

ENGINEER BRIEFING

THE DESIGN PROCESS

HOW DOES AN ENGINEER DESIGN SOLUTIONS?

One of the tools engineers use to design solutions is the design process. It is a process that helps us understand challenges and find new and powerful ways to solve them.

There are many different ways to use the design process and many different names for it. This is because it is actually a natural way of problem solving that has evolved along with people and society. As you design solutions to the problems faced in City X, you will learn seven different ways to practice each stage of the design process:



THINKING TO SOLVE PROBLEMS

When we design solutions, we want to consider a lot of ideas but also be very specific about the problem we are solving. To help us do this, we think in different ways.



Sometimes we think big, opening our minds as far as they go.



Sometimes we think carefully, focusing our minds on the right things.

As an engineer creating the future of City X, you will master both ways of thinking as you design solutions for the future.

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IRRESISTIBLE FUTURES // OUR DESIGN PROCESS

The **explore** stage is about learning as much as you can about a problem from different points of view. You will learn about the basics of each challenge, study user research, and complete activities that help you know what it's like to be in someone else's shoes.

EXPLORE



Collect all of the facts and perspectives

The **synthesize** stage is about information: organizing it, making sense of it, and deciding what to do with it. You will choose a citizen of City X to design a solution for and set a goal that guides you as an engineer.

SYNTHESIZE



Organize knowledge and define a goal to work toward

The **imagine** stage is when we start to design solutions, and it is all about creativity! Follow four rules to imagine solutions to problems:

IMAGINE



Come up with creative ideas

1. Come up with as many ideas as possible.
2. Build on the ideas of others!
3. Wild ideas are great.
4. No robots or apps. That's too easy!

The **create** stage is a process of building models (called prototypes) and testing them to get feedback from other people. In the create phase you will complete activities that make your ideas come to life so you can make them even better.

CREATE



Choose your favorite idea and begin to build and test it to make it better

The **share** stage is about communicating your ideas to the world. In the share stage, you will complete activities that help you tell the story of your challenge, your solution, and the irresistible future it will create.

SHARE



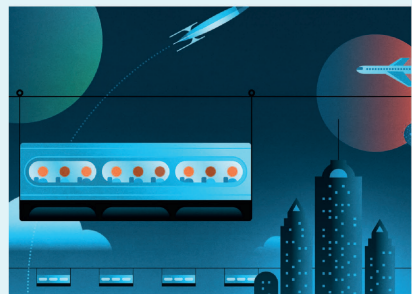
Share your story with as many people as possible

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As an Irresistible Futures engineer, you will design solutions to challenges faced by the citizens of City X, the first human settlement on a new planet. The citizens have identified seven major social problems they are facing as they create their new city. To each agent, we ask one question:

“What if we could solve the biggest challenges in City X and design a future that works for everyone?”

LEARN ABOUT THE SEVEN SOCIAL CHALLENGES



TRANSPORTATION
How we get around and move things



ENVIRONMENT
Everything that surrounds us, from the air to the trees to the buildings



COMMUNICATION
How we stay connected to other people



FOOD
How we keep ourselves strong

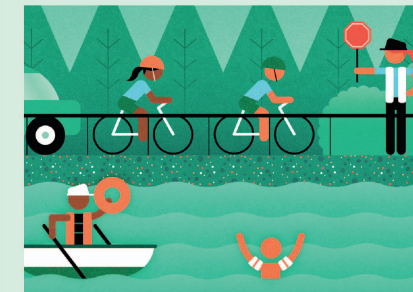


HEALTH
How we keep ourselves from getting sick

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ENERGY
How we make ourselves productive and comfortable



SAFETY
How we protect ourselves, our friends, and our world

TEST YOUR KNOWLEDGE

SOCIAL PROBLEMS VS. PERSONAL PROBLEMS

A social problem is a problem that affects a lot of people, such as a whole community or even a whole planet. These are important problems to solve to make life better for everyone.

A personal problem is a problem that is experienced by just one person. These problems might seem important to us if we are experiencing them, but usually solving them will only help one person.

We want to use our creativity to solve social problems. Which of these problems are social problems?

A.



Erin is hungry.

B.



There is no food in our stores.

C.



The power has been out for two weeks.

D.



Shailesh's phone is dead.

Answers: B, C

EXPLORE



ACTIVITY

LIVE A DAY

WE DON'T THINK a lot about many of the things we use in our lives. How many times today did you think about where the water you drank came from or who cooked your food or who built your school?

In this activity, we are going to **explore** the energy we use each day by living an entire day without it!

PREPARATION



1
DAY



▶ WHAT YOU WILL NEED



▶ PREPARE YOURSELF

You will need permission for this activity because you are going to do something a little bit silly: **You will live an entire day without energy.** It is probably best to do this activity on a weekend or on a day when you don't need to go to school.

Plan ahead! Think about how you will do some things you normally do if you cannot use energy.

THINK ABOUT IT

Before you get started, think about all the ways you use energy every day. Ask an adult you trust to help and **make a complete list in your design notebook.**

Share your work with
#QUARTOCLASSROOM



www.quartoknows.com/blog/quarto-classroom

1

GO ABOUT YOUR DAY

When your day starts, remind yourself that you have to live the entire day without using energy. Your friends or family might offer to help you or to use energy for you, but that would be cheating!

2

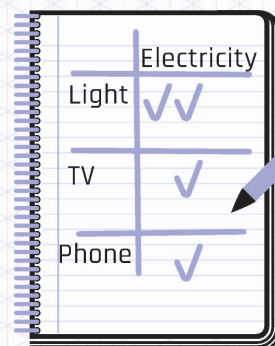
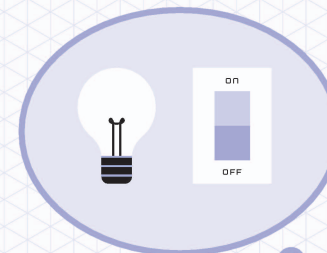
KEEP TRACK

Every time you find yourself needing to use energy, make a check mark next to that category in your notebook. If you find new ways that you didn't think of, add them to the list and keep track of those too.

3

FIND A DIFFERENT WAY

Every time you think about using energy, try to find another way to do what you need that doesn't use energy. Make a list of all the alternatives you found and also make a list of anything you needed to do that you absolutely could not find another way to accomplish.



REFLECT

How hard was it to live a day without energy?

Think about your experience living without energy. It was probably hard, and you only did it for one day!

What new ideas did you get today when you were thinking about how to complete tasks that usually use energy?