Introduction:
A cartogram is a map in which each area is sized proportionally according to some particular characteristic. Demographers use cartograms, like the World Population Map, to visually represent population data and show the relative size of different country populations on a world map according to a set scale. In this activity, students will perform the role of demographers to understand and interpret world population presented in the form of a cartogram. The Student Worksheet will provide students with a working knowledge of cartograms by challenging them to first identify the main characteristics of population cartograms and then evaluate the role of cartograms through the construction of their own world population map.

Materials:
World Population Map
Student Worksheet

Procedure:
1. Display the World Population Map and distribute the Student Worksheet.
2. Provide a working definition of demographer and have students note the definition.
   
   (demographer: a person who studies a human population’s size, structure, distribution, and changes over time)
3. Have students independently compose ideas to the Pre-Think prompt and then discuss their ideas as a class.
4. Have students work through Section A, “World View,” of the worksheet and then share observations from questions 1 and 2. Make a list of responses.
5. Guide students through Section B, “Gathering the Facts,” a map orientation to gather specifics from the World Population Map.
6. Divide students into small groups to work through Section C, “Cartography in Action.” Be sure that each group spends time answering the Small Group Discussion Questions.
7. Guide students through the class-wide Discussion Questions.

Discussion Questions:
1. How do each of the groups’ cartograms compare?
2. How do the different representations of the world’s regions impact how you imagine population numbers?
3. What are the benefits of a cartogram in understanding population data?
4. What are the limitations of a cartogram in understanding population data?

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5. What variables, other than population, could be used to create a cartogram?

Student Worksheet Answers:

Section B - “Gathering the Facts”

1. Cartogram – A map that changes the geographical area or form, in this case country size/form, through a chosen variable.
2. Countries, Nation-states
3. Population
4. A country’s size depends on its population – the greater the population the larger the country size; the lesser the population the smaller the country size.
5. Answers may vary. Examples: Increase – Pakistan, United Kingdom, Vietnam; Decrease – Canada, Mongolia, Saudi Arabia
6. Population has been scaled to have 1 grid square = 1 million people.
7. At least 10 million people
8. A star
9. Over time, as population increases, the scale increases so that 1 grid square represents a larger and larger number of people.
10. US Bureau of the Census; International Data Base 2015 population estimates; The South Sudan Center for Statistics, Census, and Evaluation; Tibet Information Network; Free Tibet Campaign

Section C - “Cartography in Action”

Grid Square totals: Africa (44); Asia (172); Europe (30); Latin America (24); Northern America (14); Oceania (1.5)

Measuring Learning:

Have students construct written arguments in support of their claims to the following questions:
   a. How do population cartograms influence our understanding of the world?
   b. What role do demographers play in providing an understanding of population data?
   c. How has the use of a cartogram influenced how you understand world population as a whole and by region? Provide at least three examples from the World Population Map.
In October of 2011, world population reached seven billion people. Every second that number increases, but what does that number really mean? Through the questioning and analysis of population data, we as global citizens can better understand how we live and interact with our world. To help with this understanding we ask for help from demographers (write in the definition): ____________________________________________

__________________________________________________________________________________________

PRE-THINK: How might a demographer’s work be useful?

Today, the demographer we need help from is you! Your task is to take the following world population information and play the role of demographer as you make sense of the data.

A. World View

1. What do you see when you look at the World Population Map? Write down all observations.

_______________________________________________________________________________________

_______________________________________________________________________________________

_______________________________________________________________________________________

2. How does this map compare to the Hobo-Dyer Equal Area Projection (found in the bottom left corner of the map poster)?

   What looks the same?

   What do these similarities mean?

   What looks different?

   What do these differences mean?

3. What do you find most interesting when you compare the World Population Map to the Hobo-Dyer Equal Area Projection?

_______________________________________________________________________________________

_______________________________________________________________________________________

_______________________________________________________________________________________
4. If you had to select one map to represent the world, which map would you choose? The World Population Map or the Hobo-Dyer Equal Area Projection? Explain your choice.

_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

5. Like all good demographers, questioning is essential! What questions do you have about the World Population Map?

_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

B. Gathering the Facts

1. What type of map is the World Population Map? _____________________________________________

2. What geographical area is being changed? _________________________________________________

3. What variable is causing this change? _____________________________________________________

4. How does the change in population affect how a country is represented on the map?
_______________________________________________________________________________________

5. Compared to the equal area map, identify three countries whose relative size is larger on the World Population Map and three countries whose relative size is smaller on the World Population Map.

   Larger:  _____________________________________________________________________________
   Smaller: _____________________________________________________________________________

6. On what scale is population measured on the World Population Map? _______________________

7. How large must a country’s population total for it to be labeled on the World Population Map?
_______________________________________________________________________________________

8. How are countries labeled if their population does not exceed one million people? _____________

9. Looking at the cartograms at the bottom of the poster (#2-6), how has the scale changed over time?
_______________________________________________________________________________________

10. From what sources were the country population totals gathered?
_______________________________________________________________________________________
C. Cartography in Action

Construct a cartogram of the world’s population by regional grouping.

1. Use the scale: 1 grid square = 25 million people. Calculate the number of grid squares for each region.

<table>
<thead>
<tr>
<th>Regional Grouping Name</th>
<th>Total Population</th>
<th># of Grid Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>1.1 billion people</td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>4.3 billion people</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>740 million people</td>
<td></td>
</tr>
<tr>
<td>Latin America</td>
<td>606 million people</td>
<td></td>
</tr>
<tr>
<td>Northern America</td>
<td>352 million people</td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td>38 million people</td>
<td></td>
</tr>
</tbody>
</table>

2. Plot the grid squares on the graph below. Use a different color or pattern to identify each group.

3. Include: Title, Orientation, Date, Author, Legend/Key (Region Labels), Scale, and Source

4. After completing the map, answer the Small Group Discussion Questions (on back).
Small Group Discussion

1. Describe the process of your cartogram construction. What factors did you have to keep in mind while you built the map?

2. Is your map useful for understanding world population? Why or why not?

3. How does your cartogram compare to the World Population Map? Does your view of world population differ from one map to the other?