

# Teaching Suggestions

## Science and Mathematics Lab

(Course 1, Lesson 14-2)

### *Living Space*

#### OVERVIEW

This activity provides students with the opportunity to measure triangular area and observe the relationship between area and population density. Students will be given the opportunity to calculate area in an active way while learning a basic ecological concept.

#### RECOMMENDED TIME

1 class period

#### MATERIALS

- meterstick

#### PREPARATION

Before class, you may want to measure the classroom and calculate the area of the triangular portions to check students' math. Students will calculate the area of the classroom by measuring its length and width. In a later exercise, the room will be divided diagonally. Students will calculate the area of one of the resulting triangles by using their previous measurements.

#### TEACHING THE LAB

1. Students will need to work together. Have students take turns measuring the length and width of the classroom.
2. Show students how to measure the room with a meterstick. For better accuracy, demonstrate how to mark to the end of the stick before moving it. Remind them to keep track of the number of times the stick is moved in order to calculate the total length.



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### *Living Space (continued)*

#### *Answers and Conclusions*

1. The population density would be twice as great.
2. Sample answer: Students became noisy, restless, and fidgety. Because all students did not have enough room to sit down, they became tired and then irritated.
3. Answers may vary, but will indicate an area greater than, less than, or equal to the area of the classroom, depending on student observations.
4. Answers may vary. Sample answers may include removing some of the furniture or assigning each student a particular time and space to sit down.
5. 1.8 persons per square meter

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## Living Space

### INTRODUCTION

Some animals, like elephants, people, and ants, need to have others of their own species around. Other animals, like male chimpanzees and male lions, live by themselves. All of these factors have an effect on the amount of space that an animal needs to live.

What is the best *population density*—the number of individuals living in an area—for a particular animal? What happens when the population density for an animal is too high?

### OBJECTIVES

In this lab, you will:

- calculate the area, population, and population density of your classroom.
- determine the effect of decreased area and increased population on population density.
- determine the effects of high population density on people.

### MATERIALS

- meterstick

### PROCEDURE

1. Use a meterstick to measure the length and width of your classroom. Then calculate the area of the classroom in square meters ( $m^2$ ).  

$$\text{Length (m)} \times \text{Width (m)} = \text{Area (m}^2\text{)}$$
 Record the data in the Data Table.
2. Count the number of people in your class today. Then calculate the population density in your classroom.  

$$\frac{\text{Population (no. people)}}{\text{Area (m}^2\text{)}} = \text{Population Density (people/m}^2\text{)}$$
 Record the data in the table.
3. Your teacher will draw an imaginary line from one corner of the classroom to another, dividing the room in half. The class will move into one half of the room and stay there.

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## Living Space (continued)

4. Determine the area of the populated half of the classroom. Record it in the table. Calculate the population density in that half of the room. Record it in the table.
5. Observe the behavior of your classmates when the class is confined to one half of the room. Notice the noise, where people stand or sit, what people do, and how the area looks.
6. Your teacher will draw another imaginary line dividing the classroom into fourths. The class will move into one fourth of the room and stay there.
7. Determine the area of one fourth of the classroom. Record it in the table. Calculate the population density in that fourth of the room. Record it in the table.
8. Observe the behavior of your classmates again when the class is confined to one fourth of the room.

### DATA AND OBSERVATIONS

Classroom	Base (m)	Height (m)	Area (m <sup>2</sup> )	Population Density (No. People/m <sup>2</sup> )
Full				
Half				
Fourth				

### Questions and Conclusions

1. How would population density change if there were twice as many students in your class?
2. Describe what happened when the population density increased. What did people do?
3. How much space does your class need?
4. If you had time to plan before your class made the move, how would you reduce the negative results of high population density?
5. Most people in the United States live in urban areas. One hundred and sixty-five million people live on about 91,605,000 square meters of land. What is the average population density in U.S. urban areas?