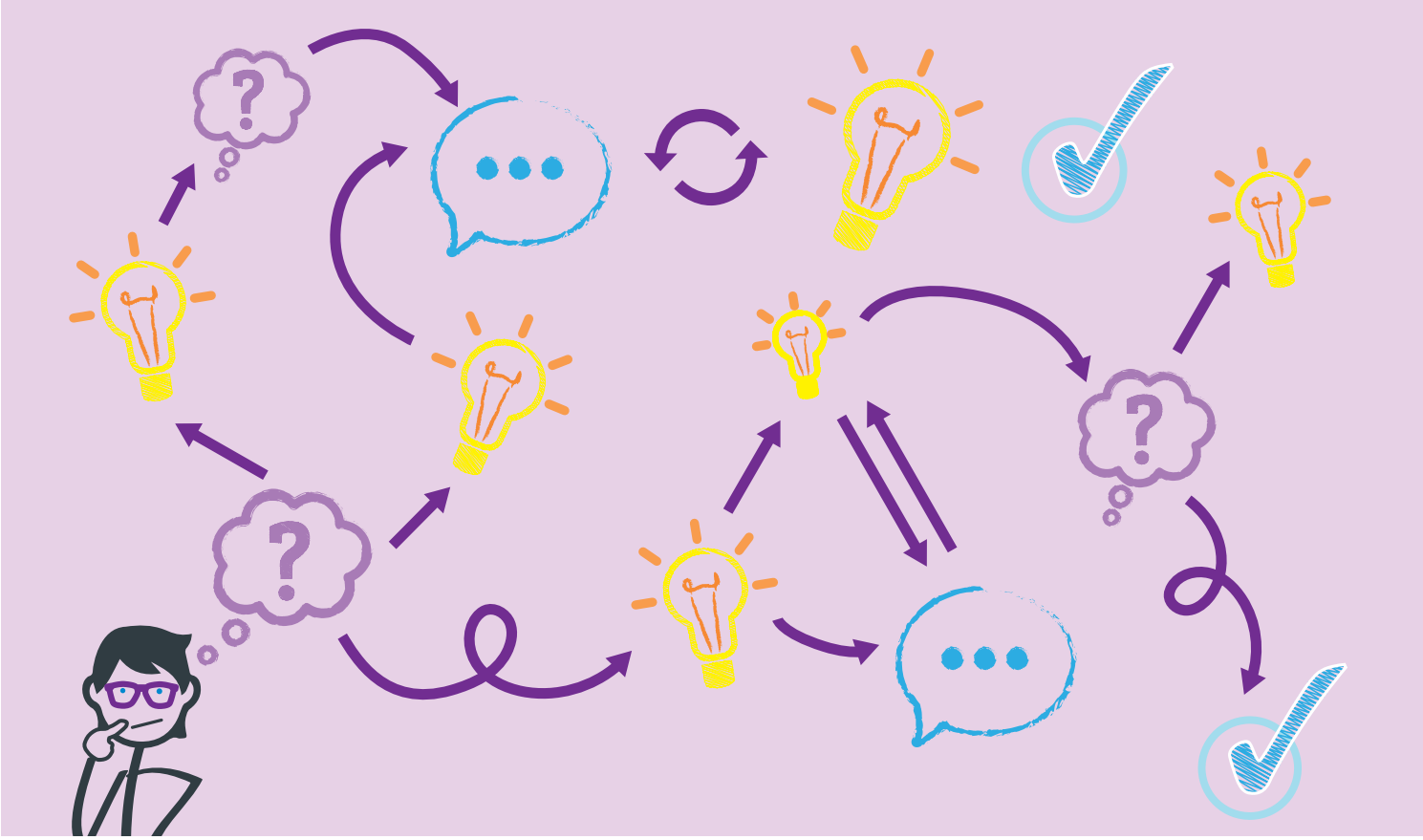
The Tech Interactive at Home

DESIGN FOR ALL
Imagining Inventions

Who says all the fun has to happen at The Tech Interactive? This DIY design activity can be done with inexpensive store-bought supplies and things you find around your home!



Introduction

Have you ever wondered why ordinary objects change over time? For example, why would designers change toothbrush handles to be made out of bamboo instead of plastic? Why would engineers develop self-driving cars? Why might someone need a contact lens that takes your temperature? Designers don't just think about the needs of the present, they also have to imagine what people might need in the future and use these ideas to create new and improved solutions! In this activity, you will also be creating a design concept for an invention of the future! You will learn about a fictional person, brainstorm some solutions to a problem they face, and create a concept sketch of your future thinking design idea.

Design Challenge

Create a concept sketch for a future thinking invention. Use the needs of a specific user as your inspiration!

Subject:
Design thinking, future thinking

Age:
7+

Time:
30 minutes

Key Concepts:
User-centered design, concept sketching, brainstorming

Materials

- Paper
- Something to write with
- Sample User Cards
- (*Optional*) Superhero Brainstorm or Mash-Up Brainstorm
- (*Optional*) Colors (markers, pencils, crayons, etc.)



Instructions

Define the Problem

Before you come up with an invention, you need to clearly define the problem you are trying to solve. Designers do this by thinking about how their product will be used — **design context**. To develop the context for their product, designers research potential users, as well as the setting where the product will be used. For this activity, we have put together the design context for you on some sample User Cards.

Choose a Sample User Card

1. Pick a user from the cards on pages 5-6.
2. Look over the details and take a moment to reflect on the problem. What do you already know that can help you think of a solution? Try asking yourself:
   - Is this a problem I have had in the past, or seen other people experience?
   - How might this person's needs or their setting be different from mine?
3. Write down any notes about the problem that you want to remember.

Imagine

Next, it's time to think of ideas. Lots of them! Designers use **brainstorming** exercises to help creatively expand their thinking. The key is to come up with a lot of ideas quickly. Don't be afraid to put down ideas that seem big or crazy — the wildest ideas can sometimes lead to the most innovative solutions! Later, you'll narrow down all those ideas to a few solutions.

Brainstorm Solutions

1. There are lots of different brainstorming strategies! Use your favorite or try one of these options:
   - **Superhero**: Ask yourself, what super powers would help solve this problem?
   - **Mash-Up**: Mash two random ideas together. See what kind of fun futuristic Frankenstein design you can come up with!
2. Once you have a bunch of ideas, pick two or three of your favorites. If you are not sure which ideas to go with, ask yourself:
   - Which idea(s) would help my user the most?
   - Which idea(s) do I want to be available in the future?

Designers usually brainstorm together as a team. Try brainstorming with a friend! More brains working together means more potential solutions. Remember instead of saying "*No*" to ideas use a "*Yes, and ...*" attitude: "*Yes, and ... what if it could spin!*"

Create

Next, it's time to figure out what your invention would look like. Designers often use sketching and drawing to think through the details of ideas. **Concept sketches** are labelled drawings that show how an invention would work.

Draw a Concept Sketch

1. Grab some scratch paper and something to draw with, then start sketching out what you imagine your inventions might look like.
   - Don't worry about how well you draw. These rough drawings are just another way for you to brainstorm!
2. Sketch two or three of your ideas. This will help expand the possibilities for your cutting-edge product.
3. Next, pick the combination of ideas or features that you would like to focus on for a final concept sketch. Choose your favorite parts of the design and incorporate new inspirations!
   - People should be able to look at your sketch and understand the basics of how your design would work.

   Your final sketch can include:
   - A name for your invention.
   - Written descriptions about what it does.
   - Labels of the different parts.
   - Information on the problem it solves.

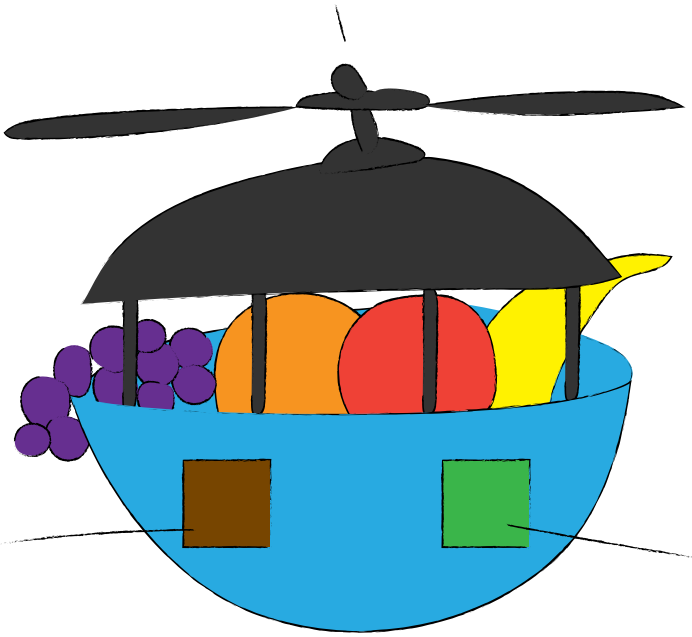
   Reminder: Focus on quickly communicating your ideas visually.

Sample Concept Sketch:

Problem: My fruit keeps going bad before I eat it. I wish it would come to me when it is ripe.

Solution: The Freshcopter

When the bowl turns green, the Freshcopter will activate and fly the fruit to you.



When the fruit is overripe, the bowl will turn brown where the fruit touches.

When the fruit is ripe, the bowl will turn green where the fruit touches.

Reflect and Iterate

Getting feedback, revising and improving is an important part of the design process. Designers often go through many revisions until they end up with a final product.

User Feedback

1. See if you can think of several ways to make your invention even better. Revisit your user card and compare it to your design:
   - How does it meet the needs of the user?
   - What would your user like about your design? Are there parts of it that might not meet their needs?
2. Ask someone to step into the role of your user to check out your design and give you feedback. Ask them to share what they loved, and what they might change and add.
3. Keep iterating and revising your design to improve your user's experience.

Explore More

- **Build it**: Take the next step in the design process and create a model of your design. Models can be built using all kinds of scrap materials, like cardboard, food packaging and fabric. Check out our Materials Treasure Hunt to see how some of our favorite makers gather materials to create various designs!
- **Imagine yourself in the future**: What kind of products and inventions do you see? Are the problems the same, or have they changed? What do you think we would need to do or create now to be ready for the future?
- **Develop for a real user**: Have a real user that you'd like to design for? Take a look at the Sample User Cards and use them as inspiration to create your own card, and a problem that they need help solving. We have included a blank card for you to fill out. Check out our Face Masks for Friends activity for more tips and an example user interview.

Designing for the Future

In addition to thinking about the needs of your user, consider the future-thinking aspects of your design:

- What makes it a design of tomorrow?
- Are there ways it could address problems we predict will be larger issues in the future (ex: can it be powered by green energy sources)?

Empathy helps us appreciate our user's needs and helps designers create more inclusive products. This often leads to designs that work better for everyone. *For example*, when city planners started adding curb cuts to make public streets more accessible to wheelchair users, they also found it created a better experience for people pushing strollers, moving heavy items, and riding skateboards or bikes.

Share Your Results! Keep us posted about your progress on social media with **#TheTechatHome**.

Sample User Cards

How can you help Eric feed his fish?

- The bowl and fish food are on the shelf, away from the cat.
- They are too high for him reach.
- He needs a way to feed the fish without knocking things over.

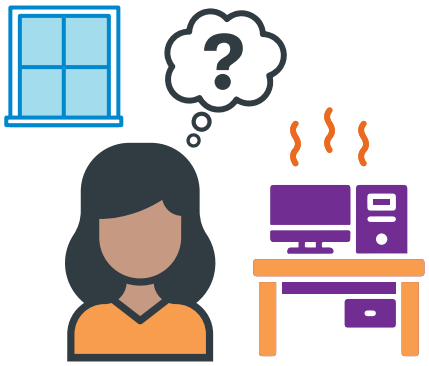
Age 5, likes soccer and his pet fish.

How can you help Deniz get her ball?

- She lost the ball over the fence.
- There is a hole at the bottom of the fence.
- She is not supposed to leave the yard.
- She is allergic to the grass.

Age 9, likes softball and drawing.

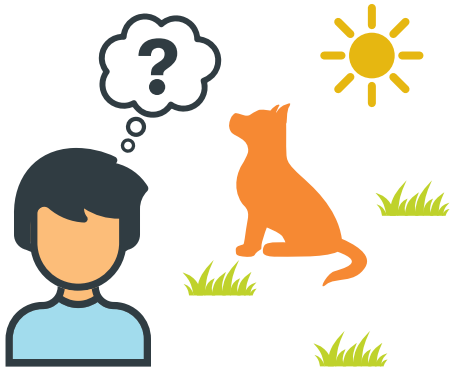
How can you help Maria keep her computer cool?



- Her computer is overheating when she tries to play games.
- She wants an environmentally friendly solution.
- There is a window, but it is too cold to have it open most of the time.

Age 14, likes skateboarding and playing the trumpet.

How can you help Hieu keep his dog entertained?



- His dog wants to play while he is in his virtual classes.
- He needs something that will entertain his dog outside.

Age 12, likes reading sci fi and hiking.

Sample User Cards

How can you help Aiko find her keys easily?

- Aiko's family lives in a big house, so sometimes it can take a while to find the keys.
- Aiko is deaf, so the solution cannot use sound.

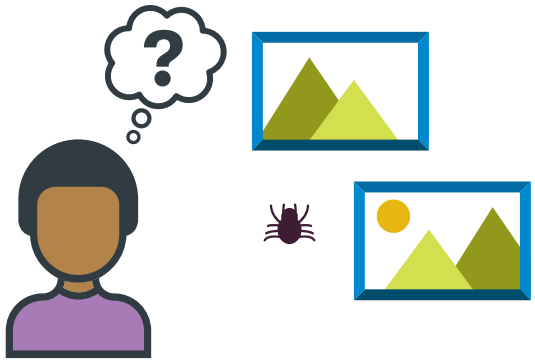
Age 15, likes fashion design and playing the trumpet.

How can you help Grey make their room quieter?

- Noise from outside is distracting.
- They do not want to put holes in their wall.
- There is a window right over their desk.
- The desk is attached to wall and is unmovable.

Age 17, likes playing guitar and reading graphic novels.

How can you help Akshay move a spider outside?



- He is afraid of spiders and does not want to get within 2 ft of it.
- It is on a wall with pictures and he does not want to knock them down.

Age 13, likes baking and video games.

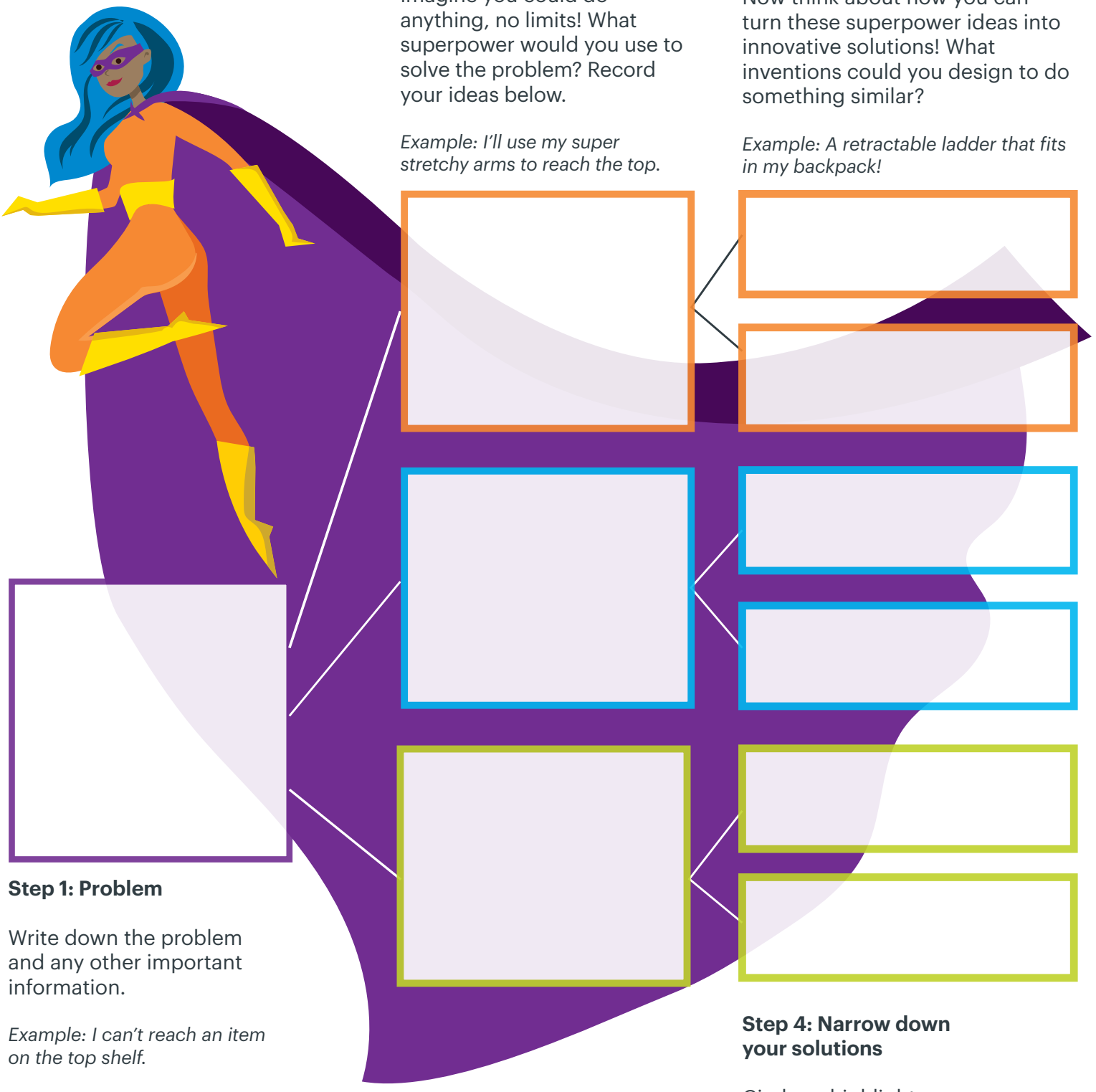
How can you help _____

Add details here.

Age _____, likes _____.

Brainstorming Solutions: Superhero

Take on the role as a superhero! This brainstorming exercise will help you come up with some superpower-inspired ideas for how you can tackle problems. Keep in mind that this is just a way to organize your ideas. Feel free to add more ideas than there are boxes!



Step 1: Problem

Write down the problem and any other important information.

Example: I can't reach an item on the top shelf.

Step 2: Superpower Ideas

Imagine you could do anything, no limits! What superpower would you use to solve the problem? Record your ideas below.

Example: I'll use my super stretchy arms to reach the top.

Step 3: Innovative Solutions

Now think about how you can turn these superpower ideas into innovative solutions! What inventions could you design to do something similar?

Example: A retractable ladder that fits in my backpack!

Step 4: Narrow down your solutions

Circle or highlight your top 3 ideas.

Brainstorming Solutions: Future Thinking Mash-Up

Spark innovative ideas by combining two random things together. See where your crazy mash-up will take you! Keep in mind this is just a way to organize your thoughts.

Step 1: Problem
Write down the problem and any other important information. Create your own mash-up if you have more ideas!
Example: I keep misplacing my toolbox.

Step 2: Simple Solutions
Write down as many solutions as you can think of. Any idea is fine, even wild and crazy ones. One word answers work, too!
Example: Metal detector, Alarm...

Step 3: Random Futuristic Fun
We started this list of random things with some futuristic examples of our own. Add some things you like or random things you think of, too!


Robots


Hologram


Biodegradable parts


Sensors


Wireless

Step 4: Mash up!
Draw lines between the two columns and see what kinds of random combinations you can create. Write down 2-3 crazy mash-ups and see if they inspire you. How would you design something similar?
Example: Flying metal detector — attach a large magnet to a drone to search the backyard.