

## **Design Thinking: Vibrant Neighborhood**

### ***Growing Livable Communities with Green Space***

#### **Introduction**

Green spaces are the heartbeat and lungs of a community. Whether you live in the middle of a city, in the suburbs, or in a rural place, green spaces are where we play, where our trees and wildlife lives, and where our air and water can become cleaner.

But as our population grows, our cities get bigger, and we need more space for homes and food production. So how do we make enough green spaces? And how do we get our green spaces to do the jobs we want them to **do**?

We can apply ideas from science, technology, engineering, and math (STEM) to create more productive green spaces. Engineers can design our buildings and cities to help preserve and create new green spaces, sometimes even on the top of buildings! Scientists can create ways to make green spaces do new things, like clean polluted air and water. And we can use technology to keep track of and protect our green spaces.

Scientists and engineers are always working to design better solutions for green spaces and other changes that make our communities better places to live. 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 made great progress in creating and preserving green spaces in our communities. But there is 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 increase the amount of green spaces and improve the ways in which they are used in YOUR community.

Your **Day of Design Challenge** is to design a solution to increase green spaces to make your community more livable and enjoyable.

#### ***Teacher Tips and Resources***

*You can define YOUR community in many different ways. It could be your classroom, the school, or beyond.*

## **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 more green spaces in your community?

#### ***Teacher Tips and Resources***

*During this initial “ideation” step give your students free rein. The “solutions” they come up with may be impracticable, even fantastical, but that’s OK. They’ll spend the next part of this activity learning about the constraints that they will have to address to develop a solution for the real-world.*

*If your students are having trouble starting you may want to explore some of the TED talks in this collection on creative ways to grow a garden and some of the amazing, unexpected effects this can have:*

<https://www.youtube.com/playlist?list=PLOGi5-fAu8bEEcsVAOaTSxHggQH286grB>

*If you want to focus your students on creating green space inside, this video shows how indoor plants can improve air quality:*

[https://www.youtube.com/watch?time\\_continue=61&v=HdOibycDIA4](https://www.youtube.com/watch?time_continue=61&v=HdOibycDIA4)

Sketch your idea here:

### **STEP 2. Dig into The Problem**

Now do your research on the problem of creating green spaces in your community. Go online. Talk to people who live in your community. If possible, interview someone who is responsible for managing open spaces in your community. 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 does your community currently provide for green spaces? What are these green spaces designed for? Do they accomplish this? If no, why? If there are no green spaces, why?

#### ***Teacher Tips and Resources***

*The following links provide a summary of some of the benefits of green space:*

<http://www.arch2o.com/urban-green-spaces-challenge-cities/>

<http://projectevergreen.org/resources/environmental-benefits-of-green-space/>

*To give them a sense of the what is involved to create a green space, this UK-based initiative provides a very simple and structured overview:*

*<http://www.brighterfuturestogether.co.uk/brighter-futures-together-toolkit/create-a-green-space-in-your-community/>*

*If available space is limiting, your students may want to explore the concept of “vertical gardens”:*

*<http://www.popularmechanics.com/home/how-to-plans/how-to/g847/how-to-start-a-vertical-garden/>*

*Doing interviews with “users” is always the most powerful and productive (and engaging) way to get insights into a design challenge. The questions listed here are suggestions. If you have time, have your students develop their own interview questions. Make sure they keep notes. If your students get confused with the amount of information they hear during interviews, coach them to focus on the “most important” things. And suggest that they sketches to summarize their findings. For “interviewees”, use your colleagues or adult volunteers to provide their perspective, or if possible reach out to civic institutions (e.g. Town Hall) or corporations (e.g. landscape firms) to recruit “experts”.*

*Capture what you learn here:*

What is the most important thing your users want green spaces to accomplish?

*Capture what you learn here:*

What does your users’ “ideal” solution to creating more green space 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 now 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 creating green space in your community?

*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.

#### ***Teacher Tips and Resources***

*Prototyping can be done using traditional classroom materials, or your students can build a model - maybe even a functional one! - of their green space using materials that are cheap/free and readily available.*

#### *Simple Prototypes:*

*Have your student draw out the green space to scale using graph paper. If you have time and resources, have them build a model out of classroom supplies. Working in teams will significantly reduce the supplies used. And reinforce the idea of sustainability by having your students recycle and upcycle building materials as much as possible.*

*Typical building materials might include foamcore, cardboard, chipboard, recycled bottles, cans and cereal boxes. To get precise cuts, you will want to use an exacto knife or box cutter for most materials. To connect materials use tape or hot glue, which tends to work better and creates more structurally sound models.*

#### *Advanced Prototypes:*

*Having your students incorporate living materials into their models will add an exciting touch of realism, and provide you with the opportunity to extend the activity and connect it into a wide variety of other STEM topics.*

*To accomplish this, have them create a self-contained biosphere in a bottle:*

<https://www.expectmorearizona.org/blog/2014/04/22/earth-day-activity-build-biosphere-bottle/>

*Or build a model vertical garden:*

<https://www.jason.org/dayofdesign/vertical-garden>

*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.

#### ***Teacher Tips and Resources***

*An important part of the design thinking process is to establish how you need to test your prototype to figure out if its going to successful for your “users”. This is often quite tricky.*

*Have your students define what the key “metrics of success” are for their prototype. For example, is the most important accomplishment of their green space: improved air and water quality, better looking communities, or happier people? Perhaps all three are important.*

*Then have them propose ways to test the prototype how it scores for these metrics. It may be difficult to test the design as a whole, so suggest that they focus on specific features and then pull these all together. For example, test the impact of their green space on water quality, or estimate the impact of including green space on the amount of time the community will spend outside together. It’s OK to estimate impacts in some cases, as long as they are justified by clear, logical thinking. For example, I think people will like our community better because over 80% of the people we interviewed said that they wanted more green space.*

*Your students will not be able to test certain important impacts of their solution, e.g. water quality, using their prototypes. If you have the opportunity, let them experience what is involved in doing these types of tests using an established, accessible green space, e.g. go down to a local river to collect and analyze water samples.*

*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

### *Teacher Tips and Resources*

*There are many ways for your students to share their ideas. This is not only empowering for them, as they get to share their ideas and work with a broader audience; it is also a great learning experience, as they identify and focus on their critical findings and outcomes, gain deep mastery of their subject materials, and develop and deliver effective communication messages and assets (e.g. models, diagrams). Remember to emphasize to them not to shy away from describing their failures and what they learned from them. This is an inevitable and powerful part of the (iterative) design thinking process. Ideas and solutions get better through testing and failure.*

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.

### *Teacher Tips and Resources*

*Your students can gain national recognition for their work by participating in the year-long Day of Design initiative and claiming their Vital Neighborhood Badge. Register on the Day of Design website (<http://dayofdesign.com/getting-started/>) to receive detailed instructions on this opportunity.*

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

### *Teacher Tips and Resources*

*The Vital Neighborhood design thinking challenge is intend to help you and your students start on the path to build and practice new career-ready skills, such as design thinking, and explore critical STEM subjects, such as energy use and efficiency, and their relationships to your local and the global community. Do not feel constrained by the guidance and suggestions of this activity. There are many ways to make these important learning opportunities work for your students! Don't hesitate to share your successes and failures by submitting them as well to the Day of Design program.*

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 more green space? Be creative, get involved! Then make and share a video to tell the story of your adventure as a DESIGN THINKER!