



Educator Guide

Design Genius Jr.: Adventures in Engineering for Kids

Journey to City X

From the author:

Dear educator, parent, or curious human:

I'm so glad you've found this in your hands. The guide you're about to read is designed to help you make the most of *Design Genius Jr: Adventures in Engineering for Kids*.

In the story, you'll find humans building City X, the first settlement on a new planet deep in space. The mayor of City X has founded an elite intergalactic engineering team called the **Irresistible Futures Agency**, charged with creating a future that works for everyone.

With this book as their toolkit, your children will become official Irresistible Futures Agents.

The activities and lessons in the book are a flexible curriculum for the classroom or at home that teaches design thinking, problem solving, STEM basics, creative communication, and even diversity and inclusion. This guide will help you unlock all its best parts.

You are free to use, distribute, copy, and remix these supplemental materials, and please share them with your own communities, and back with me!

Grab a copy of the book, find some friends - young or old - and ask them: **what is your irresistible future?**

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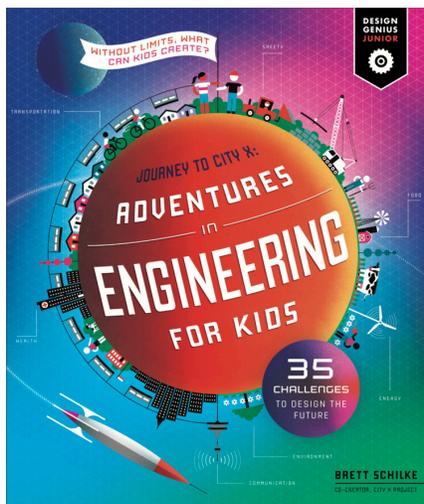


Without limits, what can kids create?

The Goal: Through a series of challenges and activities, kids learn about global issues being faced in City X, the first human settlement on a new planet. Thirty-five Citizens have participated in user research to help us understand what they need in City X, and it's up to the Irresistible Futures Agents to engineer solutions to the problems they face.

Each chapter of the book is organized around a specific global issue, like Transportation, Safety, or the Environment. Kids learn about the issues and follow the *Irresistible Futures Design Process*, an augmented version of design thinking, to engineer creative solutions.

Each chapter is structured to include:



Challenge Basics

Three perspectives on each issue.

Design Activities

Hands-on activities that guide kids through solution design.

User Research

Citizens from City X present their own unique views.

Case Studies

Lesson from the real world of engineering & innovation.

These elements are flexible and can be easily scaffolded for different ages, abilities, and desired depth. In this way, the book can be utilized throughout an entire semester or even a full year and can integrate with other subjects to help students understand how the things they learn are relevant in the real world.

In the classroom

For schools, there are many ways you can use the book to create fun experiences that get people thinking about the future.



Launch an Irresistible Futures satellite office right in your classroom

Immerse your kids in the story by setting up your own satellite office of the Irresistible Futures Agency. Connect other subjects to real world issues, and use the topics in the book to turn your entire school year into one that is focused on STEM, innovation, and the future.



Host a school-wide design challenge

Use the posters included to style your school for a big challenge. Pick an issue that is important in your own community, and choose from the 35 activities in the book to use those most relevant and exciting for your school. Choose a prize for the winning student!



Infuse your makerspace with purpose

Let students create for a reason, tinkering and building to make prototypes of solutions to real-world problems. If you'd like to use the book with a **3D printing lab**, you can find an entire supplemental curriculum for this in the original City X Project toolkit at cityxproject.com/toolkit.

In the community

The curriculum at the core of *Journey to City X* has been used in countless community-based programs. These are a few of the most popular ways to use the materials in this book.



Run a summer camp for the future

Make your summer camp an Irresistible Futures camp. An outdoor camp is a great place to dig into the Environment chapter, or a school camp might think about Energy. The book is flexible and can be used for a program as short as a day or as long as a full summer!



Make a museum experience

The book is perfect for children's museums and exploration or science museums as an activity or longer workshop experience for kids. Use your own exhibits to provide the grounds for research and testing, and have a panel presentation for parents at the end!



Learn on your own, or with friends

Homeschooling, or just summer learners, is a great match for *Journey to City X*. The book can be completed independently or with a parent/teacher guide, and the summer is a perfect time to explore and learn at the same.

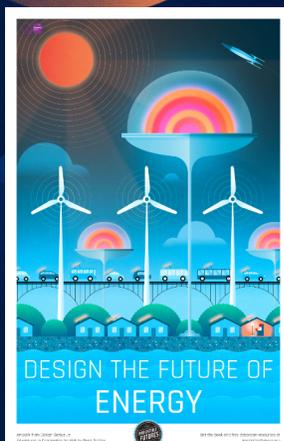
Classroom Posters



Download and print these posters for the Irresistible Futures Agency. One poster is available for each challenge faced in City X.

Activity Idea: Gallery Walk

Put posters up around the classroom as an early activity to get kids thinking about the different issues they will be solving. Have them use sticky notes to write down the ideas they have for each of the challenges, and stick them on the posters.



Click each poster for a direct link, or download the complete set as PDFs:

IrresistibleFutures.org/resources

Size: 11" x 17" (ledger) paper

Curriculum Integration

The story and elements in *Journey to City X* are carefully designed to stimulate creativity while achieving learning goals in Literacy, Math, Science, and more.

Literacy & Humanities

- | Common Core State Standards
- | CCSS.ELA-Literacy.RL.5.3 CCSS.ELA-Literacy.CCRA.W.8
- | CCSS.ELA-Literacy.CCRA.W.7 CCSS.ELA-Literacy.CCRA.SL.4

The book is built on a proven curriculum which was aligned to Common Core State Standards in partnership with Pearson Education. Even if your school doesn't use Common Core, you'll still find great ideas for using the book in your school.

Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details.

*During **User Research**, students empathize with Citizens of City X and write design statements to address the problems they are experiencing. For deeper engagement, have students do a pair share about the citizens they choose, comparing/contrasting their feelings and problems.*

Conduct short and sustained research projects on focused questions, showing understanding of the subject under investigation.

Gather information from print and digital sources, assess credibility and accuracy of each source, and integrate information while avoiding plagiarism.

Each chapter is a short research project on a real world issue, as students explore perspectives and possible solutions. For deeper engagement, have students use the prompts in the story as a launching point for further research into the history, scale, and complications of each challenge.

Present information and supporting evidence in a way that is appropriate to the task and audience, so that listeners can follow the line of reasoning.

*Presenting and sharing ideas is an integral part of the Irresistible Futures toolkit. Students present their initial ideas during the **Create phase**, integrate feedback, and then learn seven different methods for telling their story to various audiences.*

Additional Ideas

Be creative and find ways to connect the tools and resources in *Journey to City X* with other courses and subjects.

History

Completing the activities in the book, students develop solutions that address social issues for a settlement on a new planet. But these challenges are a lot like the ones we face here on Earth, too. Before students begin to brainstorm their design solutions, have them do a short research project and presentation that looks into questions like this:

What is the role of the issue in the past and present on Earth?

How have people been affected by the issue over time? Has it gotten better? Worse?

What solutions have people developed to address the issue, if any?

Language Arts

Characterization is an important aspect of understanding a story. Students can make their Citizens from City X come alive by creating a short sketch or writing a bio to offer more detail about who their Citizen is, where they come from, and what they need. This can give students more opportunity to develop and apply their empathy-building and narrative-writing skills.

Science

Students can easily connect science to their exploration of challenges in the book. Use a case study as a launching point to learn about deep space, chemistry, or physics. Strengthen skills about ecosystems by creating a map of City X or the planet on which it was built, showing its distinct features. Students can include information about the living and nonliving things on the planet. These scientific explorations can further develop their ideas for their design solutions.

Mathematics

- | Common Core State Standards
- | CCSS.Math.Practice.MP4
- | CCSS.Math.Practice.MP6

Model with mathematics.

*Creating a model is one of the central activities of every **Create** stage in the book. This gives students an opportunity to apply not only problem solving skills but also their understanding of geometry, ratios, proportional relationships, measurement, and data so they produce ideas that adequately respond to the problems being faced.*

Attend to precision.

*Precision plays a very important role when students take their initial concepts, from blueprinting, sketching, or prototyping and make adjustments through **Improve and Repeat** activities.*

Literacy and Mathematics Extensions

Meet additional standards with small adjustments and additions.

Write routinely over extended time frames

(time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two).

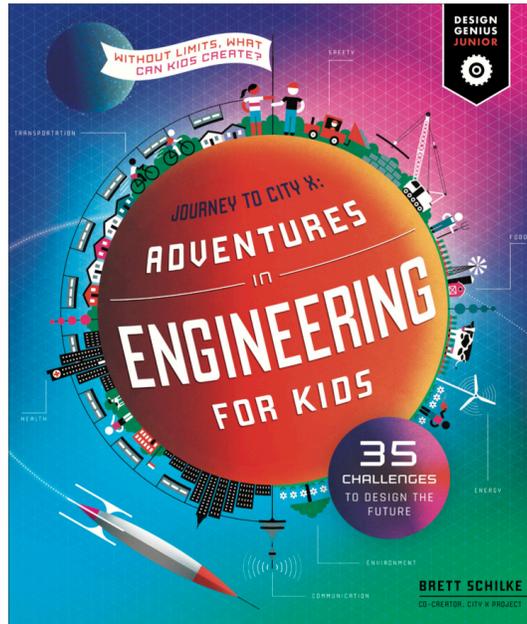
- | Common Core State Standard
- | CCSS.ELA-Literacy.CCRA.W.10

***For deeper engagement,** provide additional writing prompts throughout the activities. For example, ask students to write a short narrative based on their Citizen, keep a research log that documents their sources, or journal to reflect on their experience.*

Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

- | Common Core State Standard
- | CCSS.Math.Content.6.G.A.4

***For deeper engagement,** have students create models using graphic design or 3D modeling software. This is a great integration for tech labs, 3D printing curriculum, and geometry lessons. This more advanced modeling technique also has the added bonus of helping students think more deeply about their solution.*



This guide is a supplement to
Design Genius Jr: Adventures in Engineering for Kids.

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