

Standards	STEM Unit 1	STEM Unit 2	STEM Unit 3	STEM Unit 4	STEM Unit 5	STEM Unit 5 P2	U7	Tech Unit 1	Tech Unit 2	Tech Unit 3	Tech Unit 4
23	4	3	5	4	1	6	22	3	6	8	3 [2]
	Review Build Base, Simple Claw, Sensors-- Different Maze	Robot Soccer (manipulators, passive/active manipulator) Controller- simple claw [3]	Cube Collector (if built, add end) driving-- uses full ClawBot- add arm, driver control, autonomous, using multiple program, competition	Up and Over	Castle SWEEP VR and/or Coral Reef	Castle Crusher (VR) in-Person Use Sensors at Edge (take walls off and put pieces of wood, box) [4]		Binary Code:	Stock Market Project- Pick Several Technology Stocks Describe Pros/Cons	App Inventor- Calculator, Game, MLK and Create App Prototype to Solve Climate Change Issue	Create Product or Idea- Changes Resources for another Purpose [5]
8.1.8.CS.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.CS.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.CS.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.CS.4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.NI.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.1.8.NI.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.1.8.NI.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.NI.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.1.8.IC.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.IC.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.DA.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.1.8.DA.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.1.8.DA.3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Python
Introduction

- 8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices. Analyze online reviews, compare/contrast early computers with touch screens, brainstorm how to improve household, redesigns mobile app sensor, automatic pet feeder robotics sensors/timer software, conditions.
- 8.1.8.CS.2: Design a system that combines hardware and software components to process data. Design home security system motion sensor, automatic pet feeder robotics sensors/timer software, conditions.
- 8.1.8.CS.3: Justify design decisions and explain potential system trade-offs. Screen size, battery performance, cost, tools startups.
- 8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems. Divide/conquer approach, develop flowchart, solve problems for younger students, hardware connection probs.
- 8.1.8.NI.1: Model how information is broken down into smaller pieces, transmitted as addressed packets through multiple devices over networks and the Internet, and reassembled at the destination. Landline/cell versus: ethernet wireless. Packet race send across the classroom and reassembled at the end.. how data is broken down into parts. large image like broken puzzle Scrambled messages, rearrange.Landline, cell, ethernet, wireless: discuss different, show short video
- 8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication. Telephone game, handshake routine. list common protocols., pre-arranged cards change identify error.A short written assignment on a protocol of their choice and its role in data transmission
- 8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems. Build fortress cardboard, etc. label parts firewalls, p words, sware/hware visuals help Importance group pres.
- 8.1.8.NI.4: Explain how new security measures have been created in response to key malware events. Mock news report on fictional malware. Malware events and response to timeline.
- 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. different careers. Tech gadgets smartphones pros/cons routine; classroom debate
- 8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies. Facial recognition, color contrast, captioning for hearing impaired, popular video game biases
- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose. Spreadsheets project, graphs, database change.
- 8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. Bits/bytes and ASCII compare. Binary code. Audio/video to binary.
- 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format. File conversion activity, recognition, explore.

- 8.1.8.DA.4
- 8.1.8.DA.5
- 8.1.8.DA.6
- 8.1.8.AP.1
- 8.1.8.AP.2
- 8.1.8.AP.3
- 8.1.8.AP.4
- 8.1.8.AP.4
- 8.1.8.AP.4
- 8.1.8.AP.5
- 8.1.8.AP.6
- 8.1.8.AP.7
- 8.1.8.AP.8
- 8.1.8.AP.9
- 8.2.8.ED.1
- 8.2.8.ED.2
- 8.2.8.ED.3
- 8.2.8.ED.4
- 8.2.8.ED.5
- 8.2.8.ED.6
- 8.2.8.ED.7
- 8.2.8.ITH.1
- 8.2.8.ITH.2
- 8.2.8.ITH.3

- 8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis. Spot errors, data cleaning.
- 8.1.8.DA.5: Test, analyze, and refine computational models. Feedback loops, sim software (Vex VR), compare models.
- 8.1.8.DA.6: Analyze climate change computational models and propose refinements. Suggest changes, simplified c change models.
- 8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode. Robotics
- 8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values. Variables Myblocks, Program Celsius to Fahrenheit.
- 8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. Use nested loops robotics
- 8.1.8.AP.4: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. Breakdown problems recipe, password checking.
- 8.1.8.AP.4: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. Breakdown problems recipe, password checking.
- 8.1.8.AP.5: Create procedures with parameters to organize code and make it easier to reuse. Rectangle robot, Sphero.
- 8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users. Survey tool and get changes, challenges robotics, etc.
- 8.1.8.AP.7: Design programs, incorporating existing code, media, and libraries, and give attribution. Add on existing programs.
- 8.1.8.AP.8: Systematically test and refine programs using a range of test cases and users. Test calc app A12, Robot tasks
- 8.1.8.AP.9: Document programs in order to make them easier to follow, test, and debug. Engineering notebook, manual, comments
- 8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer. Function car, robot, phone, etc. Selec car, robot
- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. Where to find errors? Robot household chores list steps for prototype, potential errors.
- 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch). App Inventor, Robot Sketch. Identify leaves
- 8.2.8.ED.4: Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team. Robotics Pairs fix it, devise process to fix, work to find fix
- 8.2.8.ED.5: Explain the need for optimization in a design process. Test paper airplane flight, how to make it go longer.
- 8.2.8.ED.6: Analyze how trade-offs can impact the design of a product: battery life/size.
- 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). Design eco-friendly water bottles, costs, sketches.
- 8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues. Fix toaster and find solutions.
- 8.2.8.ITH.2: Compare how technologies have influenced society over time. Old CDs what to use for.
- 8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

- 9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.). Wait for sale, don't take money out of investment.
- 9.1.8.FP.5: Determine how spending, investing, and using credit wisely contributes to financial well-being. Invest stocks over years.
- 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish. Cereal: health vs. fun. Car: safety versus speed.
- 9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income and different stages of life (e.g. teenager, young adult, family). Budgeted for items to buy.
- 9.1.8.RM.1: Determine criteria for deciding the amount of insurance protection needed. Flood: should get? increase home insurance? Valuable items at home.
- 9.1.8.RM.2: Analyze the need for and value of different types of insurance and the impact of deductibles in protecting assets against loss.
- 9.1.8.RM.4: Explain the purpose of insurance products and the reasons for property product and liability insurance protection.
- 9.4.8.CI.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3) Shocbox as a charging station.
- 9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.
- 9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities). Implement sensors to monitor air quality and address pollution.
- 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations. Screen time/sleep, Sales versus advertising.
- 9.4.8.IML.9: Distinguish between ethical and unethical uses of information and media (e.g., 1.5.8.CR3b, 8.2.8.EC.2). Copyright making. Analyze information.
- 9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.
- 9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.
- 9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
- 9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.

My Grade 7	Grid Map, Transfer Grid Map and Freeze Tag	Test Bed	Vr Then Real Maze	Line Tracker	Cube Pusher??	Treasure Hunt	
	5	3	6	4	2	5	
VEX Grade 7	Team Freeze Tag	Robot Soccer	Test Bed	VR Disc Maze then real maze	Line Tracker	Treasure Hunt	
	5	4	3	3	3	5	
My Grade 8	Review. Build Clawbot different sensor maze (both in person and VR)	Robot Soccer	Cube Collector	Up and Over	Castle Crasher (Sweep the Castle in VR)	Castle in Person	
	4	3	5	4	1	6	
Vex Grade 8	Review. Build Clawbot, different sensor maze (both in person and VR)	Cube Collector	Up and Over	Coral Reef Cleanup (VR Activity)	Castle Crasher (Sweep the Castle in VR)	Castle Crasher (in person)	
	4	6	5	1	1	6	

25

23

23

23

Cube Pusher	2
-------------	---



40 Min Sessions	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	4 Links [6]	# Sessions
Maximum 23 Sessions Grade 7	Build Base, Virtual Grid Map, Distance Sensor and TRansfer Grid Map	Test Bed- Learn the Different Sensors	(Disc Maze) Vex Virtual Wall Maze and Then Real Maze using Sensors and Clawbot. Vex Robotics Pros/Cons Deign Solution Negative Impact People Getting Hurt in workplace?	Vex Line Detect, Real Work in Factory Picking up Objects	Cube Pusher, autonomous, investigative	Treasure Hunt (keep arm on) Optical- optical, cubes robot checks each cube, identify, simple claw or regular claw..		24
40 Min Sessions	Review Build Base, Simple Claw, Sensors-- Different Maze	Team Freeze Tag (base and plate) touch LED, Bumper (Traction)- Code Given- use controller first, download, (base)	Robot Soccer (manipulators, passive/active manipulator) Controller- simple claw [7]	Treasure Hunt (keep arm on) Optical- optical, cubes robot checks each cube, identify, simple claw or regular claw..	Build, Cube Collector (6-7 (if built, add end) driving-- uses full ClawBot- add arm driver	Castle Crasher (VR) in-Person Use Sensors at Edge (take walls off and put pieces of wood, box) [8]	Container Program Factory and Strawberry Plant Sorter Challenges	27
	Maximum 23 Sessions Grade 8							
								Automated Material Transport System (line detector)

[1] pivot; open-ended devices.. extension make device and do this, how many seconds, let students come up, gears. going up hill, distance..

[2] Examples: SolarPlay Toys

Concept: Redesign traditional battery-operated toys by integrating solar panels.

Example: A line of action figures or toy cars that charge during the day and light up or move at night using solar energy.
EcoStraw Studios

Concept: Upcycle plastic waste, particularly straws, into stylish and functional homeware.

Example: Create colorful coasters, decorative bowls, and even lightweight chairs using tightly woven or melted plastic straws.
Vintage Tech Hub

Concept: Transform outdated tech gadgets into modern functional devices or artistic installations.

Example: Convert old CRT televisions into retro gaming stations or a themed aquarium.
Denim Dreams

Concept: Repurpose old jeans and denim materials into new products.

Example: Produce denim insulation for homes, denim-based stationery products, or fashionable handbags made of patchwork denim.
Bookish Furniture

Concept: Transform old and damaged books into functional and stylish furniture.

Example: Craft coffee tables, wall shelves, or decorative lamp stands from hardcover books.
TyreScapes

Concept: Upcycle old tires into outdoor furniture and landscaping products.

Example: Create outdoor swings, planters, or even rubber walkways for gardens.
EcoFlight

Concept: Refurbish decommissioned airplanes into unique accommodations or recreational spaces.

Example: Convert an old airplane into a boutique hotel, restaurant, or themed playground.
GreenBrella

Concept: Repurpose broken or discarded umbrellas into a variety of products.

Example: Create lightweight backpacks, raincoats, or sun shades using the waterproof fabric from umbrellas.
Canvas Creations

Concept: Redesign old advertising banners and billboards into functional items.

Example: Produce stylish tote bags, wallets, or even picnic blankets from durable billboard canvas.
EcoCircuit Jewelry

Concept: Transform electronic waste into jewelry or decorative items.

Example: Craft necklaces from computer chips, earrings from capacitors, or bracelets made of colorful wires.

The key to success in these ventures lies in effective marketing, ensuring that the redesigned/upcycled products are of high quality, and communicating the environmental benefits to potential customers. The more innovative and unique the products, the better they will stand out in a competitive market.

User

could you provide objectives, lessons in a list form for 8th grade students to create projects related to the informaton you provided.

ChatGPT

Certainly! Here's a curriculum outline based on the concepts of upcycling and redesigning products:

Objective:

To enable 8th-grade students to understand the concept of upcycling and product redesign for sustainability. By the end of the project, students should be able to create a functional product using waste or outdated materials.

Lesson 1: Introduction to Upcycling and Redesign

Understand the difference between recycling, upcycling, and downcycling.

Learn the importance of sustainability and its impact on the environment.

Case studies: Successful upcycled products and their impact.

Lesson 2: Material Identification and Collection

Identify common waste materials that can be upcycled.

Collect discarded materials for the project. This could be a fun scavenger hunt!

Understand the properties and potential uses of different materials.

Lesson 3: Brainstorming and Design Thinking

Introduction to the design thinking process.

Brainstorm potential products based on collected materials.

Sketch or model their ideas.

Lesson 4: Tools, Safety, and Preparation

Introduction to tools that can be used for upcycling projects.

Safety precautions and procedures.

Preparing materials for the creation process (e.g., cleaning, sorting).

Lesson 5: Hands-on Creation

Students start building their upcycled products.
Peer reviews: Students give feedback on each other's designs and progress.
Iterative process: Making modifications based on feedback.
Lesson 6: Finishing Touches

Painting, decorating, or adding any final touches to the product.
Testing the product for functionality.
Preparing a presentation or showcase.
Lesson 7: Showcase and Reflection

Students present their finished upcycled products.
Reflect on the process, challenges faced, and solutions discovered.
Discuss potential marketability and usefulness of their designs in the real world.
Lesson 8: The Business of Upcycling

Basic introduction to entrepreneurship.
Understand how upcycled products can be turned into a business.
Guest lecture: Invite a local entrepreneur or an individual involved in sustainable businesses.
Lesson 9: Beyond Upcycling – Environmental Impact

Understand the broader impact of waste on the environment.
Discuss other sustainable practices in daily life.
Explore careers related to sustainability and environmental science.
Lesson 10: Project Journal and Documentation

Students document their entire process from idea to completion.
Importance of documentation for replicating the process or for future modifications.
Share their journals and experiences.
By the end of this project, students should not only understand the importance of upcycling but also gain practical skills in design, problem-solving, and possibly entrepreneurship. They'll also develop a deeper appreciation for sustainability and the environment.

[3] adding claw (20 min), manipulators (2 days).. custom contitler optional to drive train..

[4] gives sensors meaning; compare distance to scan, optical near/far, detect robot over edge (red), green (within range), add controller..

[5] To enable 8th-grade students to understand the concept of upcycling and product redesign for sustainability. By the end of the project, students should be able to create a functional product using waste or outdated materials.

Lesson 1: Introduction to Upcycling and Redesign

Understand the difference between recycling, upcycling, and downcycling.

Learn the importance of sustainability and its impact on the environment.

Case studies: Successful upcycled products and their impact.

Lesson 2: Material Identification and Collection

Identify common waste materials that can be upcycled.

Collect discarded materials for the project. This could be a fun scavenger hunt!

Understand the properties and potential uses of different materials.

Lesson 3: Brainstorming and Design Thinking

Introduction to the design thinking process.

Brainstorm potential products based on collected materials.

Sketch or model their ideas.

Lesson 7: Showcase and Reflection

Students present their finished upcycled products.

Reflect on the process, challenges faced, and solutions discovered.

Discuss potential marketability and usefulness of their designs in the real world.

Lesson 8: The Business of Upcycling

Basic introduction to entrepreneurship.

Understand how upcycled products can be turned into a business.

Guest lecture: Invite a local entrepreneur or an individual involved in sustainable businesses.

Lesson 9: Beyond Upcycling – Environmental Impact

Understand the broader impact of waste on the environment.
Discuss other sustainable practices in daily life.
Explore careers related to sustainability and environmental science.
Lesson 10: Project Journal and Documentation

Students document their entire process from idea to completion.
Importance of documentation for replicating the process or for future modifications.
Share their journals and experiences.

By the end of this project, students should not only understand the importance of upcycling but also gain practical skills in design, problem-solving, and possibly entrepreneurship. They'll also develop a deeper appreciation for sustainability and the environment.

[6] <https://kb.vex.com/hc/en-us/articles/5137735300116-1Q-2nd-gen-STEM-Lab-Unit-Concepts>
Lauren Harter8:36 AM

https://pic.pd.vex.com/t/new-1q-stem-lab-castle-crasher/356?u=lauren_harter

https://pic.pd.vex.com/t/treasure-hunt-competition-code/773?u=lauren_harter

Lauren Harter8:44 AM

<https://docs.google.com/document/d/1V7XMMi-QymjhGPAmFxnqKwqrKoolo5Rig3aSX1u-9QM/edit#heading=h.j68iorizy9t>

<https://docs.google.com/document/d/1DSkqkDdMruJcEh35CeffF-o700FUCN9RFniS7QvXCE/edit#heading=h.j15pmkpeqbs4>

<https://docs.google.com/document/d/1H-EpYF-hQyLq2xbnEPyOUPrwS7hRWCn9f12nHv5xb6s/edit#>

https://docs.google.com/document/d/13u4m27QA4np9lap9DnPyRFx9_MICoo49y25e_kqmSWs/edit

[7] adding claw (20 min), manipulators (2 days).. custom contrlrler optional to drive train..

[8] gives sensors meaning; compare distance to scan, optical near/far, detect robot over edge (red), green (within range), add controller..