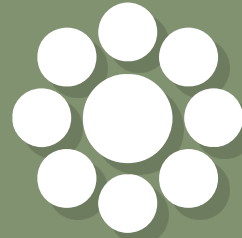


Waste is a Design Flaw

ENGR 1501 FALL 2023 - Week 10





Press release

15 Nov. 2022 | Toronto, CA

Affordability and sustainability dominating shopping behaviours this holiday season, finds EY survey

Press contact



- **55% of consumers plan to spend less on non-essential goods and services**
- **37% of Canadians plan to spend less this shopping season**
- **50% of shoppers feel they need more information to make sustainable shopping choices**



Green Technology and Sustainability Market Size Worth \$44.4 Bn by 2028: Vantage Market Research

October 21, 2022 07:14 ET | Source: Vantage Market Research

Iowa farmer honored at Sustainable Agriculture Summit



Today's Agenda



1

**DESIGN
EXPERIENCE**

2

UI AND UX

3

SLIDE DESIGN

4

DESIGN ACTIVITY

Course Objectives



- **Learn how waste creation is designed into our linear economy**
- **Understand engineering frameworks for designing “out” waste and designing with waste**
- **Explore what main components make up electronics and how to work them**
- **Create a Circular Engineering outline for an E-waste product**

Assembly Guide and Design



Due 11/22

Steps for how to assemble what you envision

This section is where we can see a lot of variance. The actual creation is not required but I am looking for effort on thinking out the process. Can be drawn, written, several slides, etc. This is the biggest part of the project.

How each component can be used



Due 11/15

For each component you salvaged, what is a possible use?

For components not listed in the assembly, how would you use them?

It's okay to not know for each but the ones unused should be identified and ideas should be given.

Be creative! Leave no trace recycling!

List what components are used in your assembly. For those not listed, give an example of how else they could be used

Value Generated and Waste Removed



Due 11/22
Last required slide!!

What is the marketability of your design?

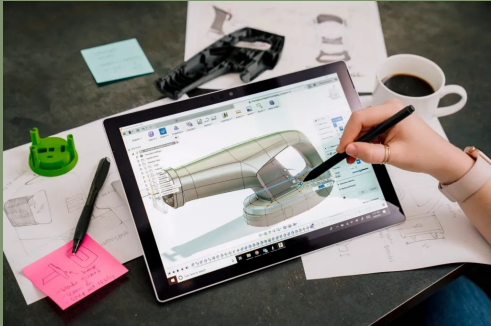
What value does your assembled product create/save?

What amount of waste did you reduce?

What would someone have learned through your disassembly and assembly?

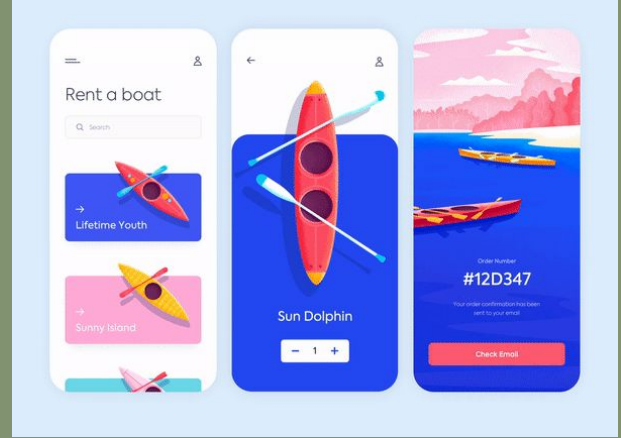
What experience do you have in design?

- Anything



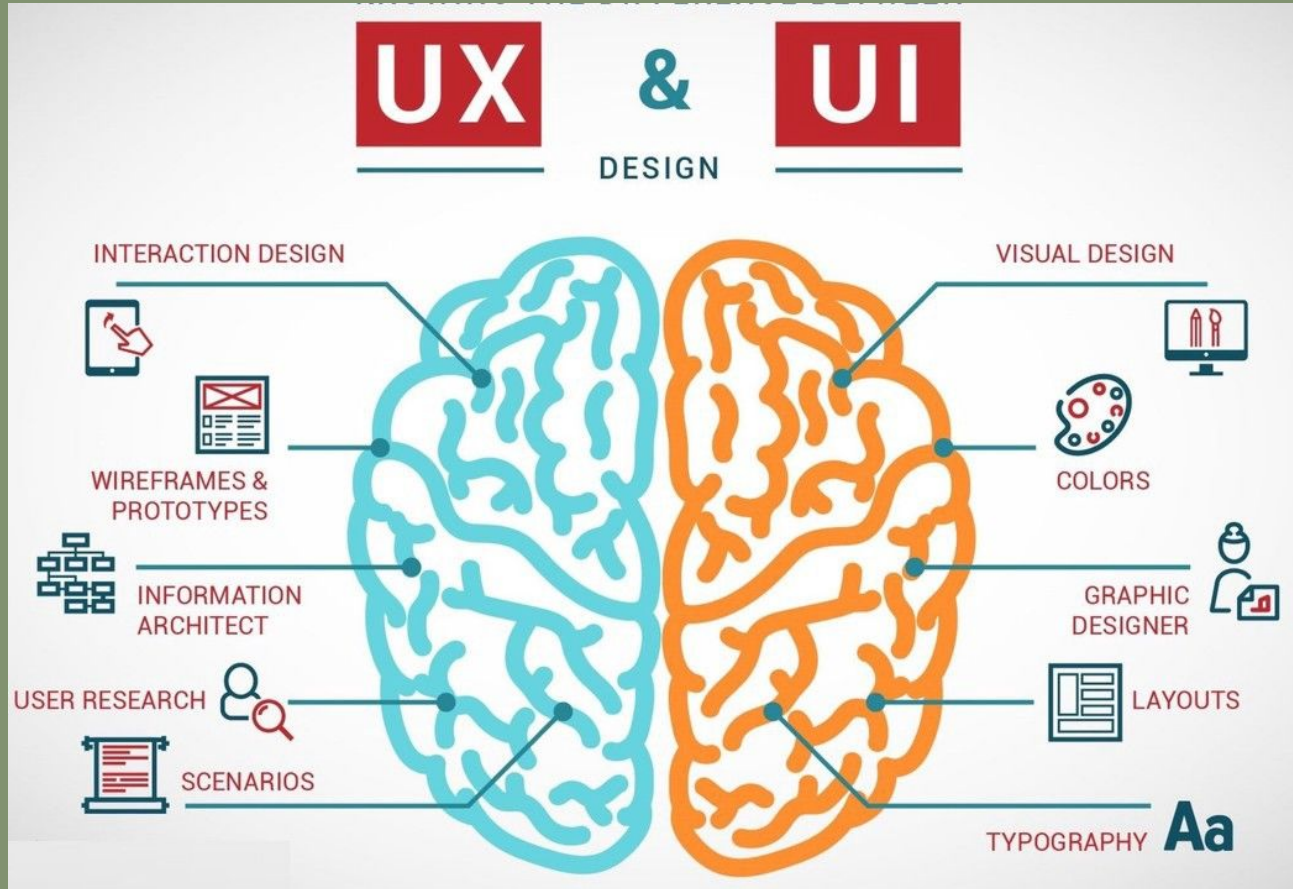
Some Design Areas

- UI - User Interface
 - Front-end coding and design for applications (web, mobile, etc.)
- UX - User Experience
 - Features and navigation
- Experiential Design
 - Customer experience journey
- Web Design
- Game Design
- Information Design
- Graphic Design



Some Design Areas

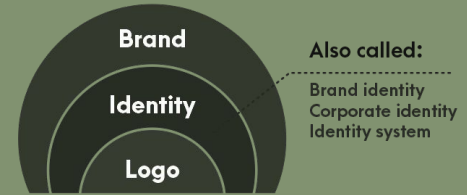
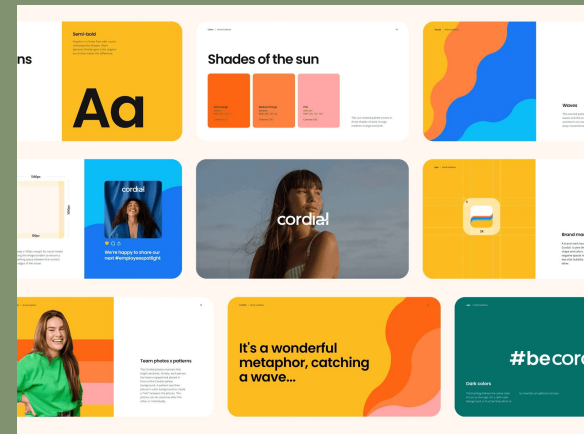
(opinion: left vs right brain is stupid)





Design Fundamentals

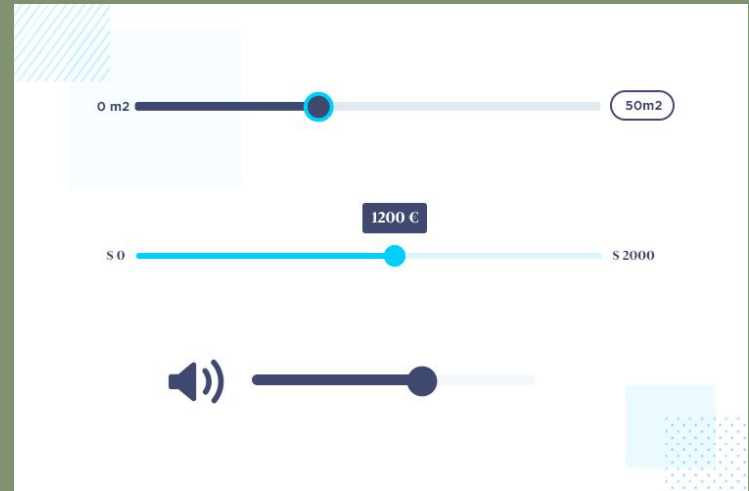
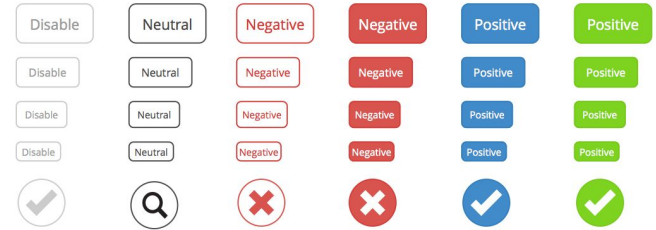
- User Interface
 - Typography
 - Informational Hierarchy
 - Style
 - Color Palette
- User Experience
 - Buttons
 - Choices
 - Navigation



Design Fundamentals

- User Interface
 - Typography
 - Informational Hierarchy
 - Style
 - Color Palette
- User Experience
 - Buttons
 - Choices
 - Navigation

Button Styling Guidelines





Informational Hierarchy

How do you tell what is most important to read.

What is the detailed information vs the large theme to take away?

How do you separate information types?



Informational Hierarchy

- **Typography**
 - **Font style, bold, underline, italics, size (Font families)**
- **Color**
 - **Matching colors for connecting info, pleasant colors, gradients**
- **Organization**
 - **Top to bottom information**
- **Boxing**



Typography

serif, sans serif, script, monospaced, and display

Font Families build off of this

- Set of fonts with a common design
 - Header, Title, Body, Subtitle, Subtext



Typography

LOREM IPSUM

Consectetur adipiscing

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.

Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

HEADING

The most important information of your message should be placed here and used to attract the viewer.

SUBHEADING

Divide your design layout into different sections to give the reader more information.

BODY

This section will include the content and that will make it text heavy.

YOU

At some point you may come back to read this line or maybe not.

WILL READ THIS FIRST.

And then you will read this line next.

You will go back to read this body copy if you want to know more. It takes the most effort to read because it has a lot of text in a small font in a light weight with tight line spacing. Many people will skip paragraphs like this unless if they aren't engaged right away. This is why it's important to draw attention to your message using visual hierarchy.

**You'll probably
read this before
the paragraph.**

How to select fonts?



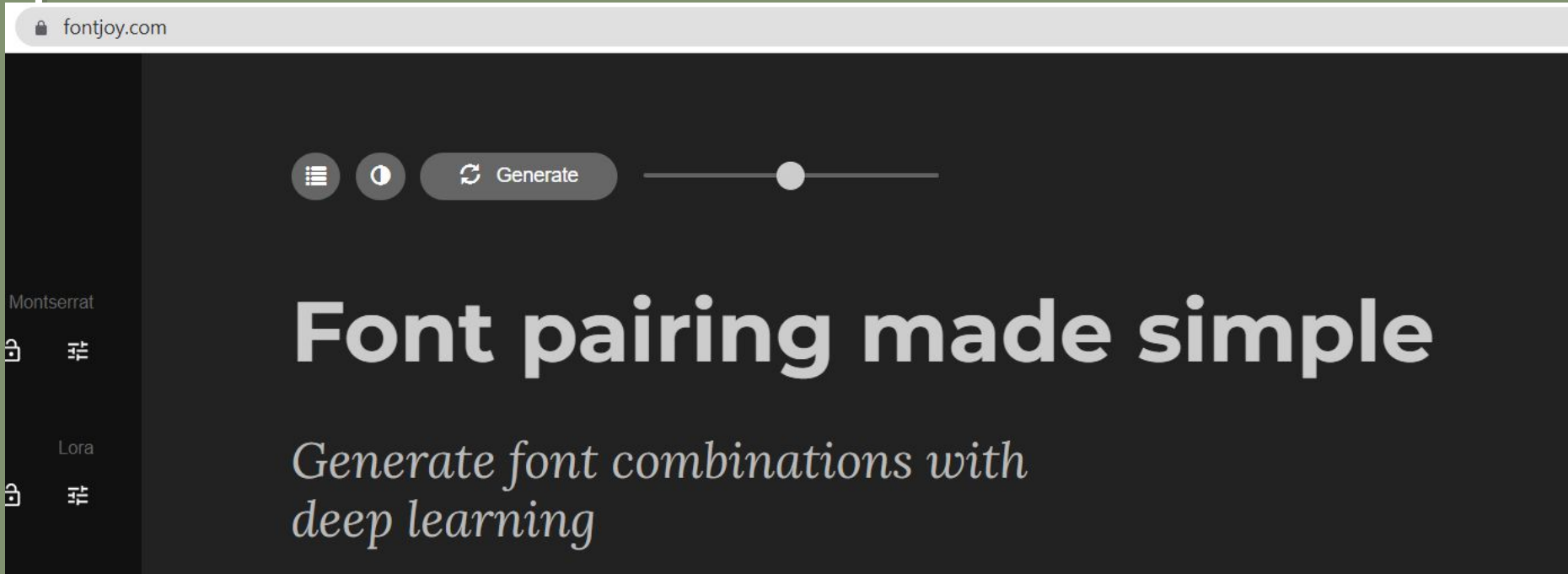
**Helps you choose fonts
for your creative projects**

enter a word or a phrase

to preview with fonts on your computer



How to select fonts?



Informational Hierarchy

EXAMPLES of VISUAL HIERARCHY



SCALE

In hieratic scaling, the most important information is the largest element in the design. Lesser information is scaled down.

©2019 Alvalyn Lundgren.



CONTRAST

The more difference there is between light and dark colors, the more something will advance visually and we'll see it first. Shape contrast is also used. For example, the HEADLINE stands out due to its complex shapes.



DIRECTION

Elements that are aligned differently from the majority of will stand out visually. If a design is mostly horizontal in stress, tall, vertical or diagonal shapes will be noticed first.



POSITION

Position on the page creates an automatic hierarchy. The most important position when reading left to right is the upper left quadrant. The next most important is the lower right quadrant. Then upper right, and least is lower left.



Informational Hierarchy

EVERNOTE Get Started Discover Download Log in **Sign up**

1 **2**

Remember everything.

Capture, organize, and share notes from anywhere. Your best ideas are always with you and always in sync.

3 **4**

Sign Up for Free

Continue with Google

Or

Email

Password

By clicking Create account, I agree to the [Terms of Service](#) and [Privacy Policy](#).

Create account

Examples

THEY NEED



YOUR **OLD RADIO** and PARTS







NOTHING TOO LARGE OR SMALL

Donate thru:
EMERSON EX-SERVICEMEN'S CLUB

Phone: STA.569-T ; STA.96-D

© 1954 Emerson Electric Co., Inc.
1718 North La Grange Ave.,
La Grange, Ill.

We STAND FOR THE Waters WE STAND IN



VOTE FOR A FUTURE OF WILD FISH AND CLEAN WATER

patagonia

Recycling Examples



RECYCLE CONTAINERS
EMPTY. RINSE. DO NOT FLATTEN

PLASTIC 

CARTONS

METAL

GLASS

NO PLASTIC BAGS **NO COMPOSTABLE PLASTICS** **NO PAPER CUPS** **NO SOLO CUPS (#6)** **NO FOOD** **NO LIQUID**

RECYCLING.COLORADO.EDU



I ♻️ **WHAT CAN I RECYCLE?**
More Recycle

TOP 10 IN THE BIN

1. CARDBOARD
2. PAPER
3. FOOD BOXES
4. MAIL
5. BEVERAGE CANS
6. FOOD CANS
7. GLASS BOTTLES
8. JARS (GLASS & PLASTIC)
9. JUGS
10. PLASTIC BOTTLES AND CAPS

ALSO RECYCLABLE BUT NOT IN CURBSIDE BIN

PLASTIC BAGS AND WRAPS 

ELECTRONICS 

TEXTILES 

Find out about your local recycling options here:
www.iwanttoberecycled.org

EPA United States Environmental Protection Agency
KEEP AMERICA BEAUTIFUL
National Waste & Recycling Association Collect. Recycle. Innovate.
SWANA 2014 Award Association

Examples

Protecting our future
includes supporting youth-led initiatives!



Climate Justice
Mural

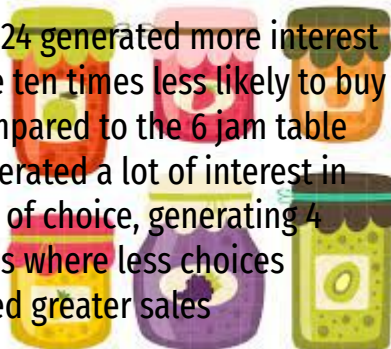
Too Many Choices: A Real Jam

Zack Landsman: Quick Talk



The Jam Jar Experiment

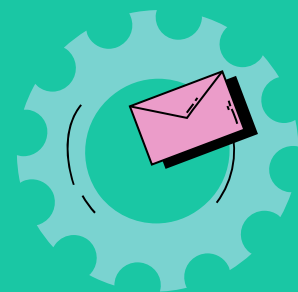
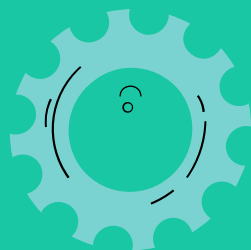
- Table of 24 generated more interest but were ten times less likely to buy a jar compared to the 6 jam table
- This generated a lot of interest in the field of choice, generating 4 scenarios where less choices generated greater sales



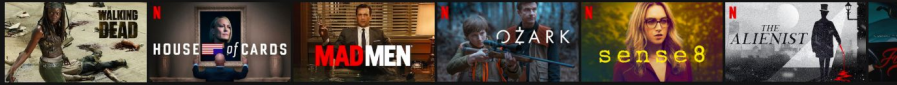
But here's the
choices, he o

re: if a person
s likely to buy

too many



Critically Acclaimed Dark TV Dramas >



Watch It Again



US Teen TV Dramas



Critically Acclaimed Suspenseful TV Dramas



1. Diminished satisfaction, even if you have made your choice.

2. Suppressed decision making.

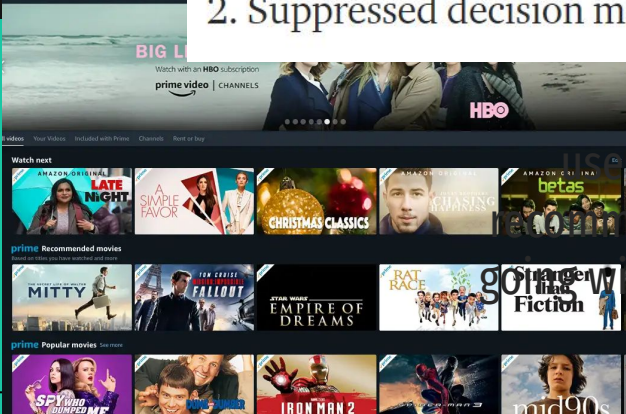
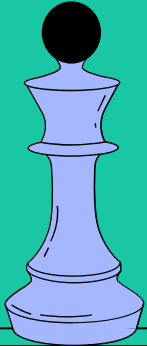
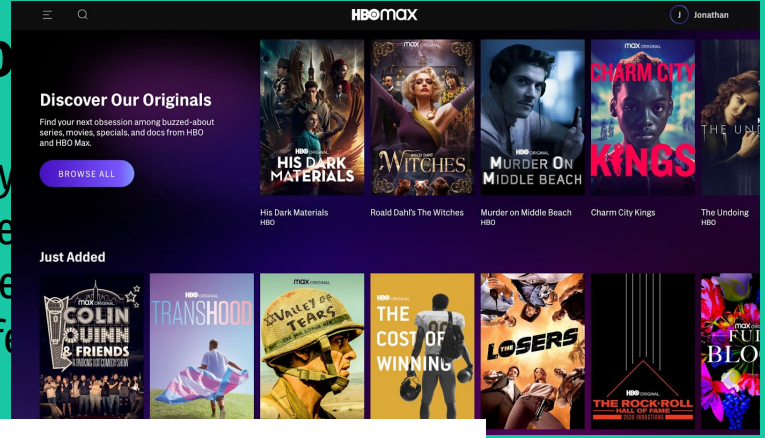
is Mo

ick easy

comple

ernative

e a prefe



ers trust their friends

endations 3x more than

going with what Netflix suggests

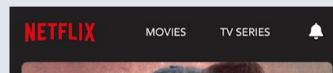


Hick's Law

Current



Proposed



Takeaways

1

Minimize choices when response times are critical to increase decision time.

2

Break complex tasks into smaller steps in order to decrease cognitive load.

3

Avoid overwhelming users by highlighting recommended options.

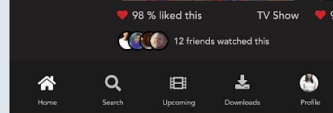
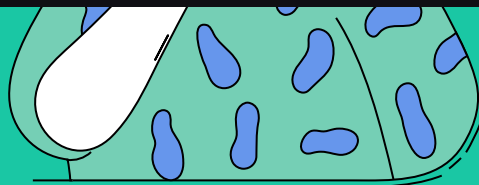
4

Use progressive onboarding to minimize cognitive load for new users.

5

Be careful not to simplify to the point of abstraction.

Continue Watching for Anupam



Implementation

Spotify's redesigned homepage makes your favorites easier to access

And it greets you with a 'good morning'



3. Ego depletion

Have you noticed that figures like Barack Obama and Mark Zuckerberg **wear the same clothes day after day**? Do you know *why* they do this?

It's because they know they have important decisions to make, and they don't want to sap their energy with trivial concerns.

Shopping Without Purchase: an Investigation of Consumer Browsing Behavior

A new study reveals that you don't need a big company advertising budget to drive sales—**face-to-face word of mouth among friends and family** drive more purchases than any other purchase influence. It's an insight of vital importance to every small business owner.



How does this apply to presentation slides?

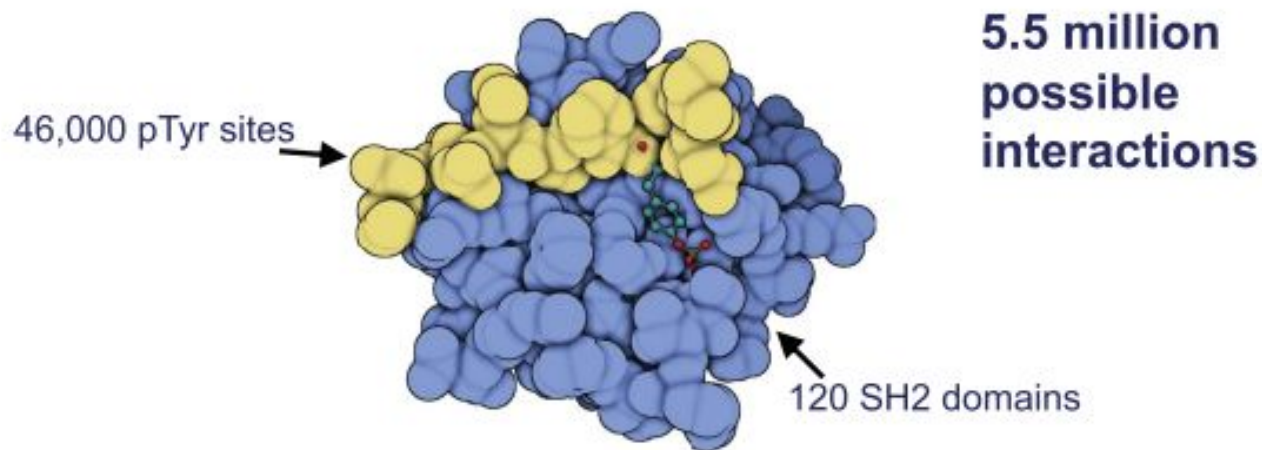
- Slides reinforce a main idea
- YOU tell the story

What do you think of this slide?

BACKGROUND

- SH2 domains are central to cell signaling networks that use tyrosine phosphorylation (pTyr)
 - PTB domains also bind pTyr ligands
- They bind ligands only when phosphorylation has occurred
 - This is regulated by the electrostatic interactions of an arginine in the SH2 domain binding pocket with the negatively charged phosphates on the tyrosine
- They discriminate between different ligand sequences via the remaining sequence around the pTyr, mostly on the C-terminal side of the pTyr
- There are 46,000 pTyr sites in the human proteome and 120 SH2 domains, meaning there are ~5.5e6 possible interactions in human cells

SH2 domains reversibly interact with phosphotyrosine (pTyr) ligands



Structure: PDB 2IUI (Nolte et al., Nat Struct Biol, 1996)

BACKGROUND

RULE 3,7,8

RULE 1

New Slide 1

- SH2 domains are central to cell signaling networks that use tyrosine phosphorylation (pTyr)

~~• PTB domains also bind pTyr ligands~~ RULE 4

- They bind ligands only when phosphorylation has occurred
 - This is regulated by the electrostatic interactions of an arginine in the SH2 domain binding pocket with the negatively charged phosphates on the tyrosine

- They discriminate between different ligand sequences via the remaining sequence around the pTyr, mostly on the C-terminal side of the pTyr

New Slide 2

- There are 46,000 pTyr sites in the human proteome and 120 SH2 domains, meaning there are ~5.5e6 possible interactions in human cells

RULE 6. 7



RULE 5

Structure: PDB 2IUI (Nolte et al., Nat Struct Biol, 1996)

EDITORIAL

Ten simple rules for effective presentation slides

Kristen M. Naegle *

Biomedical Engineering and the Center for Public Health Genomics, University of Virginia, Charlottesville, Virginia, United States of America

* kmn4mj@virginia.edu



What tools do you use for design?

- Anything



Tools available (freeeeee)

- Canva
- Slidesgo - Free google slide templates
- Figma - UI/UX design but also easy vector design
- Colors - color palette generator
- Wordmark
- Fontjoy
- Microsoft paint
- Powerpoint
- Inkscape (free adobe illustrator)
- Blendr (versatile 3D/2D design/animation)



Design Workshop!!

Create a poster that helps inform an audience of your choosing about a randomly generated phrase.

You can use whatever you want to make it and we will spend the rest of class designing and then showcasing!



Design Workshop!!

Create a poster that helps inform an audience of your choosing about a randomly generated phrase.

You can use whatever you want to make it and we will spend the rest of class designing and then showcasing!

FEELING STUCK?

BETWEEN A ROCK AND A HARD PLACE?

LEAVE.

VISIT YOSEMITE.

LEAVE YOUR HARDSHIPS AND
FIND YOURSELF ON A ROCK NOT
BETWEEN ONE

PAID FOR BY THE STAND ON ROCK FOUNDATION IN COLLABORATION
WITH THE ANTI-HARD PLACE COLLABROATIVE



RAIN ON YOUR PARADE



BACK TO SQUARE ONE

THE MODERN ARCHITECTURAL REVOLUTION

5 PM DECEMBER 10, 2022
DOME ROOM



NEEDLE IN A HAYSTACK

FALL

NOVEMBER
2022

FESTIVAL

UNIVERSITY OF
VIRGINIA

Find the Needle
Competition



11 HANCOCK
CHARLOTTESVILLE,
VA

PINK FLOYD PRESENTS

**A FOOL AND HIS
MONEY ARE SOON
DEPARTED**

THE MONEY TOUR

2 0 2 3

SUMMER CONCERT TOURS

5 Cities | 10 - 15 July | 5 Arenas

OPENING LINEUPS

Taylor Swift | Lil Yachty | Joji

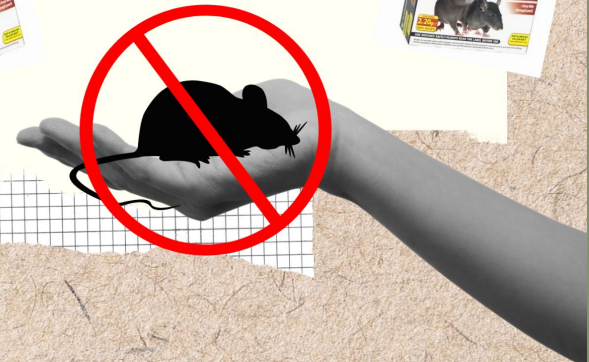
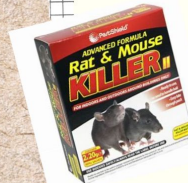
Ticket Available: www.pinkfloyd.com



I SMELL A RAT



PESTSHIELD
RAT AND MOUSE
KILLER



Thought for the class:

“brain scan studies reveal that the sight of an attractive product can the part of the motor cerebellum that governs hand movement. Instinctively, we reach out for attractive things; beauty literally moves us.

<https://www.nytimes.com/2013/02/17/opinion/sunday/why-we-love-beautiful-things.html>

Recommended Media:

[The first secret of great design | Tony Fadell](#)





Appendix Slides











Type of Plastics: Broad

- **Thermoplastics** soften on heating and harden on cooling. Examples include polyethylene (PE), polypropylene (PP), polytetrafluoroethylene (Teflon), polyethylene terephthalate (PET), polyamide (PA), polyvinyl chloride (PVC) and polystyrene (PS).
- **Thermosets** never soften once they have been molded. Examples include Epoxy resins, polyurethane (PU), polyester resins, and Bakelite.
- **Elastomers** are elastic in character, so they can return to their original shape after stretching. Examples include rubber and neoprene.








Microplastics - less than 5mm

Type of Plastics: Numbers and Initials

 Which plastics are recyclable?
Resin Identification Number (RIN) & Type

						
PETE	HDPE	V	LDPE	PP	PS	Other





How To Recycle

						
Widely Accepted	Widely Accepted	Rarely Accepted	Rarely Accepted <small>Check local retail bag collections.</small>	Moderately Accepted	Rarely/Never Accepted	Rarely/Never Accepted

Plastics #1 & 2 are the most desired material. Check with your local service provider for details on your local recycling collection program.

EcoStrategiesGroup.com

Type of Plastics: Numbers and Initials

 PETE	 HDPE	 PVC	 LDPE	 PP	 PS	 OTHER
polyethylene terephthalate	high-density polyethylene	polyvinyl chloride	low-density polyethylene	polypropylene	polystyrene	other plastics, including acrylic, polycarbonate, polyactic fibers, nylon, fiberglass
soft drink bottles, mineral water, fruit juice container, cooking oil	milk jugs, cleaning agents, laundry detergents, bleaching agents, shampoo bottles, washing and shower soaps	trays for sweets, fruit, plastic packing (bubble foil) and food foils to wrap the foodstuff	crushed bottles, shopping bags, highly-resistant sacks and most of the wrappings	furniture, consumers, luggage, toys as well as bumpers, lining and external borders of the cars	toys, hard packing, refrigerator trays, cosmetic bags, costume jewellery, CD cases, vending cups	

Current Plastic Recycling

1. Sort
2. Wash
3. Shred
4. Melt
5. Pellet






Precious Plastic

MAKE IT
PRECIOUS

Start a business from plastic waste!

[Learn how to start](#)





Teardown Steps

1. Safety
2. Disassembly
3. Identification
4. Sorting

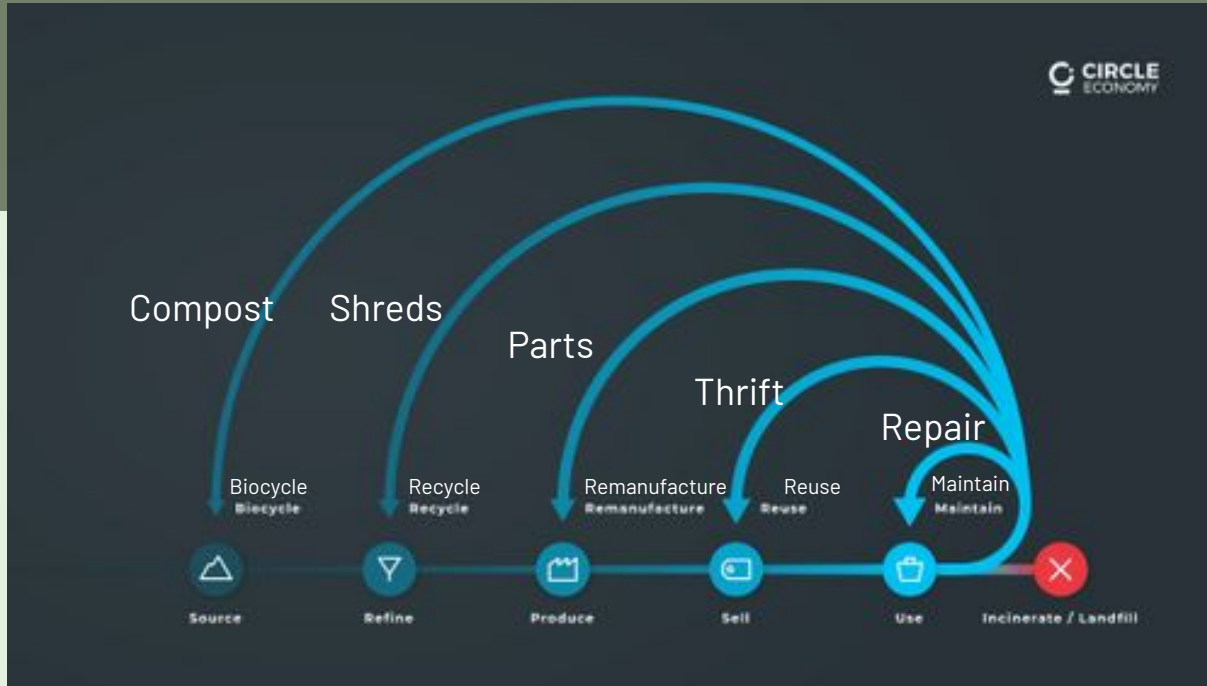


E-Waste Recycling Process

1. Collection
2. Storage
3. Disassembly
 - a. Data Deconstruction
 - b. Toxic Waste Removal
4. Recovery (Recycle, Remanufacture, etc.)
5. Reintegration (Donation/Selling)

CIRCLE ECONOMY

Common Language for reintegration process





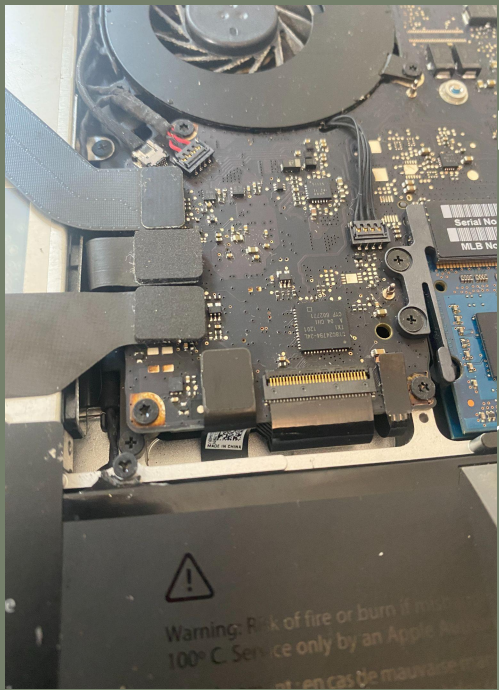
Class Naming Convention of 12 Principles

1. Safety First
2. Prevention
3. Low resource separation and purification
4. Optimization
5. Limit Extraneous thinking
6. Hard Work to Salvage Gold
7. Realistic Design Goals (Durability)
8. Necessary design
9. Minimize material diversity
10. Integration and interconnectivity of resources
11. Long-term designing
12. Renewable sources



How Companies Design Waste?

1. Hardware
2. Software
3. System



Macbook Air

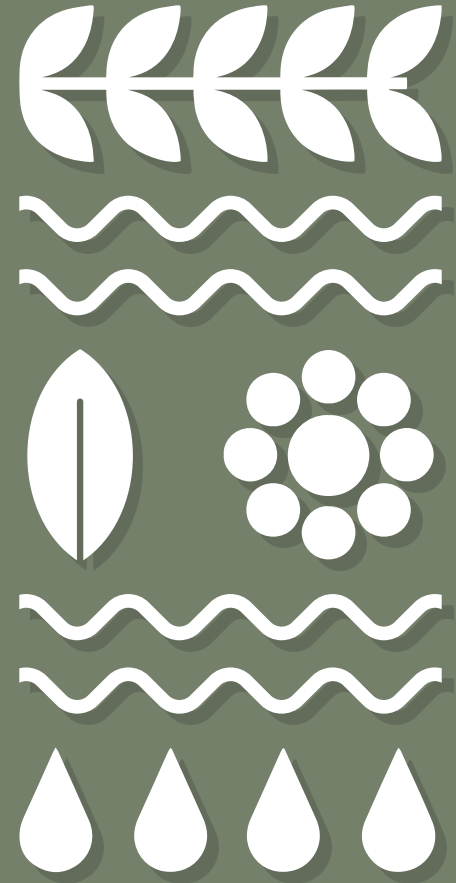


Simon Game
Uno Game

That means each year we waste 90 billion tons of resources. This also means that we create 90 billion tons of potential resources.

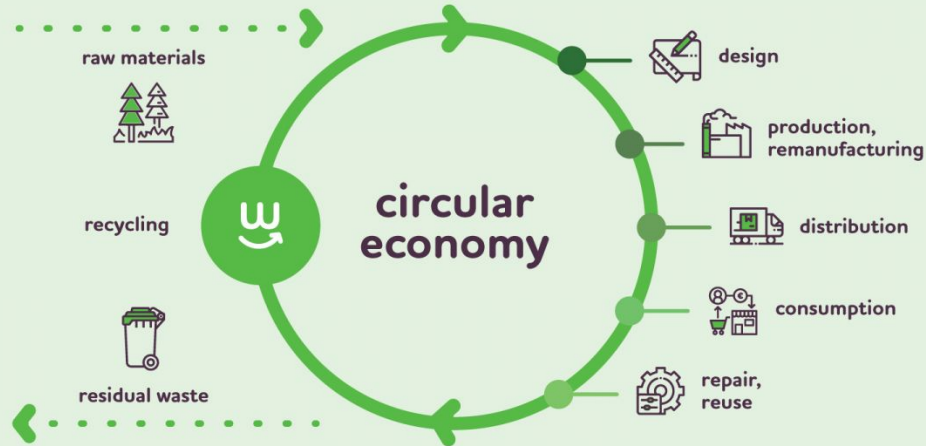
The current dominant economy is linear in its processes: it takes resources, makes goods, and quickly wastes them.

-CIRCLE REPORT, 2021



CIRCLE ECONOMY

The circular economy is an economic system where waste is designed out, everything is used at its highest possible value for as long as possible and natural systems are regenerated.



These 2 will be our main focus



USE **WASTE** AS A RESOURCE

Utilise waste streams as a source of secondary resources and recover waste for reuse and recycling.



STRETCH THE LIFETIME

While resources are in-use, maintain, repair and upgrade them to maximise their lifetime and give them a second life through take back strategies when applicable.

The 12 Principles of Green Engineering

- Principle 1:** Designers need to strive to ensure that all material and energy inputs and outputs are as inherently nonhazardous as possible.
- Principle 2:** It is better to prevent waste than to treat or clean up waste after it is formed.
- Principle 3:** Separation and purification operations should be designed to minimize energy consumption and materials use.
- Principle 4:** Products, processes, and systems should be designed to maximize mass, energy, space, and time efficiency.
- Principle 5:** Products, processes, and systems should be “output pulled” rather than “input pushed” through the use of energy and materials.
- Principle 6:** Embedded entropy and complexity must be viewed as an investment when making design choices on recycle, reuse, or beneficial disposition.
- Principle 7:** Targeted durability, not immortality, should be a design goal.
- Principle 8:** Design for unnecessary capacity or capability (e.g., “one size fits all”) solutions should be considered a design flaw.
- Principle 9:** Material diversity in multicomponent products should be minimized to promote disassembly and value retention.
- Principle 10:** Design of products, processes, and systems must include integration and interconnectivity with available energy and materials flows.
- Principle 11:** Products, processes, and systems should be designed for performance in a commercial “afterlife”.
- Principle 12:** Material and energy inputs should be renewable rather than depleting.

Through *the* 12 Principles **GREEN** *Engineering*

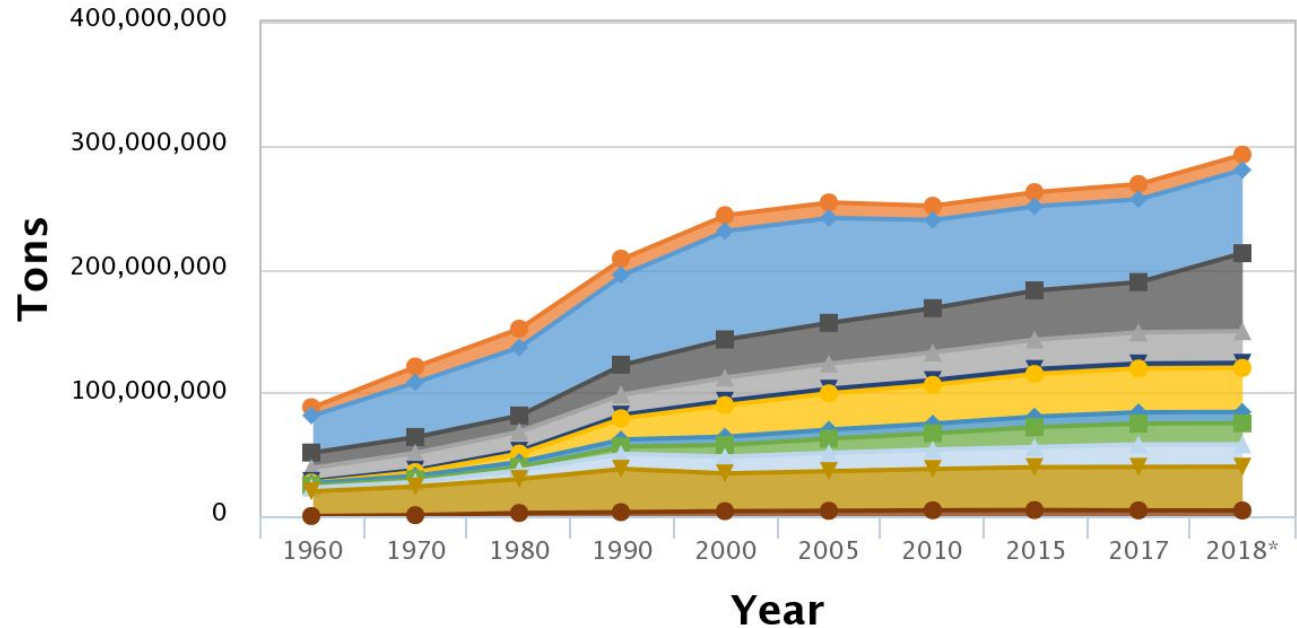
Let's make a memorable summary phrase/word for each principle so they can be easily referenced

We will also go through any questions you all have on the principles for how to implement and what they mean.

We will be testing Miro for this, so please go to the announcements page on Collab

- Average U.S. person produces 4.9 pounds of waste per day
- That's 1,788.5 pounds a year. Almost a full TON per person.

Generation Tonnages, 1960-2018



Click on legend items below to customize items displayed in the chart

- Glass**
- Paper & Paperboard**
- Food**
- Metals**
- Misc Inorganic Waste**
- Plastics**
- Rubber & Leather**
- Textiles**
- Wood**
- Yard Trimmings**
- Other**














By 2000, global waste production per year was at 54.9 billion tons and as of 2019, it surpassed 100 billion tons,

Of the 100 billion tons of resources used by the global economy each year, only 8.6% are cycled back.





	Make & use	Annual economic value loss	Share of annual carbon budget by 2050	Other negative impacts
 Plastics	 50% of all plastics are single-use	120bn USD	 15%	 More plastics than fish in the ocean by 2050 (by weight)
 Fashion & textiles	 60% of clothing is landfilled or burnt within years of being made	500bn USD	 26%	 22m tonnes of plastic microfibres entering the ocean between 2015 and 2050
 Food & agriculture	 33% of edible food is thrown away	1,300bn USD	 77%	 For every dollar spent on food, society is paying two dollars in health, environmental, and economic costs

Source: Ellen MacArthur Foundation, *Financing the Circular Economy: capturing the opportunity* (2020)