

MORE THE MERRIER?



People
and the
Planet

Lessons for a Sustainable Future

INTRODUCTION

Human population growth has a variety of consequences, both direct and indirect. Crowding is one of the consequences that is easiest to see. With population growth, the average population density increases, even if the population is denser in some places than others. Over half the world population now lives in urban areas and this portion is growing, creating more and larger cities around the globe.

Visualizing increased population density in a variety of environments can help us plan for the future. For example, in a place already densely populated, an increase can result in more crowding, traffic congestion, tighter clusters of houses, compact apartments, less space and a general sense of stress. In a mostly unpopulated place, a slight increase in population density can interrupt a previously uninterrupted horizon, reduce or fragment open space, and require new electrical wires and other services.

**Share with students online images of both densely populated cities (like Tokyo or New York City) and sparsely populated rural areas. Find these in search engines (Google Images). For example, here's a link to photos of the ever-crowded Tokyo subway: www.amusingplanet.com/2016/08/subway-pushers-of-japan.html*

MATERIALS

- Yarn or masking tape



CONCEPTS

As the population of a region grows, the population density increases, requiring more cooperation and coordination of activities. Global population density has increased as more people live in urban areas.

OBJECTIVES

Students will be able to:

- List the advantages and disadvantages of high population density.
- Explain how behavior changes as population density changes.
- Interpret a population density map of the United States.

SUBJECTS

Social studies (geography)

SKILLS

Observing, interpreting maps, identifying trends and patterns

METHOD

Students demonstrate the effects of crowding in a "jumping jack" activity, discuss the pros and cons of population density, and analyze a United States population density map.

PART 1: JUMPING JACK FLASH MOB

PROCEDURE

1. Have students imagine that the number of people in your classroom has doubled and discuss the effects of this. Make sure that both positive and negative impacts are mentioned.
Answers may include: more friends, more ideas, more sharing, less space, crowding, more noise, competition for chairs and books, less attention from the teacher.
2. Have students vote by secret ballot on whether they would like to have more, fewer or the same number of students in the class as they have now. Tally, announce, and discuss the results with the class.
3. Mark off an area in the classroom with yarn or masking tape (about 10 feet x 10 feet). Select two students to stand in the area and do jumping jacks.
4. Keep doubling the number of students doing jumping jacks in the area until it becomes impossible to add more and still have enough room to move. If you find they have coordinated their arm movements, secretly ask one of the students to get out of sync.
5. Solicit observations from the original pair on how their environment and behavior changed.
6. While students are still standing in their tightly-packed space, introduce the concept of **population density** – a measure of the number of people per unit of space. Ask students to determine the population density of the area you marked off for the activity (this could be people per square foot or another measure).

DISCUSSION QUESTIONS

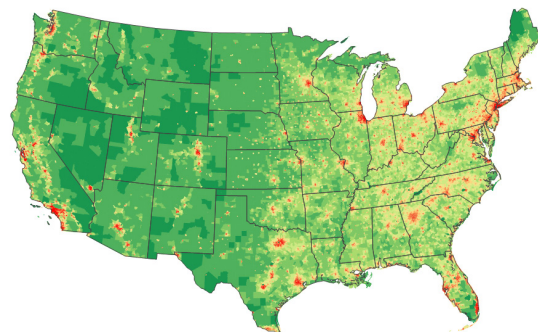
1. Did the students jump in sync? Why did this happen? How did this happen? Can you think of things people do differently when they are among lots of other people?
Coordination of movement is necessary in crowded situations in the real world, too. People get in lines at crowded events, they obey traffic signals and laws, etc.
2. What happened when one person was out of sync? What would happen if that occurred in the real world?
The person who was out of sync most likely had a negative impact on everyone else's ability to do jumping jacks. Have them imagine real-world situations such as: a person who always disobeys traffic signals, won't wait his/her turn, or won't share.
3. List situations, events and activities for which it is better to have a lot of people around, and those for which solitude is better.
Possible activities for large groups include parties, family reunions, sports events, competitions, dances, walking on dark streets. It is often less desirable to have big crowds for classes, bicycling, shopping, driving, walking, drawing, studying, reading, sleeping, waiting for the bus.

4. If you were raising money for a school project by selling candy bars to your neighbors, would you want it to be in an area with high population density or low population density?

In highly populated areas it would be easier to sell more candy in a shorter amount of time, and, therefore, make more money. If the households were scattered farther apart you might enjoy more fresh air and open scenery on your walk but you would not be able to visit as many neighbors in the same amount of time.

PART 2: AMERICAN DENSITY

At the time of the 2010 U.S. Census there were 309 million people in the country and the population density was approximately 88 people per square mile. That was an average for the entire country; there are some square miles with no people and some with tens of thousands of people.



PROCEDURE

1. Ask students to predict whether or not the county where their school is located has higher or lower population density than the national average.
2. Visit www2.census.gov/geo/pdfs/maps-data/maps/thematic/us_popdensity_2010map.pdf and display the U.S. population density map or have students view it on their own computers or tablets.
3. Instruct students to find the county on the map where your school is located. They may need to zoom in to locate it.
4. Have students identify whether your county is more or less dense than the national average. Did this surprise them? Why or why not?
5. Gauge students' understanding of the map with the following questions:
 - a. Which region of the U.S. appears to be the most densely populated? (*The Northeast, especially from Massachusetts to Maryland*)
 - b. Which region of the U.S. appears to be the least densely populated? (*Most of the West, except the West Coast, and also Alaska*)
 - c. In which states are all the counties less densely populated than the national average? (*Montana, Wyoming, North and South Dakota*)
 - d. Which states have the most population density? (*New Jersey, Connecticut, Rhode Island, Massachusetts, and also Puerto Rico, which is a U.S. territory*)

DISCUSSION QUESTIONS

1. What services are easier to provide for an area of high population density?

Answers may include: mail delivery, electricity, telephone, cable, water and sewer connections, public transit, museums, stadiums, theaters. Additionally, services centered in one building, like community

hospitals, schools, libraries, etc., can be more convenient to people who live close.

2. What qualities are desirable about areas of lower population density?

Answers may include: more peaceful, open space, more space to plant gardens, fresher air, more nature, less noise, more space to cut loose or to get away.

3. If you had a cold, would more people be likely to catch it where population density was high or low?

Colds, like other contagious diseases, can pass more easily in areas of high population density. In the densely populated city of Tokyo, Japan, people wear face masks when they have a cold so as not to spread it.

4. Human migration can change the population density of an area relative to neighboring areas, as people move in or out. What are some qualities of a place that might draw people to live there? What are some reasons a particular place might have a low population density?

Job possibilities, nice retirement areas, healthy climate for allergy sufferers, entertainment and cultural variety, better quality of life and affordable housing are some reasons people might move to an area. Places where a major industry goes bust, civil war breaks out or job possibilities decline tend to lose people.

5. What challenges might an area face if its population density increases in a short time span (like some of the world's fastest growing cities)?

Answers may include: providing clean water and sanitary living conditions for everyone, making sure everyone has safe housing, building more schools, medical facilities and other services, increasing infrastructure for transportation (roads, public transit, etc.).

ASSESSMENT

Students complete an exit ticket listing three ways high population density presents challenges to a community and three ways high population density can be useful in a community.

FOLLOW-UP ACTIVITIES

1. Have students look online for a list of the world's largest cities (such as Tokyo, Sao Paulo, Mexico City or New York). Instruct them to select one of the cities and find three facts about how population density shapes the lifestyle in that place. (Example: In Tokyo, the average speed on general roads is 10 miles per hour due to heavy traffic.)
2. In the United Nations' World Urbanization Prospects, there is a visualization of how urban the world was, is and will be for different years (1970, 1990, 2018, 2030). Follow this link <https://population.un.org/wup/Maps> to show students the difference in population densities and number of cities of various sizes across the globe during those years. Ask students to list their observations of changes in urbanization over that 60-year time period.