Craft and Tinker

Ready, set, CRAFT! When you craft, you make something with care, skill, and imagination. You can craft with a computer and a 3-D printer. You can craft with recycled materials to help the planet.

Makers turn ideas into objects. They also tinker or make changes to improve them. They might fix a broken clock. They might test what they make multiple times.

Steps

1. Explore crafting and tinkering
2. Tinker with a craft
3. Learn about users
4. Craft for form, fit, and function
5. Tinker with your project

Purpose

When I've earned this badge, I'll know how to craft and tinker to solve problems.

Words to Know

Craft: To make something with care, skill, and imagination.

Feature: Any part of an object that is useful, fun, or different from other similar objects.

Fit: How the parts of an object combine to make it work.

Form: The physical properties of something, like its size, shape, color, or weight.

Function: The purpose or use of an object.

Maker: A person who creates art or designs objects.

Measurement: A number that shows the size or amount of something.

Tinker: To make changes in order to make something better or different.

Tool: Something used to do a job or make a change to something else.

Upcycle: To use old or discarded materials to make something new.

User: The person, people, or group that uses an object.

User-centered design: Creating something by focusing on what the user wants, needs, likes, and dislikes.

Step 1: Explore crafting and tinkering

Makers are problem solvers. They make solutions by crafting objects people can use. They might sew or bead. They might use wood, clay, or metal. They might invent a new machine.

Some **crafts** have been around for a long time:

- **Pottery**, such as pots, plates, vases, and other ceramics, is crafted with clay. Potters sculpt by hand or use spinning tables called potter's wheels.
- **Jewelry** is made by putting beads, string, and other materials together using pliers, scissors, and other **tools**.
- **Textiles**, such as clothing or blankets, are made with thread or yarn. People use needles, pins, and crochet hooks to sew, knit, weave, and crochet.

Today, many objects are made in factories, but people craft them by hand, too.

Choices—do one:

Discover crafts and inventions in your community. What's being made in your community? Is there a pottery studio or woodshop? Have people built a bench or little library? Try to talk to someone who crafts for their job or for fun. With help from an adult, see if you can check out their workspace, such as a studio, makerspace, or even a kitchen.

Examine the world of making. People everywhere use blankets to stay warm and cups to drink from, but there are many different kinds of blankets and cups. Search for different kinds of a certain craft, such as pottery or baskets. Compare them and find out more about the craft. How has it been made across different time periods? What about in different places? How could it be made in the future?

Try it out! Baking, woodworking, candle making, jewelry, weaving, and pottery—there are so many kinds of crafts. Pick one that's new to you, and try it out. You might weave a basket or make soap. You might tinker with an alarm clock or add a strap to a phone case.

Step 2: Tinker with a craft

When you **tinker**, you change an object to make it better or different. Tinkering can even lead to something entirely new! A broken wooden box might become a sculpture, birdhouse, or stool.

Every object has a purpose or **function**—from fun to organization. Function is also how an object works. It's the way makers put the parts and features together to work how they want them to. A **feature** is any part that's useful or fun, like a zipper, pocket, or special clasp. Features aren't needed for something to function, but they're nice to have.

Choices—do one:

Tinker with tools. In the past, humans only had hand tools, such as wrenches or screwdrivers, to craft. Now technology has made crafting faster and easier. Choose a craft. Is it mostly made by machines or people today? Have the tools used changed over time? Brainstorm new tools and imagine what tools people might use in the future. Then craft with past, present, or even future tools.

How Does it Measure Up?

Have you ever heard the saying, "**Measure** twice, cut once"? Measuring prevents mistakes and the wasting of materials. Tape measures and rulers tell you how long something is. Scales tell you how much something weighs. Sometimes you can even use lasers to measure!

1" 2" 3" 4" 5" 6" 7" 8"

Tinker with materials. When you **upcycle**, you use an old or discarded material, such as clothing, glass bottles, or cardboard, to make something new. It helps the planet by keeping things out of the trash, and there's no need for new materials. Choose a material to upcycle and make a craft with it. How does the upcycled material compare to what's usually used for the craft? How does using different materials change the craft?

Tinker with function. A cup has many possible functions: you might drink from it, put flowers in it, or store pencils in it. Make a craft and identify its function. What features does it need to function? When you finish, tinker with it to add another part. For example, you might tinker with a pencil case so it can hold a cell phone, or you could add a key ring.

INCH

9"   10"   11"   12"

Crafty Communities

Crafting has changed the world and the economy. During the Roman and Middle Ages, makers who crafted the same thing came together in guilds—there were bakers' guilds, weavers' guilds, and so on. Guilds chose new people to join and taught them to be skilled craftspeople.

Guilds inspired trade schools and apprenticeship programs. Today, you can go to a cooking school or learn how to weld. Labor unions grew from guilds as craftspeople in different fields came together for better working conditions and fair pay. Today, makers such as carpenters, painters, and electrical workers have their own craft unions.

Gathering with other makers is easier than ever with help from technology. Today, you can meet fellow makers, take classes, find materials, and even sell your creations online! In the real world, you can also connect with others in makerspaces, at markets, or at craft shows.

Step 3: Learn about users

Have you ever had something made just for you? A favorite meal or birthday treat? A baby toy or blanket? The person who gave you that special thing had YOU just in mind.

Objects have parts they need to function as well as features for the user. A **user** is the person, people, or group that uses an object. **User-centered design** is when you create something by focusing on what the user wants, needs, likes, and dislikes.

Needs are things you must have to survive, such as food, shelter, and clothing. Wants are things you might like but don't need, such as a plant or concert tickets.

Which comes first? The user or the craft?

This is the first of two steps to craft something for your user. In this step, choose a user, like a friend or a family member, and learn more about them. Take notes on "My User Profile" and sketch your ideas. Then in Step 4, craft something to either entertain them, make their life easier, or do anything else to help them.

Choices—do one:

Interview them. The best way to find out what to make for someone is to ask! Talk to your user. Find out what they want, need, like, and dislike. What craft could entertain them, make their life easier, or be useful? Ask questions, listen carefully, and take notes. Look for clues to craft something great!
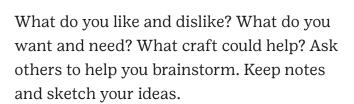
Reflect on their experience. What if you can't talk to your user or if they're an animal? You can pretend to be your user! Imagine what your life is like.

What do you like and dislike? What do you want and need? What craft could help? Ask others to help you brainstorm. Keep notes and sketch your ideas.

Research to learn more. What do you know about your user and need to find out? What do they like and dislike? What might they want or need? Make a list and gather the information. Conduct interviews, surveys, or focus groups. Search online or read books. You could take notes and sketch your ideas.

My User Profile

My User is: _____

I am crafting* (Check out Step 4 for info on each choice!):

◯ To entertain   ◯ To make life easier   ◯ Anything else useful

First, make a plan to learn about your user.

What I know

•

•

•

What I need to learn

•

•

•

How to gather information: _____

_____

Then follow your plan. Take notes and sketch ideas.

My user's needs:

•

•

•

My user's wants:

•

•

•

My user's likes:

•

•

•

My user's dislikes:

•

•

•

Other notes and ideas: _____

_____

Step 4: Craft for form, fit, and function

Crafts need to function and work. The way something functions is affected by its form. **Form** is how it looks, like its size, shape, and color. **Fit** is how the parts and features are put together.

Some people say, "Form follows function" or that the function comes first. Once you know what you want the craft to do, it's easier to create a form with parts and features that fit together. User-centered design helps makers decide on a function and form that the user will like and want to use.

Choices—do one:

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Make something to entertain. What would your user find fun and entertaining? Go over your notes from Step 3, and decide what to craft, such as a game, video, photo album, or something else. What parts will it need to function? What features will make it fun? What materials and tools will you need? Create a plan, sketch your idea, and get crafting!

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Make something to simplify life. What craft could make your user's life easier? Review what you learned in Step 3 and decide what to craft. Maybe a reminder to take out the trash or refill a bird feeder? Something to keep track of their keys or homework? Make a plan, sketch your idea, and create your craft. Include all the parts it needs to function and any features your user might like.

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Make anything else. What is your user's life like? What's something that could come in handy? Look at your notes from Step 3. What can you craft to help them? You might make a corkboard, notebook, bowl, or anything else useful. What's the function of your craft? What parts will it need? What features will your user like? Create your plan, sketch your craft, and make it special for your user.

Use "My Maker Plan" on the next page to create your plan!

My Maker Plan

I am making _____

Function: What's the purpose of your craft? How will it work?

I want the craft to (do) _____

Parts needed to function:

_____

_____

_____

Features my user might like:

_____

_____

_____

Form: How will the craft look? How can you design something special for your user?

Style, colors, and measurements:

_____

_____

_____

Materials:

_____

_____

_____

Fit: How will you make the craft? How will you test it?

Tools:

_____

_____

_____

How to build and test:

(Add as many steps as you need!)

_____

_____

_____

Step 5: Tinker with your project

When you try something new, how do you improve? You keep trying! When makers craft something, they often tinker with it to fix it or make it even better. They might try different materials, add something, or take something away.

Making different versions of a project helps makers improve the form, fit, and function of what they create. They might even come up with something entirely new!

Choices—do one:

Streamline it. Sometimes less is more. Choose a craft you've made in this badge to streamline or simplify. You might remove features or make your design stronger. You might make it smaller or lighter. Could you turn it into two or more objects, each with its own function? Sketch ideas for your simplified craft.

Test it with others. Choose a craft you've made in this badge. Ask other people for feedback. What works well? Observe how each person uses the object. How do they react? Where do they see problems? Find out what they like and dislike. What would they add, take away, or change? Take notes. Then sketch your ideas for how you would tinker with your craft.

Add a new feature or function. Put a finishing touch on something you've made in this badge. What new color or decoration might your user

like? Can you add a fun or helpful feature? Can you add a part that gives the craft a new function, such as a clip, handle, or pocket? Sketch your ideas to add something new.

▶ **For more fun:** Craft it. If you have extra materials, use them to tinker with or make an improved craft! Then, compare the two: Which will your user like more? How well does each function?

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