

MAKER PROJECT GUIDE

What is this all about?

The Maker Project - from Maker Workshops to projects you do at home to the STEM Maker Faire - is about challenging your imagination, learning new ways to accomplish your goals, and stretching your ability to turn your ideas into reality. The process includes building up a base of knowledge, tools, and skills! Then you turn your eye outward to find a need, problem, or desire you can provide an answer to; you must ask yourself a question: “What kind of thing can I make or do to achieve this goal?” Once you have an idea, you begin to turn it into action: prototype, document, discuss and share with others, then prototype some more! Finally, when your new “something” has journeyed through the process of revision and you have documented your progress, you have the chance to share your story of success from beginning to end with an audience of fellow makers at the STEM Maker Faire!

What can you do with what you know? As a maker, it is your job to take a concept and turn it into a real prototype. This involves exploration, sharing ideas with others, choosing and defining a project, planning, executing and refining your plan, and displaying your final project at the Hickman STEAM Maker Faire or sharing with friends and family. Your Maker Project is all about turning your ideas into action, creating a “THING,” and sharing your “THING” with others!

GETTING STARTED...

Brainstorming

Have lots of ideas! Dr. Linus Pauling famously said that the best way to have good ideas is to have LOTS of ideas. That is, create a list of as many ideas as you can, then start focusing on the ones that appear promising. Eventually, you’ll winnow the list down to the good ones. Don’t be surprised if only a fraction of your initial ideas turn out to be good. That’s normal.

(Makerspace Playbook)

Here are some websites for Makers to help with brainstorming:

- Make: Projects
 - <https://makezine.com/projects/>
- Maker Camp
 - <http://makezine.com/maker-camp/>
- The Maker Ed. Initiative
 - <http://makered.org/>
- The Tinkering Studio at the Exploratorium
 - <http://tinkering.exploratorium.edu>
- Science Fair Central
 - <https://www.sciencefaircentral.com/>



Coming up with an Idea

There are lots of starting points to help spark your creativity when you are looking for a Maker project. Here are some suggestions:

- You may want to work with a material you've never used before or you might want to learn a new skill.
- You might want to try to make something you already know how to make using a new or improved process.
- You might want to create an individualized item - something that you can't buy or that goes with something you already have.
- Or you may want to design something that solves a problem.

A Maker Project that Solves a Problem

"Solving a problem" might be more difficult than it sounds. How do you identify a problem and then how do you engineer a solution? Finding a problem and designing a solution require having a "designer's eye". As a designer, your job is to study the designs of the objects around you. Look at objects and ask yourself:

- Why were they designed as they are?
- What is wrong with them?
- How would you improve them?

You don't have to limit your thinking to just objects, however. What about the ways we do things? Ask yourself about processes you observe:

- Is this function being properly performed?
- Is it being performed in the best way possible?
- Are there any problems with it?
- How can I improve upon it?

And be open to the ideas of others. Ask others:

- How do you use this object/process?
- How could this object/process perform its function better?
- What improvements would you suggest?

Keep in mind, many people today take for granted the things around them. Often we don't even know how something is put together or how it works! We view objects as something to be used, not as something that could be improved upon. A designer looks at the world and says, "I can do better than that."



"Really good improvements are not the result of inspiration [so much as] the results of an observing mind."

Henry Petroski, *The Evolution of Useful Things*

Just in case you still need some ideas, here are some examples of student inventions:

- a device that cleans gutters
- a plastic product that holds a book while you eat
- a rain poncho designed for use when riding a bicycle
- a lunch-box alarm that goes off when an unauthorized person opens the box
- a bird feeder that protects feed from wind and rain
- a newly designed bottle opener
- a toothpaste cape that minimizes waste and mess
- a device that prevents blisters from forming on hands when raking, shovelling, or sweeping
- a billfold that organizes money by denomination for blind people
- a new type of swing set
- a dog collar that lights up at night
- a bedspread that zips down the middle
- safety suspenders that light up at night for joggers or bikers
- a new type of ice cream container that minimizes mess
- a new type of rake that allows you to pick up leaves without bending over
- an infant support that prevents a very young baby from falling over
- a robot that distributes and collects student papers
- a glove with a light for signaling turns when riding a bike at night
- a better, more comfortable swing set
- a device to hold objects for disabled people who use a walker
- a child's seat that fits a shopping cart
- a hearing-aid guard
- a mailbox alert device that signals when mail has been delivered to a roadside mailbox
- a leg cast sock to keep toes warm
- tapeless wrapping paper
- a comforter for cats
- an outside house light that flashes to signal police, firemen, or other helpers as to which house made a call for assistance
- a computer program that catalogs videotapes
- an eyeglass defogging device
- a device that makes it easier to swallow pills
- a drying rack for gloves
- a liquid that covers fade marks on blue jeans
- a light switch for young children
- a chocolate-candy device that prevents ice cream cones from dripping

DEVELOPING YOUR IDEA...

Once you've got an idea, you'll have to spend some time refining it. This is where a group activity called *plussing* can help.

Plussing

Pixar uses the term "plussing" to mean finding what's good about an idea and making it even better.

Successful makers keep themselves open to suggestions during the project development stage. Talk to your family, friends, classmates, other makers, and teachers about your project! Here are a few of the kinds of questions makers can ask one another during the plussing process:

- What is your project vision? What are you hoping to do?
- What inspired you to pick this project? Why are you doing it?
- Do you know of other people who have done a similar project, or is this one-of-a-kind?
- What other project ideas have you toyed with?
- What kinds of projects have you built in the past?
- What do you think the hard parts are going to be? What are the easier parts?

Why have plussing sessions?

- They provide a deadline so that student makers aren't faced with one huge deadline (like the STEM Maker Faire) months in the future.
- They give all student makers a chance to see the creativity and breadth of ideas of the entire group, and students can see other projects develop through the season.
- They give student makers a chance to talk about their failures in a positive and constructive way.
- They give student makers a chance to practice talking about their projects in advance of exhibiting at the faire.
- They provide an opportunity for participants to get to know one another, helping to build the kind of community and culture we're trying to promote.

EXECUTING YOUR PLAN...

Now it's time to build! During the build process, you may find that there are some things you didn't plan for or details that you hadn't thought of. That's okay! Executing your build also involves refining your ideas as you go. And don't forget to document your progress!

Documenting

It's not enough just to make something - it's also important to be able to tell others about your project and why it is great. Documentation can take many forms, but the important thing is to capture the why and how of what you made. Your project notes will be invaluable information to future Makers! Below are some ways you may choose to tell your story at the maker faire:

- **Notebooks:** Keep a maker journal with your project ideas and progress notes.
- **Project Binder:** Revise what has been captured in your notebook specific to the project you will display.
- **Photos:** Before and after pictures of your materials; action shots of your project build.
- **How-Tos:** Give back to the community by sharing what you have learned.
- **Video:** Capture the exciting trial and error process on video.

Making

Some supplies and tools for projects may be available in the Maker Garage. Families will be responsible for procuring/purchasing other supplies for their student(s)'s projects. The Maker Garage and staff will provide space, tools, and training to assist students and families working on their projects upon request

Contact your EC for questions related to your project and they can point you in the direction of an answer!