A black background with a black square

Description automatically generated with medium confidenceSTEAM Activity Example

**Activity Ideas**



**What to do:** Review this example activity, which combines all five STEAM disciplines — science, technology, engineering, the arts, and mathematics — to address a real-world problem. You can use this as a model for creating your projects and activities.

**Why it matters:** Activities like this give students a chance to experience what it’s like to work on a problem together, make decisions, and make a positive difference. It also helps them see real-world uses for what they’re learning in school.

# Real-World Problem: The Teachers’ Lounge Needs an Update

## Topic: Let’s Upcycle!

Students hear teachers talking about how the teachers’ lounge needs new furniture, but there’s no budget for it. Students have been learning about recycling and upcycling, and they wonder if that might be a way to solve the problem.

## Design Thinking Step 1: Empathize

Students talk to teachers about why they’re having problems with the furniture in the lounge. They take **surveys** and have one-on-one **interviews**.

## Design Thinking Step 2: Define

Students find out the furniture is broken and uncomfortable. The facilitator guides students through the **“five whys” technique** to determine the root cause of the problem.

*Facilitator:* Why do the teachers want new furniture?

*Students:* Because the lounge is their place to relax, and they want to be comfortable.

*Facilitator:* Why is the furniture broken and uncomfortable?

*Students:* Because it’s over 30 years old.

*Facilitator:* Why can’t they get new furniture?

*Students:* Because the administration doesn’t have it in the budget this year.

*Facilitator:* Why is it not in the budget?

*Students:* Because of budget cuts and “more important things” that needed funds.

*Facilitator:* Why are teachers not considered the most important?

*Students:* Because the students and their needs come first.

Students determine that the **root problem** is that teachers need a place to relax, and their needs should be considered. They need new furniture at the right price.

## Design Thinking Step 3: Ideate

Students brainstorm and research solutions to overcome the problem. They talk to carpenters around the area and figure out where they can get recycled materials. They also do research on how designers have used upcycled materials. They **identify three possible solutions**:

1. Create miniature prototypes of the teachers’ lounge and propose a plan to the administration.
2. Build the furniture that teachers want using upcycled and recycled materials.
3. Create a fundraiser to raise money for new furniture.

## Design Thinking Step 4: Prototype

Students decide to **build a prototype** of the teachers’ lounge and create 3D replicas of the furniture.

* Students decide to work in groups of two to three.
* The facilitator sets up the room with graph paper, cardboard, glue, Popsicle sticks, pipe cleaners, plastic cups, and anything else the students may need to build the replicas.
* Students start to draw ideas on the types of furniture the teachers want, and they think about the recycled materials they can use to make it life-size.
* Students begin to build replicas. The replicas will act as blueprints that included 3D mini-replicas of furniture they will build out of upcycled/recycled materials, keeping in mind that the furniture will need to fit in the teacher’s lounge, and be comfortable and inviting.
* The facilitator makes sure students have enough time to dig in and think critically about what they’re designing.

## Design Thinking Step 5: Test

Students decide to test their prototypes by presenting three-dimensional blueprints and replicas to the teachers. Teachers make notes about what they like best in each replica. Students review the feedback and build one final replica. *Note: Students may need to go back and repeat previous stages of the design thinking process.*

## Finish It Up

From the final replica, students determine the cost of building or buying the new lounge furniture. They make a plan and take it to the administration. The goal is for students to get the funding to build or buy the items for the teachers’ lounge. They may decide to do a small fundraiser. Or, maybe they can’t do it this year but administration is OK with students sprucing up the lounge by painting it, adding plants, and making pillows.

## Take It Further

Each year, students make a new piece of furniture. Students work with local carpenters and interior decorators to learn about furniture and room design. They learn to use design software. As they interact with carpenters and interior decorators, students learn what people in these professions do on a day-to-day basis.

## How Is STEAM Addressed?

* **Science:** Students learn about recycling and upcycling and why the processes matter.
* **Technology:** Students use search engines to conduct research and use design software to build small-scale prototypes and/or furniture designs.
* **Engineering:** Students use engineering to build their 3D replicas, and think about the best materials to use.
* **Arts:** Students use their creativity to design their miniature furniture replicas, to select colors and materials that appeal to the teachers, to make pillows, and to arrange the room in a way that’s practical and aesthetically pleasing.
* **Mathematics:** Students use skills such as measuring and scaling/ratios, angles, and fractions when building their replicas.

## Are Students Working in a Makerspace?

Yes. By providing students with the tools needed to develop their replicas, and allowing them to be creative and inventive, the facilitator provides a makerspace. The facilitator ensures a safe environment as students learn a new skill and use tools they’ve likely never used before. They can also use new technology like 3D software for designing rooms and furniture.

## Career Pathways That Can Be Explored

Drivers, sorters, mechanics, technicians, designers, machine operators, recovery center managers

Can you think of more? Add them below!

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Good design’s not about what medium you’re working in.   
It’s about thinking hard about what you want to do and   
what you have to work with before you start.*

—Susan Kare

A white rectangular frame with purple border

Description automatically generated

This resource was developed in 2024 by the Nita M. Lowey 21st Century Community Learning Centers (21stCCLC) National Technical Assistance Center (NTAC), funded under a grant from the U.S. Department of Education (Department) and administered by Synergy Enterprises, Inc. under Cooperative Agreement No. 287E230009 with the Department’s Office of Elementary and Secondary Education. Opinions expressed herein do not necessarily reflect the position or policy of the Department, nor does mention of trade names, commercial products, or organizations imply endorsement by the Department or the federal government. This resource is in the public domain and is available at [21stcclcntac.org](http://www.21stcclcntac.org). Authorization to reproduce it in whole or in part is granted.