

## CLASSROOM ACTIVITY

# Sustainable City Planning

### OBJECTIVES

Students will be able to

- **Determine** and **defend** sustainable practices to incorporate in their city.
- **Construct** a model of a sustainable city.

### OVERVIEW

This Earth Day activity provides students with an opportunity to step into the shoes of an urban planner and work collaboratively with an urban planning committee to develop a city that will be powered by renewable energy. Students will construct a model of their city addressing the needs for sustainable food production, increasing green space, transportation, and the reduction of waste.

### NEXT GENERATION SCIENCE STANDARDS

Next Generation Science Standards

- **HS-ETS 1-1 Engineering Design**  
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- **MS-ESS3-3 Earth and Human Impact**  
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Common Core English Language Arts

- **Speaking and Listening:**  
SL.1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

### BACKGROUND

Did you know that by the year 2050, it is estimated that nearly 70% of the world's population will live in urban areas? Due to this staggering statistic, it will be essential for urban planners to create cities that support sustainable infrastructure. A sustainable city is one designed to address social, environmental, and economic impact through urban planning and city management. The United Nations focus on future cities which provide equal access to housing, the development of sustainable transport systems, buildings, and agriculture, and implement policies towards climate change, resource efficiency, and disaster risk reduction.

**KEY VOCABULARY**

- Sustainable
- Carbon footprint
- Climate change
- Greenhouse gases
- Hydropower
- Renewable energy
- Solar energy
- Wastewater
- Urban sprawl
- Smart growth

**MATERIALS**

- Video—[What Is the Most Sustainable City in the World?](#)
- Student resources *Renewable Energy*
- Student resources *Food Production*
- Student resources *Transportation*
- Student resources *Public Access to Green Spaces*
- Student resources *Water Conservation & Waste Management*

**TEACHER PREPARATION**

- For each group—one copy of each student resources
- Poster paper
- Markers or colored pencils

**PROCEDURE**

1. Begin the activity by asking students to develop a list of criteria they would use to determine which city in the world is the most sustainable. Record all student responses on the board.
2. Encourage students to write down the innovative ideas used in cities mentioned in the video [What Is the Most Sustainable City in the World?](#).
3. After watching the video, ask students the following discussion questions:
  - a. What criteria were used to determine the most sustainable city? How did it compare to the criteria we developed?
  - b. Have you heard of the United Nation's 17 sustainable development goals?
  - c. What are some of the issues facing cities and the increasing population of the future?
  - d. What type of sustainable practices does our city or community incorporate?

4. Explain to students that Earth Day is an annual event on April 22<sup>nd</sup> to demonstrate support for environmental protection. Earth Day was first held on April 22<sup>nd</sup>, 1970, and now coordinates a wide range of global events in more than 193 countries. The official theme for 2022 is “Invest in Our Planet.”
5. Divide students into five urban planning committees. Groups should be diverse in terms of ability, ethnicity, race, and sex. Challenge each committee to create a plan for a new sustainable city that will only use renewable energy and incorporate innovative ways to produce sustainable food, decrease the number of cars, increase access to public green space, conserve water, and reduce waste. What will be your new city’s name?
6. Using a jigsaw technique, explain that each student on the committee will become an expert in one area. Distribute the student resources to each group. Students can determine the topic they would like to research, or the teacher can assign the topics. Students will form temporary “expert groups” by having one student from each committee join other students with the same assigned topic. Give students in these groups time to research, discuss main points, and rehearse how they will present their topic to their committee.
7. When expert groups have gathered their information, bring them back to their urban planning committee and have them present their findings. Encourage others in the committee to ask questions for clarification.
8. The committee will discuss and determine how to create a model of their city incorporating each of the sustainable practices. Students can create two-dimensional models that include posters, multimedia presentations, or Minecraft or three-dimensional models using various arts and crafts materials brought from home or provided by the teacher.
9. Each urban planning committee will present their model to the class providing a rationale for the practices they incorporated.

## EXTENSION

As an extension of this activity, students can display their city models on Earth Day and have students and staff vote for the most sustainable city model using the United Nation’s 17 sustainable development goals.

## SOURCES

- [Cities—United Nations Sustainable Development Action 2015](#)
- [Sustainable Cities—PSCI](#)
- [Earth Day 2023—Earth Day](#)
- [What is renewable energy? | United Nations](#)
- [6 Traits of a Sustainable City \(With Examples\) | Digi International](#)

**ASK**

How can we provide renewable energy to our city to reduce greenhouse emissions?



**IMAGINE**

Describe each renewable energy source below.

Hydropower

Wind

Solar

**CREATE**

Which renewable energy source will be used in our city? Where will it be built?



**PLAN**

Identify pros and cons for energy source below.

Hydropower

Wind

Solar



**ASK**

How can we reduce how far food must travel to reach the people of our city?



**IMAGINE**

Describe each practice below.

Vertical farming

Rooftop farming

Community gardens



**CREATE**

How can we incorporate these practices in our city? Where would they occur?



**PLAN**

Identify pros and cons for energy source below.

Vertical farming

Rooftop farming

Community gardens

**ASK**

How can we encourage our people in our city to have fewer cars to get cleaner air?



**IMAGINE**

Describe each practice below.

EV charging stations

Public transportation

Bicycle lanes

**CREATE**

How can we incorporate these practices in our city? Where would they be found?



**PLAN**

Identify pros and cons for practice below.

EV charging stations

Public transportation

Bicycle lanes



**ASK**

How can we create more green space in residences and provide animal habitats?



**IMAGINE**

Describe each practice below.

Parks

Nature preserves

Recreational areas



**CREATE**

How can we incorporate these practices in our city? Where would they be placed?



**PLAN**

Identify pros and cons for practice below.

Parks

Nature preserves

Recreational areas

**ASK**

How can we reduce the city's amount of water, food, and solid waste?



**IMAGINE**

Describe each practice below.

Smart technology for leaks

Recycling or composting

Repurposing materials



**CREATE**

How can we incorporate these practices in our city? What incentives could we offer?



**PLAN**

Identify pros and cons for practice below.

Smart technology for leaks

Recycling or composting

Repurposing materials