






## Global GIS Lesson:

# ***Exploring the Demographics of the World and Central America***


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### **Description**

In this lesson, students use Geographic Information Systems (GIS) to investigate population and its characteristics around the world with an emphasis on Costa Rica and Central America. Students investigate population and life indicators with the tools and data from the regional Module 4 from the book *Mapping Our World: Geographic Lessons for Educators* by Lyn Malone, Anita Palmer, and Christine Voigt. The methods used here can be applied to other map themes contained within the *Mapping Our World* data set and in other geographic inquiry using GIS.

Zoom to Central America. Practice zooming in , zooming out , and the hand symbol .


1) What does the hand symbol do?

You can always zoom back to the full extent of all themes by clicking on the tool that is an arrow pointing into a stack of layers. .

Use the label tool  to label Costa Rica and the surrounding countries.

2) What countries border Costa Rica on the north and on the southeast?

Go to View → Properties and change the distance units to kilometers.

3) Use the measure tool  to measure the distance across Costa Rica.

4) What is the narrowest from the Atlantic to the Pacific, distance across Costa Rica?

5) What is the widest from the Atlantic to the Pacific, distance across Costa Rica?

6) What is the length from the north to the south, distance across Costa Rica?

Go to View→ Properties and change the Map Projection to Geographic.

7) What happened to the map as you did so?

As you move around the map, notice the latitude and longitude values to the upper right of the view (map) window.

8) What is the latitude and longitude of the center of Costa Rica?

9) What direction is Costa Rica from where you live?

Go back to View→ Properties and change the Map Projection to Robinson.

Open the population growth view.

Make the births/1000 theme visible.

10) Describe three characteristics of the pattern of the birth rate around the world.

11) Which continent would you say has the highest birth rate?

12) Which continent would you say has the lowest birth rate?

13) Name two reasons why these continents have the rates that they do.


Zoom in to Central America.

14) How does Central America compare to the rest of the world in terms of birth rate?

15) How does Costa Rica compare to the rest of the world in terms of birth rate?

16) How does Costa Rica compare to your country of birth in terms of birth rate?

17) Use the identify button to identify the birth rate for Costa Rica, Panama, and Nicaragua. Compare the birth rate for the three countries.

Zoom out to the world by clicking on the tool that is an arrow pointing into a stack of layers. 

Turn the death rate theme on.

18) Which continent would you say has the highest death rate?

19) Which continent would you say has the lowest death rate?

20) Name two reasons why these continents have the rates that they do.

Zoom to Central America.

21) How does Central America compare to the rest of the world in terms of death rate?



22) How does Costa Rica compare to the rest of the world in terms of death rate?

23) Use the identify button to identify the death rate for Costa Rica, Panama, and Nicaragua. Compare the death rate for the three countries.

24) What is the relationship of birth rates to death rates? Is this relationship the same all across the world?



25) How does Costa Rica's death rate compare to the country where you were born?

Make the birth rate theme active by single clicking on it.

Examine the database for the birth rate theme . Click on the "birth rate" field and sort it in descending order . Click on the first record in the table.



26) What is the birth rate for the country with the highest rate?

27) What country has the highest birth rate?

Click back in your map. Select the "Zoom to Selected" tool  to zoom to this country. Use the label tool  to label this and the surrounding countries.



28) What continent is this country on?

Make the death rate theme active by single clicking on it.


Examine the database for the death rate theme . Click on the "death rate" field and sort it in descending order . Click on the first record in the table.

29) What is the death rate for this country?

30) What country has the highest death rate?

Click back in your map. Select the "Zoom to Selected" tool  to zoom to this country. Use the label tool  to label this and the surrounding countries.

31) What continent is this country on?

Clear your selection .

Click on the query builder (hammer with question mark). .

What is the relationship between birth rates and the percentage of young people in a population? To uncover this relationship, you will first find countries with over 40% of the population between 0 and 14 years of age. Enter this expression by double-clicking on the field name and single-clicking on the Boolean operator, and typing in the value. Your expression should look like the following:

( [pop0\_14] > 40 )

Access the table. Be careful not to click on any of the rows in the table at this time.

32) Look in the upper left. How many rows are selected, and therefore, how many countries have over 40% of their populations under 14 years of age?

Go to your map. The selected countries are yellow.

33) Describe the geographic distribution of these countries.


Examine the table and look at the birth rates of the countries with a high percentage of young people.


34) What is the relationship of birth rates to the population between 0 and 14 years of age?

35) Why?

Make three observations about the percentage of young people in the countries of Central America.

36) What is the relationship between the percentage of young people versus the percentage of a country's population over 60 (field name: pop>60\_9)?

Clear your selection .

Examine the database for the death rate theme . Click on the "pop\_cntry" field and go to Field→ Statistics.

37) What is the mean country population?

38) What is the total world population according to this database?

39) What is the population of Costa Rica?

40) How does Costa Rica's population compare to the world mean?

Go to the map. Use the selection tool (4<sup>th</sup> button from the left, just left of the zoom in tool) to select all of the countries in Central America.

41) Using the Field → Summarize function that you did earlier, what is the population of Central America?

42) What percentage of people in Central America live in Costa Rica?


43) What countries in Central America are smaller than Costa Rica in terms of population?

44) What countries in Central America are smaller than Costa Rica in terms of land area?

45) What countries do you define to be "Central America?"

46) Would you consider Central America to be a continent?

If not, which continent do you think Central America is in?

Clear your selection .

Next, you will make a new map of world population. Access the legend editor by double-clicking on the theme name "births/1000".

Access the classification field pull-down menu.

Change the classification field to "pop\_cntry". Apply.

Go to the project window named "region4.apr" and open both views: Population Growth, and Standard of Living Indicators.

Move the two views on your screen so that you are looking at both of them.

47) What is the relationship between GDP per capita and literacy rates in Central America?

48) Compare the GDP rate in Costa Rica versus that of the rest of Central America.

49) Compare the literacy rate in Costa Rica versus that of the rest of Central America.

50) Select at least two standard of living indicators, and compare the pattern of these standard of living indicators with at least two population growth indicators. Did you find a relationship, and if so, what is it? Be prepared to defend your conclusions to the class.

51) Indicate what you consider to be the most surprising thing you have learned in this lesson, the most interesting thing, and the most significant thing.

Most surprising:

Most interesting:

Most significant:

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