



## STEAM Activity Example

Here's an example of a STEAM activity that combines all five STEAM disciplines — science, technology, engineering, the arts and mathematics — to address a real-world problem. You can use this example as a model when creating your own STEAM projects and activities.

### 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 teachers' lounge 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 furniture that's 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 the 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 have to be taken into consideration. They need new furniture at the right price.



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### 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**:

- Create miniature prototypes of the teachers' lounge and propose a plan to the administration.
- Build the furniture that teachers want, using upcycled and recycled materials.
- 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 they'll test their prototypes by presenting their 3D blueprints and replicas to the teachers. Teachers write down the things within each replica that they like the best. Students review the teachers' feedback and work as a team to build one final replica. *Note: Students may need to go back and repeat previous stages of the design thinking process.*



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### Finish It Up

Once they have the final replica, students determine the cost of building or buying the furniture needed for the lounge. They put a plan together and take it to the administration. The goal is for students to get the funding they need to build or buy these items for the teachers' lounge. They may decide they need 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, a new piece of furniture is made. Students work with local carpenters and interior decorators and learn about furniture and room design. Students learn to use design software. As they interact with carpenters and interior decorators, students learn people in these professions do on a day-to-day basis.



# STEAM Activity Example

## How Is STEAM Addressed?

- **Science:** Students are learning about recycling and upcycling and why it’s important.
- **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 in building their 3D replicas and thinking about the best materials to use.
- **Arts:** Students use their creativity to design their miniature furniture replicas, to select colors and materials that are appealing 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!

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*“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

