Objective: Students will be able to:

- Recognize the difference between population and population density.
- Calculate the population density of an area.
- Understand the impact of population on an area.

Time Required: One class period

Materials Needed:
- Map of United States, marked with the locations of every Major League baseball city (*Note- This exercise was completed in Lesson 1. If your class has not done Lesson 1, the map can be pre-made and photocopies can be given to students.)
- Map of the United States which shows population density. (One may be found at: http://www.census.gov/dmd/www/pdf/512popdn.pdf).
- Yard stick or measuring tape

Vocabulary:
Population - The total number of people living in a specified area
Population Density - The size of the population within a specific unit of space
Applicable Common Core State Standards:

CCSS.ELA-Literacy.W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons.

CCSS.ELA-Literacy.SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

CCSS.ELA-Literacy.W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

CCSS.ELA-Literacy.SL.4.4 Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

CCSS.ELA-Literacy.W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

CCSS.ELA-Literacy.SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

CCSS.Math.Content.3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.
  - CCSS.Math.Content.3.MD.C.5a A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
  - CCSS.Math.Content.3.MD.C.5b A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.

CCSS.Math.Content.3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

CCSS.Math.Content.3.MD.C.7 Relate area to the operations of multiplication and addition.
  - CCSS.Math.Content.3.MD.C.7b Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

CCSS.Math.Content.4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
Additional Relevant National Learning Standards:
(Based on Mid-continent Research for Education and Learning)

**Geography. Standard 1.** Understands the characteristics and uses of maps, globes, and other geographic tools and technologies

**Geography. Standard 2.** Knows the location of places, geographic features, and patterns of the environment

**Geography. Standard 4.** Understands the physical and human characteristics of place

**Geography. Standard 9.** Understands the nature, distribution, and migration of human populations on the Earth’s surface
1. Introduce the lesson by explaining that the United States is a large nation both in terms of physical size and in population.

2. The area of the United States is about 3,537,500 square miles. It is the 4th largest nation in the world by area. (The largest three are the Russian Federation, Canada, and the People's Republic of China.)

3. Review the meaning of the word "population." Population is the total number of people living in a specific area.

4. Have students find the population of your classroom. Write it down on the board. Then ask students to come up with an educated guess for the population of your whole school.

5. Ask students about the population of your town or city. Is it a small town? A big city?

6. The United States is home to over 310,000,000 people. It is the 3rd largest nation in the world by population. (China is the largest, followed by India.) (Visit http://www.census.gov/main/www/popclock.html to see the estimated U.S. population on the day you do this lesson.)

7. Ask students to think about what life might be like in a city with a very large population. What might people enjoy about living there? What challenges would people living there face?

8. Now ask students to think about what life might be like in a town with a small population. What challenges would people face? What might people enjoy about living there?

9. The number of people that live in an area can greatly affect the way that people live. Explain that "population density" is the term that describes the number of people living in an area in relation to the size of that area. Write the following on the board or on a piece of chart paper:

   Population density = Population/Land Area
10. Point out that students have already found the population of the classroom. Ask students what other information they need in order to find out the population density of the classroom.

11. In order to find out the area of the classroom, have two or three students (or small groups, if you have enough supplies) use a yard stick or tape measure to determine the length and width of the classroom. Students may take the measurements in feet, meters, or yards.

12. Use the information gathered to find the area of the classroom.
   \[ \text{Area} = \text{Length} \times \text{Width} \]

13. Using these dimensions, have the students calculate the population density of the classroom. Population Density (people per square unit) = Number of Students/Classroom Area (in square units)

14. Ask your students how they are affected by the population density of the classroom. Do students have a lot of personal work space? Are students cramped? How would students' learning/comfort be affected if five more students were added to the classroom? What would happen if they had a bigger classroom?

15. Hand out the U.S. map that shows population density. Explain the key. Point out that while the population density of your classroom was measured in square feet, meters or yards, population density of cities or countries is usually indicated using square miles or square kilometers.

16. Ask students to describe what they see. Where are the areas with large populations? Where are the areas with smaller populations?

17. Now have students compare the population density map to the map of Major League team locations (created in Lesson 1 of this unit). Ask students to identify similarities between the two maps.

18. Major League sports teams are generally located in areas with high population density. Why would this be? Baseball teams are businesses that need to make money to be successful. Is it easier to sell more tickets and make more money in larger cities or smaller towns?

19. Ask students if your home town would be a good place for a Major League baseball team. Have them explain why or why not.
Conclusion:

To conclude this lesson and check for understanding, have students compare the two maps again. Individually or in pairs or small groups, have them choose a location for a new baseball team. Have them write a 2-3 page essay on why they think a Major League team would succeed there and present their argument to the class.