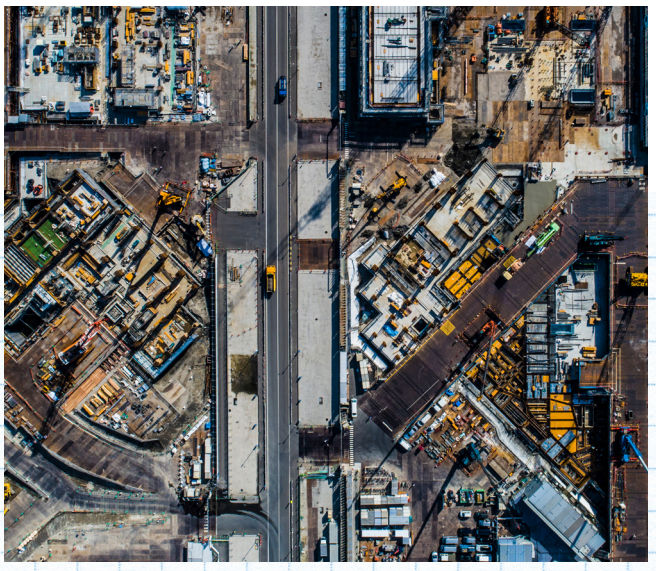
SCIENCE FAIR CENTRAL

Maker Corner Activity



URBAN PLANNING FOR OUR COMMUNITY

Grade Level: High School

MAKE. CREATE. EXPLORE.

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THE HOME DEPOT

Discovery EDUCATION

Urban planners are always looking to the future.

Overview

After learning about the role of urban planners and the importance of planning when it comes to public and environmental health, students will examine a location in their community using mapping technology. They will propose how to improve upon this area's design, and they will create a 3D model of this location with the improvement included.

This activity focuses on the **"Defining the Problem", "Designing Solutions", "Creating or Prototyping", "Refining and Improving",** and **"Communicating Results"** stages of the Engineering Design Cycle.

Engineering Design Cycle

- **Defining the Problem**
- **Designing Solutions**
- **Creating or Prototyping**
- **Refine or Improve**
- **Communicating Results**

Have you ever wondered...

What exactly is urban planning?

Urban planning is a profession that strives to create and revitalize communities (from cities and suburbs to small towns and rural areas) by focusing on the layout of space in these areas. Urban planners must consider a range of factors, including economic development, transportation, housing, environmental protection, land use, and community planning as they work to build or maintain a high quality of life. Urban planners look into the future as they plan in order to ensure the future quality of life in a community.[1]

What other professionals do urban planners work with to bring their community visions to life?

Urban planners must work with a variety of other professionals in order to set their city plans in motion. Planners often have to collaborate with civil engineers, environmental engineers, architects, real estate developers,

Objectives

Students will be able to:

Understand the role and impact of urban planners.

Evaluate areas of growth in their own community and assess how urban planning could promote public and/or environmental health.

Construct a 3D and scaled model of their improved community design.

and lawyers.[2] It is usually the responsibility of urban planners to zone areas for different types of development and construct the initial ideas and plans for the physical layout of these areas. Once this is complete, they work with architects and engineers to design the plan in fuller detail. Lawyers and town officials then ensure that the plans abide by community laws, and real estate developers can help transform the approved plans into a reality!

Materials

- Planning article, one per student
- Making Our Cities Green video, to project
- Community Planning Handout, one per student
- Pencil with erasers, one per student
- Ruler, one per every two students
- Poster board, one per every two students
- Hot glue gun and hot glue, at least 2 for the class to share

The following materials can be shared among all students:

- Craft sticks
- Paper
- Foam core
- Paint
- Paint brushes
- Paper plates
- String
- Modeling clay
- Cardboard
- Scissors
- Glue

Make connections!

How does this connect to students?

It's important for students to have access to and knowledge about a wide range of careers as they begin to consider what interests them most. The field of city planning is one that students may not initially consider—yet it utilizes many of the STEM skillsets that today's students possess. By encouraging students to explore what the field entails, it broadens students' understanding of STEM career opportunities.

How does this connect to careers?

Urban Planner: While the roles of a planner are varied, their work always advocates for development that will yield community improvement by keeping factors such as environmental impact, social issues, and economic development in mind.

Architects: Architects draw designs for new construction projects. The construction company will then follow their directions as they begin to build.

Civil Engineers: Civil engineers design, build, construct and maintain infrastructure such as tunnels, roads, bridges, and buildings.

Environmental/Sustainability Managers: These managers oversee the environmental performance of a wide range of organizations, suggesting where improvements can be made, and making sure current environmental legislation is followed.

How does this connect to our world?

In a world where global warming and climate change are becoming more pressing every day, ways to combat our contribution to these issues is important. It is therefore crucial that those in charge of planning, developing, and updating communities do so with a globally-conscious and environmentally-friendly mindset. An increase in green spaces and fewer greenhouse gas-emitting transportation routes will help lesson our carbon footprint around the world.

Blueprint for Discovery

Prior to class arriving

- Prepare the Google Maps community projection.
- Ensure that the video is ready to project and play.
- Photocopy the article and Community Planning Worksheet.
- Display the 3D model materials in an area of the room that is easily accessible to students.

During class:

1. Begin class with a quick share: What is your favorite part of our town or city?

   Once students have shared, tell students that many (if not all) of the features they just mentioned exist because of the work of an urban planner.

2. Distribute one "What is Planning?" article to each student. Divide students into pairs and instruct them to read and annotate the article with the following guiding question in mind: What role may a planner have played in developing your favorite part of our community?

3. Once students have completed their reading, invite a few pairs to share what they learned and engage the class in a quick group discussion around the guiding question.

4. Next, tell students that today they will be taking on the role of an urban planner / town planner (depending on the size of your community). In other words, they will now help create plans that will be used to better their own community!

5. Project Google Maps and zoom into the center of your town or city. Use the box on the bottom left of the screen to toggle between *Map view* and *Satellite* view. As you do, encourage students to make observations about their community. Ask: What do you notice from this birds-eye view about the layout of our community? What do you wonder?

6. Show this quick video (from the beginning to 2:16), which features how cities in Australia are working to become healthier and greener. As students watch, prompt them to consider: What improvements to our community could help our own residents and/or the environment become healthier?

   Tip: If you live in a rural community, remind students that they can still apply key points from the video to their own community.

7. Next, distribute the Community Planner Handout to each student. Explain that students will be working in pairs to create a plan to improve their community. Provide students with a general overview of the directions, as well as where they can find the materials for their 3D model. Be sure to share the amount of time students will have to complete Steps 1 through 5.

8. Provide students with updates indicating how much time they have left throughout the design and building process.
9. Before class wraps up, pair student partners together. Encourage them to share their "before" image, their "after" model, and the rationale for their new city or town plan.

Take action!

Possible Extension Activities:

1. Dive farther into the mathematical concept of "to scale." Challenge students to think more fully about the scales for the 3D portion of their community models, and revise any components that are too large or too small. Or, students may choose to create a new to-scale model using a different scale that allows them to more accurately represent their community.
2. Now that students have experience with city planning, they can tackle a new challenge: designing cities that are friendlier to children. After reading this article about the subject, students can redesign a portion of a city of their choice by following a similar procedure as they did in this lesson, but working on a new area of improvement.

National Standards

Science

Next Generation Science Standards

MS-ETS1-1 Engineering Design
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Technology Education

Standards for Technological Literacy
As part of learning how to apply design processes, students should be able to:

- Specify criteria and constraints for the design.
- Make two-dimensional and three-dimensional representations of the designed solutions

English Language Arts

Common Core

CCSS.ELA-LITERACY.CCRA.R.1:
Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCSS.ELA-LITERACY.CCRA.R.10:
Read and comprehend complex literary and informational texts independently and proficiently.

Mathematics

Common Core

CCSS.MATH.CONTENT.7.RP.A.2
Recognize and represent proportional relationships between quantities.

Sources

1. Frequently Asked Questions about Urban Planning. School of Architecture and Urban Planning, University of Wisconsin. uwm.edu/sarup/urban-planning/faq/.
2. Urban and Regional Planners. Occupational Outlook Handbook. Bureau of Labor Statistics. bls.gov/ooh/life-physical-and-social-science/urban-and-regional-planners.htm.

Community Planning Handout

Step 1: Familiarize
Use Google.com/Maps to view your community. Zoom in and out and take a few minutes to find some areas/locations that you recognize!

Step 2: Assess
As a City/Town Planner, it is your job to not only develop new communities, but improve existing communities too! With your co-planner, read through the common community problems below.

Then decide: Do you think one of these problems affects your own community? If so, place a checkmark next to it. If not, describe another design problem your community faces that may affect the health of residents and/or the environment.

_____ **Problem:** Not enough green space! Green space includes parks, public gardens, play areas, and even walking trails! Parks and public green areas are important for the environment, the health of local citizens, and creating a sense of community.

_____ **Problem:** Too much traffic! If a more walkable and/or bikeable community center could be constructed, residents could walk to complete their errands and activities. This would cut down on air pollution and help residents get more exercise.

_____ **Problem:** _____
_____
_____

Step 3: Prepare
Now decide on an area in your community that you would like to improve based on the problem you identified. Zoom in and out on Google Maps until this area is in view. Then grab a piece of poster board and work with your co-planner to sketch a blown-up version of the map you see on your device screen.

> *Tip:* Try to make your map to scale. This means that everything on your poster board will be bigger than the map on your device by about the same amount.
>
> To make your map to scale, estimate about how much larger the poster is than your device screen, and then make sure all parts of your sketch are this many times larger. For instance: If your poster is about 4 times larger than the map on your device screen, then everything on your poster should be about 4 times larger than it appears on your screen. Use a ruler to help you!

Community Planning Handout

Step 4: Plan
Once you have a map of your community lightly sketched, it's time to make improvements! How could you solve the problem you identified above? Pretend you are meeting with your local architect (drawing designs and creating models is their specialty!) as you brainstorm and discuss possible changes with your co-planner. Then make these changes on your own map.

Step 5: Create
Bring your design to life! Use the map as your base and construct a 3D version of your design by using the model materials to build upward. Keep your model to scale as much as possible!