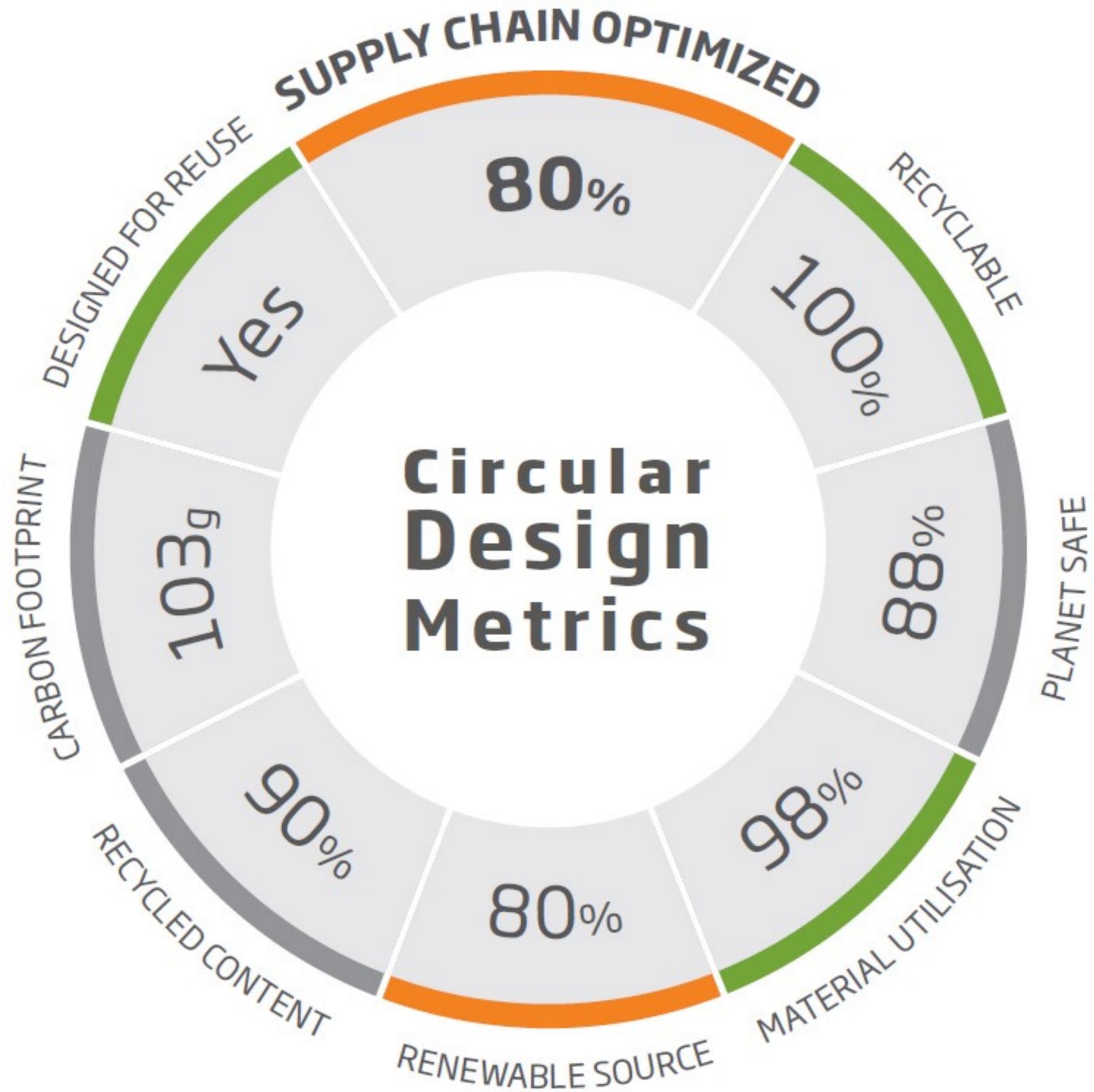


Recycling Industry



Circular Economy





Inspiration

SEARCH: Enter keyword

BIOLOGICAL STRATEGIES 285

INNOVATIONS 58

INNOVATIONS | PROCESS INFORMATION

X CLEAR ALL

Functions

- Break Down 26 +
- Get, Store, or Distribute Resources 73 +
- Maintain Community 37 +
- Make 42 +
- Modify 100 +
- Move or Stay Put 77 +
- Process Information 58 x
- Compute 11 +
- Encode/Decode 7 +
- Learn 12 +
- Navigate 5 +
- Process Signals 15 +
- Send Signals 15 +
- Sense Signals/Environmental Cues 41 +
- Protect From Physical Harm 117 +

Sectors

Academia 7

FUNCTION

Process Information

INNOVATION : ACADEMIA



Meticulous Walking Robot Inspired by Ants
Aix-Marseille University

INNOVATION : ACADEMIA



Preventative Vision Screening Device Inspired by Octopus Vision
University of Bristol

INNOVATION : INDUSTRY



Mechanical Sniffer Inspired by Canines
National Institute of Standards and Technology

INNOVATION : ACADEMIA



Astronomical Algorithm Inspired by Slime Mold
University of California Santa Cruz

INNOVATION : INDUSTRY

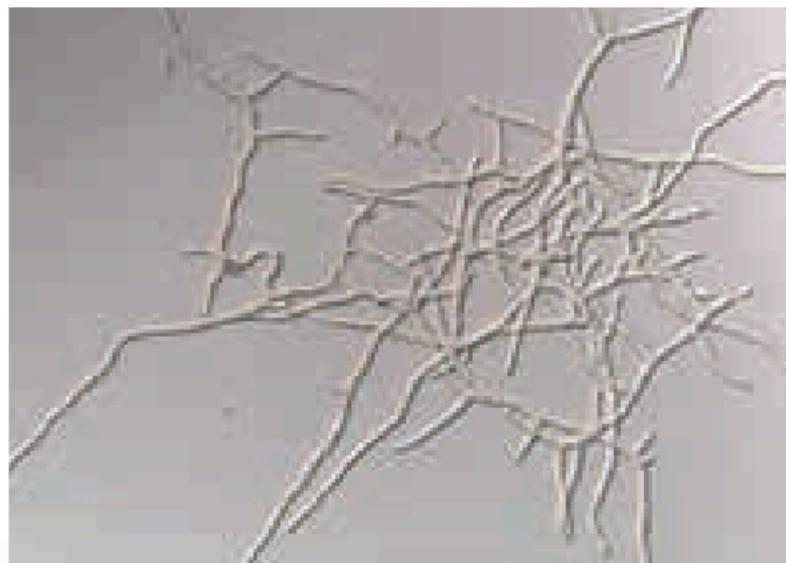


Locomotive Robot Inspired by Animals
German Research Centre for Artificial Intelligence (DKFI)

INNOVATION : INDUSTRY



Passively Cooled Building Inspired by Termite Mounds
Mick Pearce



Worksheet

THE
CIRCULAR
DESIGN
GUIDE



WORKSHEET

Smart Material Choices



Learn to make smart material choices by asking the right questions. These steps will help you make better choices about what materials go into your products as well as their impact on the wider system.

Materials play an essential role in a circular economy, so we need them to be made of safe ingredients that can be continuously cycled. By designing products with materials that come from, and safely flow, into their respective nutrient cycles, you can be part of creating an optimised materials economy that eliminates the concept of waste. So let's get materials savvy!

STEPS

- 1 Consider what parts your product is made of (tags, zipper, basic fabric, buttons etc.)

Draft Timeline

April

May

June

July

24th of June - Feedback



Draft Timeline



On the 24th of June / 8th of July (final presentation)

We will do team-reviews individually

- Present the results of working with the “Smart Material Choices” worksheet
- Define one circular design aspect in your prototype (which would play a part in an industrialisation)

Final Presentation

- “Elevator Pitch Style” 5min presentation + demonstration
- Only brief reflection of the process, more focused on “Problem vs. Solution”
- All tricks allowed

References ...

[1] Yablonski, J. (2020): Laws of UX: Using Psychology to design better Products & Services, O'Reilly Media.

[2] Weinschenk, S. (2020): 100 Things Every Designer Needs to Know About People, New Riders Publishing.

[3] Knapp, J. (2016): Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days, Simon & Schuster.

[4] Norman, D.(2013) : The Design Of Everyday Things: Revised and Expanded Edition, Basic Books,

[5] Hartson, R., & Pyla, P. S. (2018). The UX book: Agile UX design for a quality user experience. Morgan Kaufmann.

[6] Unger, R., & Chandler, C. (2023). A Project Guide to UX Design: For user experience designers in the field or in the making. New Riders.

<https://germanupa.de/wissen/fragebogenmatrix/sus>

<https://www.ueq-online.org/>