

Presentation Sources	Links
Organisations	
Materiom Platform	Materiom.org
EcoRegions	https://ecoregions2017.appspot.com/
FabCity initiative	https://fab.city/
Fab Foundation	https://fabfoundation.org/
Ellen McArthur Foundation	Biological and Technical loops diagram
EMF Circular Design Guide	https://www.circulardesignguide.com/
Mark Dorfman, Biomimicry Institute	Biomimicry Videos
Biomimicry 3.8	https://biomimicry.net/
GBIF Global Biodiversity Information Facility	Map
Ask Nature	https://asknature.org/
Reflow Project	Reflow website
IDEO	https://www.ideo.com/eu
British Council	https://www.britishcouncil.org/
Biomaterials Case Studies	
Seaweed Bottle - Ari Jónsson	Biodegradable Water Bottle
Ellen Rykkelid	www.ellenrykkelid.com
NOOR ELGEWELY	www.noorelgewely.com/4-bioplasic
The Shellworks	www.theshellworks.com
Crafting Plastics	www.craftingplastics.com
Chip[s] Board	www.chipsboard.com
Notpla	www.notpla.com
Piñatex	www.ananas-anam.com
Bolt Threads	www.boltthreads.com/technology/mylo/
Blast Studio	www.blast-studio.com
Margarita Talep - seaweed-based packaging	Margarita Talep
Emma Sicher - bacteria-based packaging	Emma Sicher
Charlotte McCurdy - seaweed-based garments	Charlotte McCurdy
Eben Bayer - Ecovative Design - Mushroom packaging	https://ecovatedesign.com/
(Somos) LABVA	https://www.labva.org/

Other Website Links	
AlgiKnit	https://www.algiknit.com/
<u>Mycoworks</u>	https://www.mycoworks.com/
Open Cell	https://www.opencell.bio/
Ecovative	https://ecovatedesign.com/
GreenLab	https://www.greenlab.org/
CraftsCouncil	https://www.craftscouncil.org.uk/
Franklin Till	www.franklintill.com
Colour Hive	www.colourhive.com
Material Driven	www.materialdriven.com
Oddbox	https://www.oddbox.co.uk/
Atlas of the Future	https://atlasofthefuture.org/
Institute of Making	https://www.instituteofmaking.org.uk/
Metabolic	https://www.metabolic.nl/about/
WWF	https://www.worldwildlife.org/biomes
Common Objective	https://www.commonobjective.co/
Fashion Revolution	https://www.fashionrevolution.org/
Dezeen	https://www.dezeen.com/
Trash to Cash	https://www.trash2cashproject.eu/
Offset Warehouse	https://www.offsetwarehouse.com/
MA Material Futures	https://www.arts.ac.uk/subjects/textiles-and-materials
MA Biodesign	https://www.arts.ac.uk/subjects/textiles-and-materials
Remakery	http://remakery.org/
LMB Textile Recycling	http://www.lmb.co.uk/
Modern Meadow	http://www.modernmeadow.com/
Blond and Bieber	https://www.blondandbieber.com/algaemy
Merdacotta	http://www.theshitmuseum.org/prodotti/i-prodotti-da-t
Unmade (formerly Knyttan)	https://www.unmade.com/
Kniterate (compact digital knit	https://www.kniterate.com/

Green Chemistry Principles	
1	Prevent waste: Design chemical syntheses to prevent waste. Leave no waste to treat or clean up.
2	Maximize atom economy: Design syntheses so that the final product contains the maximum proportion of the starting materials. Waste few or no atoms.
3	Design less hazardous chemical syntheses: Design syntheses to use and generate substances with little or no toxicity to either humans or the environment.
4	Design safer chemicals and products: Design chemical products that are fully effective yet have little or no toxicity.
5	Use safer solvents and reaction conditions: Avoid using solvents, separation agents, or other auxiliary chemicals. If you must use these chemicals, use safer ones.
6	Increase energy efficiency: Run chemical reactions at room temperature and pressure whenever possible.
7	Use renewable feedstocks: Use starting materials (also known as feedstocks) that are renewable rather than depletable. The source of renewable feedstocks is often agricultural products or the wastes of other processes; the source of depletable feedstocks is often fossil fuels (petroleum, natural gas, or coal) or mining operations.
8	Avoid chemical derivatives: Avoid using blocking or protecting groups or any temporary modifications if possible. Derivatives use additional reagents and generate waste.
9	Use catalysts, not stoichiometric reagents: Minimize waste by using catalytic reactions. Catalysts are effective in small amounts and can carry out a single reaction many times. They are preferable to stoichiometric reagents, which are used in excess and carry out a reaction only once.
10	Design chemicals and products to degrade after use: Design chemical products to break down to innocuous substances after use so that they do not accumulate in the environment.
11	Analyze in real time to prevent pollution: Include in-process, real-time monitoring and control during syntheses to minimize or eliminate the formation of byproducts.
12	Minimize the potential for accidents: Design chemicals and their physical forms (solid, liquid, or gas) to minimize the potential for chemical accidents including explosions, fires, and releases to the environment.
Biomimicry3.8 Video	https://synapse.bio/blog//demystifying-life-friendly-chemistry https://www.compoundchem.com/2015/09/24/green-chemistry/ https://www.e-education.psu.edu/eme807/node/534 https://link.springer.com/chapter/10.1007/978-1-4020-3175-5_3
Beyond Benign	https://www.beyondbenign.org/about/

Video	Link
Materiom Vimeo	https://vimeo.com/user101264043
Materiom Youtube Playlists	https://www.youtube.com/channel/UC2MBh7iSbv848g9Po8ciAUA/playlists
Biomimicry 3.8 - Life Friendly Chemistry Explained	https://synapse.bio/blog//demystifying-life-friendly-chemistry (video to download)
DIF (Disruptive Innovation Festival) Youtube	https://www.youtube.com/channel/UCQAC2otE5_agzHZPnk3mE5w
Economy: Ken Webster, the economy is not a force of nat	https://www.youtube.com/watch?v=GIFqkj-0UEk

Vocabulary	A-Z of Terms, useful vocabulary or phrases		
A	Abundant	is existing or occurring in large amounts : ample.	
	Algae	simple plants that can range from the microscopic (microalgae), to large seaweeds (macroalgae), such as giant kelp	
	Alternative	a choice limited to one of two or more possibilities, as of things, propositions, or courses of action.	
	Applications	any material, product or a program which is designed for end-user to use.	
B	Biology	the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution.	
	Biomass	waste material from plants or animals that is not used for food or feed; it can be waste from farming (like wheat stalks) or horticulture (yard waste)	
	Biopolymers	polymers produced by living organisms; in other words, they are polymeric biomolecules.	
	Byproducts	is a secondary product derived from a manufacturing process or chemical reaction. It is not the primary product or service being produced	
C	Case studies	research method involving an up-close, in-depth, and detailed examination of a subject of study (the case), as well as its related contextual conditions	
	Catalyst	a substance that causes or accelerates a chemical reaction without itself being affected	
	Carrageenan(s)	a family of linear sulfated polysaccharides that are extracted from red edible seaweeds.	
	Celulose	an organic compound with the formula (C ₆ H ₁₀ O ₅) _n , a polysaccharide. an important structural component of the primary cell wall of green plants, many forms of algae and the oomycetes. Some species of bacteria secrete it to form biofilms.	
	Chemical building blocks	amino acids from proteins, sugars from carbohydrates	
	Chitin	a long-chain polymer of N-acetylglucosamine, is a derivative of glucose. It is a primary component of cell walls in fungi, the exoskeletons of crustaceans and insects, and the scales of fish and lissamphibians.	
	Circular Economy	a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops; this can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling. This is in contrast to a linear economy which is a 'take, make, dispose' model of production.	
	Collective	A collective is a group of entities that share or are motivated by at least one common issue or interest, or work together to achieve a common objective	
	Community	a unified body of individuals	
	Composites	is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components	
	Constraints	a limitation or restriction.	
	Cultivate	try to acquire or develop (a quality or skill) / prepare and use (land) for crops or gardening.	
	Cycle	any complete round or series of occurrences that repeats or is repeated	
	C2C / Cradle to Cradle	a biomimetic approach to the design of products and systems that models human industry on nature's processes viewing materials as nutrients circulating in healthy, safe metabolisms.	
	D	Decentralise	to distribute the administrative powers or functions of (a central authority) over a less concentrated area.
		Design thinking	refers to the cognitive, strategic and practical processes by which design concepts are developed by designers and/or design teams.
Design sprint		a five-day process for answering critical business questions through design, prototyping, and testing ideas with customers.	
Destructive		designed or tending to hurt or destroy	
Digital Manufacturing or Digital Fabrication		an integrated approach to manufacturing that is centered around a computer system. The transition to digital manufacturing has become more popular with the rise in the quantity and quality of computer systems in manufacturing plants.	
Distributed		to divide and give out in shares; deal out; allot. to disperse through a space or over an area; spread; scatter.	

	Dysfunctional	Not functioning properly : marked by impaired or abnormal functioning
E	Economy	Economy an area of the production, distribution, or trade, and consumption of goods and services by different agents.
	Ecological Region(s)	an ecologically and geographically defined area that is smaller than a bioregion, which in turn is smaller than an ecozone.
	Ecosystems	a community made up of living organisms and nonliving components such as air, water, and mineral soil.
	Efficient	the ability to avoid wasting materials, energy, efforts, money, and time in doing something or in producing a desired result
	Effective	producing a decided, decisive, or desired effect
	Elastomer	any rubbery material composed of long chainlike molecules, or polymers, that are capable of recovering their original shape after being stretched to great extents—hence the name elastomer, from “elastic polymer.”
	Ethical	pertaining to or dealing with morals or the principles of morality; pertaining to right and wrong conduct. Also being in accordance with the rules or standards for right conduct or practice, especially the standards of a profession:
	Extractive	tending or serving to extract, or based upon extraction: coal, oil, copper, and other extractive industries.
	F	Fairtrade
Fibres		a natural or synthetic substance that is significantly longer than it is wide. Fibers are often used in the manufacture of other materials
Finite Materials		resources that cannot be created or produced once the original stores are depleted, or those that are used up at a greater rate than nature can replenish
G	Gelatin	a protein obtained by boiling skin, tendons, ligaments, and/or bones with water. It is usually obtained from cows or pigs. It is translucent, colorless, brittle (when dry), flavorless food ingredient that is derived from collagen.
	Glycerine / Glycerol	a clear, colorless, and odorless viscous liquid. It is used as an agent in cosmetics, shampoos, soaps, and other household items.
H	Hemicellulose (<i>see also Celulose</i>)	a heteropolymer (matrix polysaccharide), such as arabinoxylans, present along with cellulose in almost all plant cell walls. While cellulose is crystalline, strong, and resistant to hydrolysis, hemicellulose has a random, amorphous structure with little strength. It is easily hydrolyzed by dilute acid or base as well as a myriad of hemicellulase enzymes.
	Higher-valued goods	products that are high in value, often but not necessarily due to processing.
I	Impacts	the strong effect or influence that something has on a situation or person.
	Ingredient	a substance that forms part of a mixture (in a general sense)
	Integration	concept of consistency of actions, values, methods, measures, principles, expectations, and outcomes
J		
K	Key Performance indicator (KPI)	(or performance indicator) is a type of performance measurement. KPIs evaluate the success of an organization or of a particular activity (such as projects, programs, products and other initiatives) in which it engages.
L	Landfill	is a site for the disposal of waste materials by burial. It is the oldest form of waste treatment (although the burial part is modern; historically, refuse was just left in piles or thrown into pits).
	Leverage	power or ability to act or to influence people, events, decisions, etc.; sway:
	Life-friendly Chemistry	(Green Chemistry) Use chemistry that supports life processes e.g.: Break down products into benign, build selectively with a small subset of elements, do chemistry in water.
	Lignin	a class of complex organic polymers that form key structural materials in the support tissues of vascular plants and some algae. Lignins are particularly important in the formation of cell walls, especially in wood and bark, because they lend rigidity and do not rot easily.
	Linear cycle	A 'take-make-dispose' step plan. Resources are extracted and products are produced.
	Localised	to make local; fix in, or assign or restrict to, a particular place, locality, etc.
	Local community	a group of interacting people living in a common location. The word is often used to refer to a group that is organized around common values and is attributed with social cohesion within a shared geographical location, generally in social units larger than a household.

M	Manufacturing	the production of merchandise for use or sale using labour and machines, tools, chemical and biological processing, or formulation.
	Material	a chemical substance or mixture of substances that constitute an object. Materials can be pure or impure, a singular composite or a complex mix, living or non-living matter, whether natural or man-made, either concrete or abstract.
	Material Science	the interdisciplinary field of design and discovery of new materials, particularly solids.
	Material Testing:	the measurement of the characteristics and behaviour of such substances as metals, ceramics, or plastics under various conditions.
	Methodology	a body of methods, rules, and postulates employed by a discipline : a particular procedure or set of procedures.
	Mindset	a set of assumptions, methods, or notations held by one or more people or groups of people. A mindset can also be seen as incident of a person's world view or philosophy of life
	Modularity	<u>a system's components may be separated and recombined, often with the benefit of flexibility and variety in use.[1] The concept of modularity is used primarily to reduce complexity by breaking a system into varying degrees of interdependence and independence</u>
N	Nutrient	a substance used by an organism to survive, grow, and reproduce. The requirement for dietary nutrient intake applies to animals, plants, fungi, and protists. Nutrients can be incorporated into cells for metabolic purposes or excreted by cells to create non-cellular structures, such as hair, scales, feathers, or exoskeletons.
	Nutrient Network	Each node represents a nutrient, and nodes are connected through correlations between abundances of nutrients across all foods.
O	Open Source	an resource that can be freely used, distributed and modified
P	Packaging	the science, art and technology of enclosing or protecting products for distribution, storage, sale, and use.
	Peer production communities	(also known as mass collaboration) is a way of producing goods and services that relies on self-organising communities of individuals. In such communities, the labor of a large number of people is coordinated towards a shared outcome.
	Petrochemicals	are chemical products derived from petroleum. Some chemical compounds made from petroleum are also obtained from other fossil fuels, such as coal or natural gas, or renewable sources such as corn, palm fruit or sugar cane.
R	Polymer	a large molecule, or macromolecule, composed of many repeated subunits. Due to their broad range of properties, both synthetic and natural polymers play essential and ubiquitous roles in everyday life
	Recycled	the process of converting waste materials into new materials and objects.
	Remanufacture	the rebuilding of a product to specifications of the original manufactured product using a combination of reused, repaired and new parts".It requires the repair or replacement of worn out or obsolete components and modules.
	Regenerative / Regeneration	formed or created again; to change radically and for the better; to generate or produce anew; to restore to original strength or properties
	Renewable(s)	a natural resource which replenishes to overcome resource depletion caused by usage and consumption, either through biological reproduction or other naturally recurring processes in a finite amount of time in a human time scale.
	Resource	a source of supply, support, or aid, especially one that can be readily drawn upon when needed.
	Resources	the collective wealth of a country or its means of producing wealth.
	Restorative	Having the ability to restore health, strength, or well-being.
	Resilience / Resilient	(Ecological resilience) the capacity of an ecosystem to recover from disorder / disruption
	Resilience (organisational)	the ability of a system to withstand changes in its environment and still function
	Roadmap	a strategic plan that defines a goal or desired outcome, and includes the major steps or milestones needed to reach it.
	Safe & Circular	Circular design encourages us to rethink business models, how we make products, and to consider the system surrounding them, but we also need to think about the materials we use.
	Seaweed	(or macroalgae) refers to several species of macroscopic, multicellular, marine algae. The term includes some types of red, brown, and green macroalgae.
Service-Provider	provides organizations with consulting, legal, real estate, communications, storage, processing.	

S	Socio-economic	is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy. Societies are divided into 3 groups: social, cultural and economic.
	Solvent	a substance that dissolves a solute resulting in a solution. A solvent is usually a liquid but can also be a solid, a gas, or a supercritical fluid.
	Strategy	a high-level plan to achieve one or more goals under conditions of uncertainty.
	Standardisation	the process of implementing and developing technical standards based on the consensus of different parties that include firms, users, interest groups, standards organizations and governments. Standardisation can help to maximize compatibility, interoperability, safety, repeatability, or quality.
	Stiffness	is the extent to which it(an object) resists deformation in response to an applied force. The complementary concept is flexibility or pliability
	Supply Chain	a network between a company and its suppliers to produce and distribute a specific product, and the supply chain represents the steps it takes to get the product or service to the customer.
	Symptomatic	having the characteristics of a particular issue/ disease but arising from another cause.
	Sustainable	the process of maintaining change in a balanced fashion, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations
	T	Technological
Transition		passage/ movement / development / evolution from one state, form, stage, subject, style or place to another.
Trends		a current style or preference; the general movement over time of a statistically detectable change.
U		
V	Value Chain	a set of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. The concept comes through business management.
	Viscosity / Viscous	The viscosity of a fluid is the measure of its resistance to gradual deformation by shear stress or tensile stress. For liquids, it corresponds to the informal concept of "thickness": for example, syrup has a higher viscosity than water
W	Waste	rejected as useless or worthless; refuse (also) useless consumption or expenditure; use without adequate return; an act or instance of wasting
	Waste stream	the complete flow of waste from domestic or industrial areas through to final disposal. The intervention of recycling may act to lessen the content of a waste stream as it moves down the line.