Design Thinking: Be Energy Smart
Designing Space- and Energy-Efficient Homes

Introduction

Since humans first created simple shelters to protect them from the elements, our homes have been important parts of our lives. We now build homes from a wide variety of materials and in almost any location. Today, we use technology to make our homes healthier, more enjoyable places to be.

But this comes with a cost. The more sophisticated and elaborate our homes become, the more space and energy it takes to build and maintain them. And our supply of both these critical resources is limited. So how do we make our homes use less space and energy, while still being wonderful places to live?

We can apply ideas from science, technology, engineering, and math (STEM) to develop more efficient homes. Scientists and engineers can create new materials and building strategies that make better use of our existing resources. They can even provide ideas to help our homes create their own resources, like energy, fresh air, and clean water. We can also use technology to monitor the resources we use. This can help us make the best possible use of those resources.

Scientists and engineers are always working to design better solutions to develop more space- and energy-efficient homes. These are complex problems, and they require complex thinking. Design thinking is a powerful way to develop solutions to complex problems. It starts with defining the problem and understanding how that problem affects people Then it requires brainstorming many, many ideas and designing and testing prototypes of those ideas. In this type of design, failure is just part of the process. There is room for improvement in every design.

We have already identified many ways to make our homes more space- and energy-efficient. But there is also much more we could do. And that is where you come in. By applying your understanding of STEM skills and knowledge and by using design thinking, you can come up with new and innovative solutions to create space- and energy-efficient homes for YOUR community.
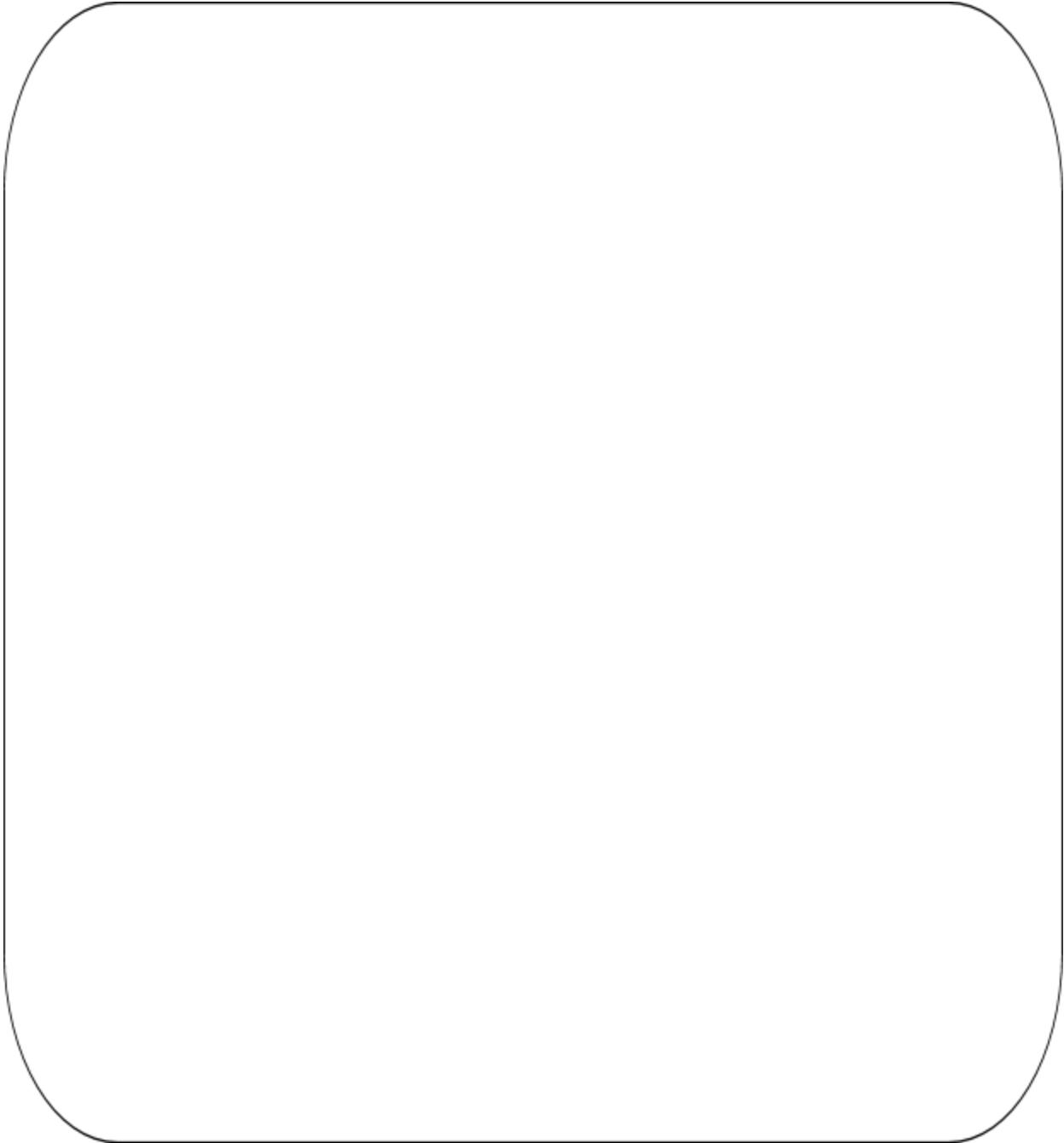
Your **Day of Design Challenge** is to design an affordable home that is designed to be as space- and energy-efficient as possible.

PART 1. IMAGINE A SOLUTION

STEP 1. Imagine an "Ideal" Solution

Talk to your team. What do you think the "perfect" solution is to create a space- and energy-efficient home?

Sketch your idea here:

STEP 2. Dig into The Problem

Now do your research on the problem of create space- and energy-efficient homes. Go online. Talk to people who live in your community. If possible, interview someone who builds homes. These are your "users".

Try to get answers to as many of these questions as you can, and ask other questions that you come up with!

What strategies are already being tried in homes to use space and energy as efficiently as possible? Which of these work and which don't work? Why?
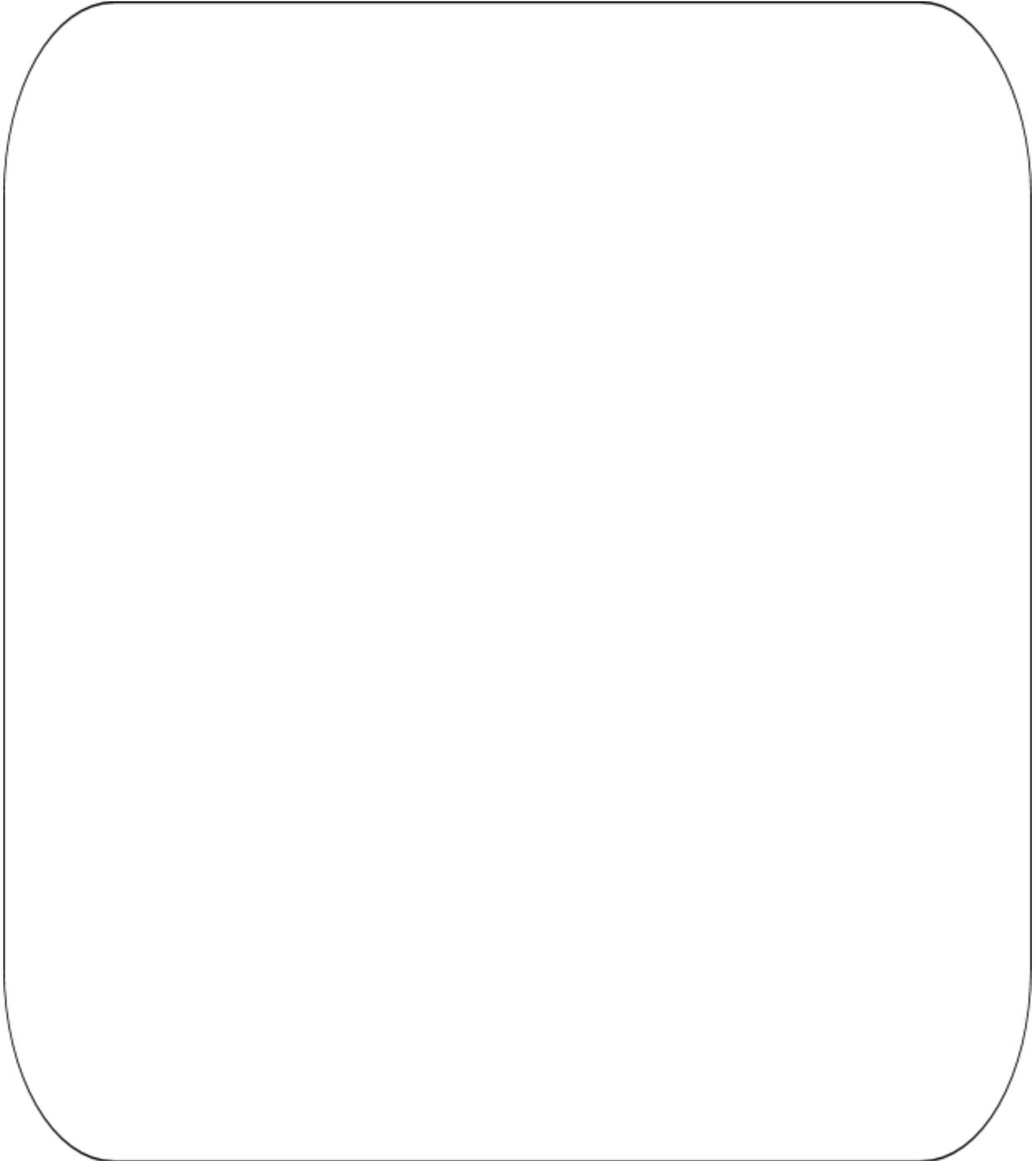
Capture what you learn here:

What is the most important thing your users want space- and energy-efficient homes to accomplish?

Capture what you learn here:

What does your users' "ideal" solution to creating a more space- and energy-efficient home look like?

Sketch or describe it here:

What is stopping them from creating their "ideal" solution? Is it money, rules, lack of technology or materials?

Capture what you learn here:

What were the key findings from your research?
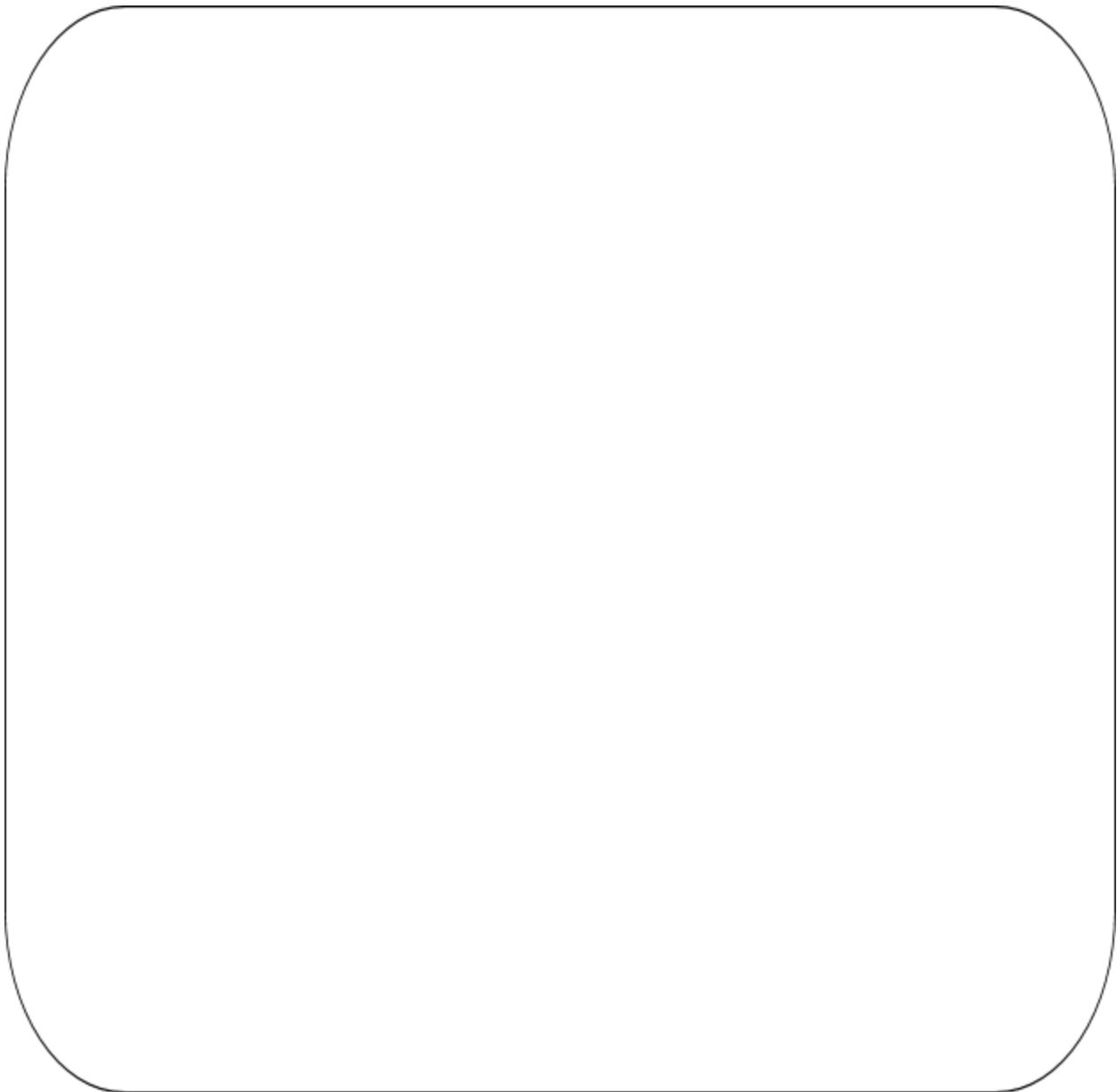
Capture what you learn here:

What features of your "ideal" solution do you think will work and which won't? Why?

Capture what you think here:

STEP 3. Create Alternatives to Test

Imagine at least 3 different ways to meet your "users" needs. Make sure that each is as different as possible from the next.

Sketch your 3 or more ideas here:

Ask your "users" or other teams in your classroom what they think of your ideas.
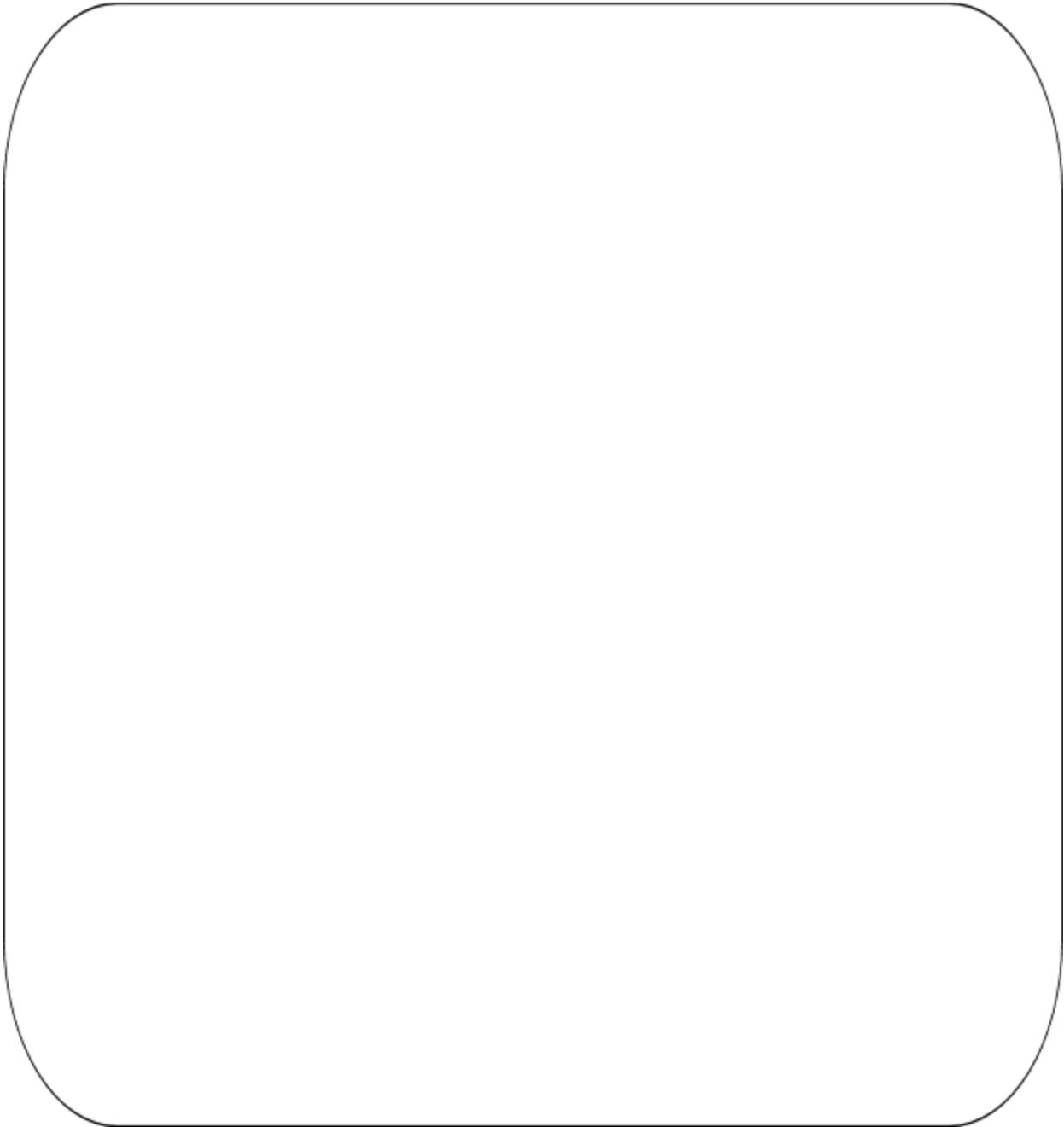
Capture what you learn here:

PART 2. PROTOTYPE YOUR SOLUTION

STEP 1. Reimagine Your "Ideal" Solution

Based on all the insights you have gained, what do you NOW think the "ideal" solution is to create a space- and energy-efficient home.

Sketch your idea here:

STEP 2. Create a Prototype

Using the resources available to you, create a prototype of your solution. It might not match your ideas completely. But it should help bring your ideas to life for your users, and allow you to start testing them.

Describe how you will create your prototype here:

STEP 3. Test Your Prototype

Using the resources available to you, test your prototype. If possible, ask your "users" what they think.

Describe how you will test your prototype here:

Capture what you learn here:

STEP 4. (OPTIONAL). Refine Your Prototype

If you have the time and the resources, use what you have learned by testing your prototype and improve your solution. You can do this once, twice, or as many times as possible.

PART 3. SHARE YOUR SOLUTION

Now it's time to tell your users and your community about your solution. Using the resources available to you, create a presentation (with pictures if possible) or a short (1-minute video) that describes your solution, how it works, and anything you have learned about it. Don't be afraid to share ideas or designs that didn't work. These are important because they tell you what the tough challenges are and help you make better solutions for the future.

Ask your teacher to upload your presentation / video to the **Day of Design** so that you can get your **Smart Homes Design Thinking BADGE.**

How can you bring your prototype / solution to your community? What do you need to make this happen? Who could you work with? Are there other opportunities to help your community create space and energy-efficient homes? Be creative, get involved! Then make and share a video to tell the story of your adventure as a DESIGN THINKER!