

UNIT 4 | SHARING SPACES

GREEN SPACES

METHOD

Students graph how being outdoors affects their moods and then design an imaginary city that meets both the green space needs and daily living needs of the city's residents.

MATERIALS

Part 1:

- Graph paper or Graph Template (provided)

Part 2:

- Student Worksheet
- Crayons or colored pencils

Measuring Learning:

- Anchor chart paper
- Index cards

INTRODUCTION

Green spaces are plant-filled community spaces, like parks. When more people move into a community, the amount of green space can shrink. This is because new schools, houses, and grocery stores need to be built to support all of the new community members. When done irresponsibly, all this new construction can destroy green spaces.

Green spaces are important to communities because they allow people to enjoy the outdoors, grow their own fruits and vegetables, and provide a home for plants and animals. They also provide residents with a place to relax and escape the hectic pace of the city. Urban planners work very hard to design cities that have enough green space and enough buildings to meet people's daily needs.



CONCEPT

It is important for communities to balance green spaces with development, especially as the population grows.

GRADE LEVEL

Upper elementary

SUBJECTS

Science, Social Studies, Math

OBJECTIVES

Students will be able to:

- Measure and graph how access to green spaces affects their feelings.
- Explain why green space is important and how a growing population can impact the availability of green space.
- Develop ways to establish more green space in an urban setting.

SKILLS

Collecting data, analyzing data, setting-up and drawing a bar graph, adding multi-digit numbers, calculating percentages, problem solving, spatial reasoning



PART 1: HOW MUCH GREEN DO WE NEED?

PROCEDURE

1. Explain to students that they are going to spend time outside today and measure their moods.
2. Before you begin measuring, lead a discussion with your students about the kinds of things they enjoy doing and seeing outdoors. Following this discussion, present a 1 to 10 “mood scale” to the students. 1 = feeling very bad. 10 = feeling excellent.
3. Instruct your students to turn and talk with a partner about how they are feeling right now. Students should pick a mood number that best fits how they are feeling. While students are discussing their moods, draw a three-column chart labelled “Class Mood” on the board.

Class Mood

Mood Number	Number of Students - Before Outdoors	Number of Students - After Outdoors
1 (very bad)		
2		
3		
4		
5		
6		
7		
8		
9		
10 (excellent)		

4. Ask the class: “Raise your hand if your mood number is 1 right now.” Record the number of students who raised their hand in the chart. Repeat for mood numbers 2 through 10. To keep student data anonymous, this can be done with the students keeping their heads down.
5. Ask students to make a hypothesis: Will people’s mood numbers increase, decrease, or stay the same after going outside? Students can share their hypotheses with the class before going outdoors.
6. Spend around 15 minutes outdoors. Encourage students to do something that they enjoy, like drawing in a notebook, writing in a journal, playing a game, or reading a book.
7. As students re-enter the classroom, ask them to turn and talk with their partner about how they are feeling and pick a new mood number.

8. Once at their desks, ask students to share that number and record it in the After Outdoors column of the Class Mood chart. Once the After Outdoors column has been filled in, ask the students if the hypotheses they made before going outdoors were correct or incorrect.
9. Using the data from the Class Mood chart, instruct students to create two bar graphs, one titled “Before Outdoors” and the second titled “After Outdoors.” Each graph’s x-axis should be labeled “Mood Number” and include numbers 1 through 10. Each graph’s y-axis should be labeled “Number of students” and list numbers by twos, so students can create scaled bar graphs.

NOTE: If students require assistance with properly formatting their graphs, provide them with copies of the Graph Template and instruct them to fill in the template with their class data.

10. Take some time to analyze the graphs with the students. Look for differences and similarities between the two groups of data and how the data has changed (or stayed the same) after students spent time outdoors.
11. Typically, students will see their mood numbers increase after spending time outdoors. Lead a discussion about why that may be and why green spaces are important.

If a mood number decrease is observed by your students, lead an open discussion with them about what might have happened or been present outdoors that could have caused the decrease.

PART 2: CITY PLANNING

PROCEDURE

1. Tell students that when designing a city, urban planners must find a balance between land used for development (like houses, roads, schools, etc.) and land used for green space. This activity simulates the challenging process of designing a city that features enough development to house and support all of its community members, while also maintaining important green space.
2. Distribute the Student Worksheet to each student. Explain that the City Planning Grid represents a city with a population of 400 people. The grid is made up of 900 squares and each square represents one block. In order to reach their goal as an urban planner, there must be one block of green space for each resident of the city. Ask students, “Based on the city’s population, how many blocks of green space must the city have to meet your green space goal?” (400)
3. Have students work through Part 1 of the Student Worksheet to determine how many blocks of green space are currently in the city and if the green space goal is being met. You may want to share that the provided numbers are real pieces of data about New York City.

4. As a class, brainstorm ways that more green space could be produced in the city, so the goal of one green block per person can be achieved. Ideas may include: Combining some of the residential areas into skyscrapers so that more ground level room is left open; ripping out unused parking lots to develop green space; requiring some “blocks” to have rooftop gardens, etc.
5. Challenge students to complete Part 2 and Part 3 of the Worksheet. They will design a city that can meet both the green space goals and living needs for a population of 400 people. Note: You may want to assign these tasks for homework or as a project to be completed over several days.

STUDENT WORKSHEET ANSWERS

Housing: 41%

Commercial: 6%

Industrial: 4%

Transportation 8%

Public Facilities: 7%

Green Space: 306 blocks, 36%

No, the number of blocks is not enough. 94 more “green” blocks are needed to meet your goal.

DISCUSSION QUESTIONS

1. Why is it so important for cities and towns to have green spaces?

Answers may include: Green spaces can be used for exercise, for going for walks, or for socializing with friends; spending time in green spaces can make us feel happier; green spaces give plants and animals a safe place to live.

2. How do you think green spaces are impacted when the population of a city, state, or country grows?

As a population grows, green space may be replaced by development to support the housing, education, and lifestyle needs of a larger population. As a result, the amount of green space gets smaller. Ecosystems may suffer as habitats are turned into schools, houses, and stores.

3. Can you think of ways to keep green space, even when the population of a city is increasing?

Answers may include: Tearing up unused or under-used pavement and turning it into parks or gardens; “building up” so that less space is needed for housing and businesses; passing laws to preserve the green space that is currently available; creating gardens and parks on rooftops of buildings, etc.

4. What are the possible consequences of living with more people and less green space?

Less green space would also mean less room for people to enjoy the outdoors and fewer habitats to support plants and animals. The green spaces that are left could become very crowded and less enjoyable to be in.

MEASURING LEARNING

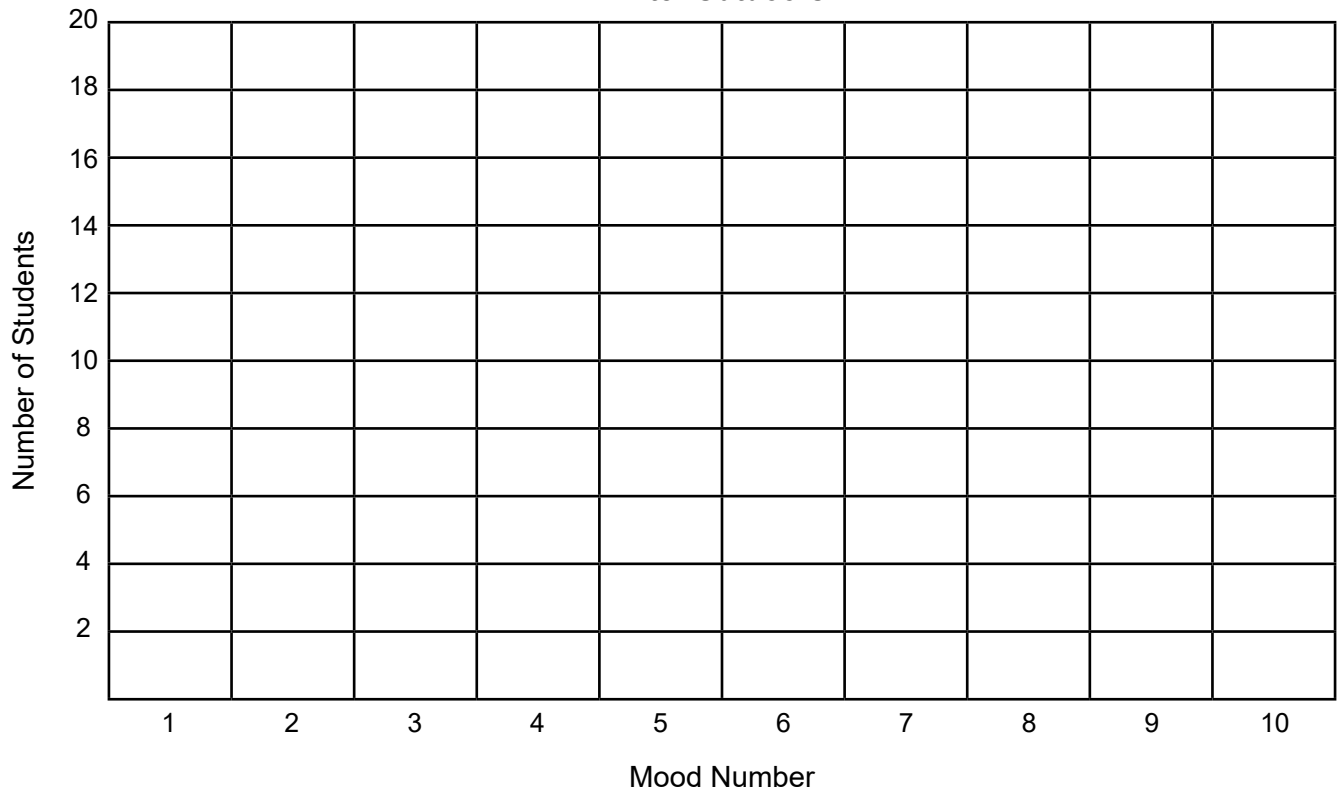
On a sheet of chart paper, write “My Dream Green Space” in large letters. Give each student an index card and ask them to respond to this prompt: “Imagine that you are designing a new green space in your hometown. What are some things you would like there to be in your new green space – sports fields, gardens, lots of trees? Be creative! Why do you think this green space would be important and useful for your hometown?” Students should share their responses and then tape their index card to the anchor chart.

FOLLOW-UP ACTIVITIES

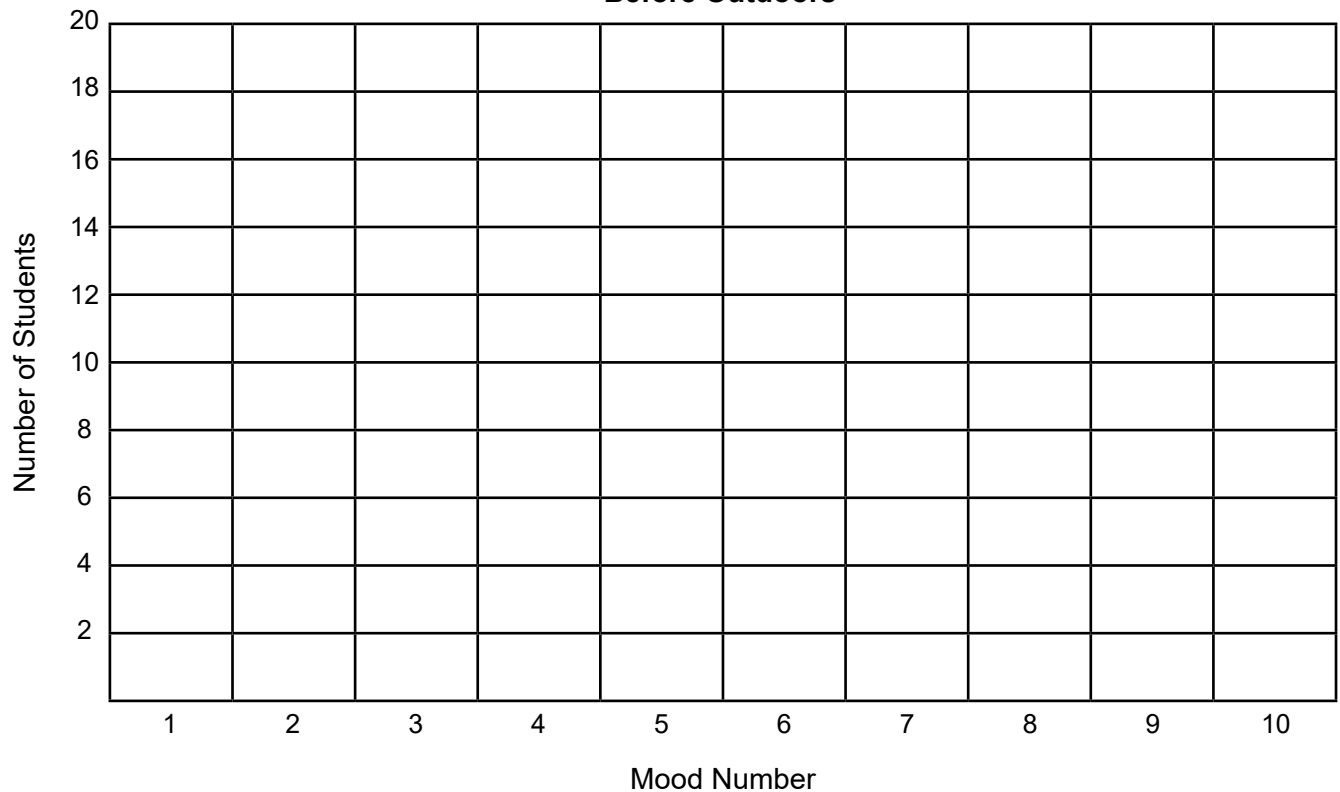
1. Using maps of your community, have students estimate the amount of land devoted to public parks and green space. Discuss whether this amount is sufficient, insufficient, or more than sufficient for community needs, considering things such as housing, transportation, filtering pollutants, recreation, etc.
2. Research and discuss how cities and communities are working to develop more green spaces. Project EverGreen is a group working to enhance green spaces in cities across the United States. A good place to start your research is in the “Projects” section of their website, Projectevergreen.org.

GRAPH TEMPLATES

After Outdoors



Before Outdoors



GREEN SPACES

STUDENT WORKSHEET

Name: _____ Date: _____

Part 1: Your city is made up of 900 blocks. Your goal is to have 1 block of green space per person. The city's population is 400 people. First, calculate how many of the 900 blocks are green space and write your answer in the shaded box in the chart below. Then, to understand how land is being used in your city, calculate the percentage of total land area used for each type of land use.

Type of Land Use	Number of Blocks	% of Total Land Area
Housing	369	
Commercial (restaurants, stores, doctors, etc)	54	
Industrial (factories)	36	
Transportation (roads, parking lots, airport, railroad)	72	
Public Facilities (schools, hospitals, museums, churches)	63	
Green Space Vacant Land		
TOTAL	<u>900 blocks</u>	<u>100%</u>

**Percentages are based on land use distribution in New York City.*

Is the number of blocks of green space enough to meet your goal? _____

How many more "green" blocks do you need to meet your goal of 1 green space block per person? _____

Part 2: Can you figure out ways to have more green space available? Decide what changes you can make to your city and explain your decisions below. Be sure to give a clear, detailed explanation of the changes you want to make to create more green space. Try to make your changes realistic and remember that you can make changes to multiple categories of land use. Don't forget, you need a total of (at least) 400 green squares!

Type of development land that will change	What change will be made?	How many blocks will be turned into green space?	New total number of development blocks (Original number of blocks from land use chart – number of blocks turned into green space)
Example: Housing	Example: Replace single family homes with apartment buildings that fit more people in less space.	Example: 50	Example: 369 – 50 = 319 housing blocks
Housing			
Commercial			
Industrial			
Transportation			
Public Facilities			

Number of green space blocks: _____

Hint: Use this equation... 900 – [total number of development blocks] = green space blocks

Part 3: It's time to design your city! First, complete the key by choosing a color (not green!) to represent each type of developed land and color in the boxes in the key. Look back at the "New Total Number of Blocks" column of the chart in Part 2 and design your city by coloring the appropriate number of squares on the grid to represent each type of land. After you're done "building" your developed areas, color all your open spaces green. Don't forget to name your new "green" city!

City Name: _____

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are no margins, text, or other markings on the page.

Key:

Fill in each square with the color you will use to represent the five different land uses.

- ☐ Housing
 ☐ Industrial
 ☐ Public Facilities
☐ Commercial
 ☐ Transportation
 ☐ Green Space