GEO STAC
Student Lesson

Lesson Title: Analyzing Patterns of Human Development

Lessons Summary: In this lesson students will describe global **spatial patterns** of human development using HDI rankings. Students will complete a table of demographic data on selected countries so they can look for connections. Students will use that information to make comparisons and hypothesize reasons for the data.

Lesson Objective: Students will be able to:

Define the following: HDI, Spatial Patterns and Correlation

Describe spatial patterns of demographic statistics

Complete a table of Human Development statistics

Perform a logical query

Identify correlations and Hypothesize reasons

Before you begin using this module, you will need to know about using a Web-based GIS viewer. You can do this by watching the tutorial video or working through the tutorial. The tutorial video, student activity, and Web-based GIS Tutorial Viewer can be found at http://gis.lanecc.edu → "Modules" tab → "Tutorial" link. The activity works best with a high speed Internet connection.

Prior Skills: You will need to know how to turn layers on and off, use the ID tool and, zoom in and out of the map, toggle from layers to the legend, and perform a search (Boolean) query.

Remember, computer steps are indicated by a ► symbol and questions you need to answer are numbered.

► Connect to the Web-based GIS map at: http://arcgis.lanecc.edu/website/geodemographics

Your web browser should open the following map.

Explore the map

Population density (number of people per square kilometer) is the visible data layer. You should see a world map with a list of different layers of information or data. Each layer has a **Visible** check box beside it. Some are checked and some are not. You can only view the data layer if the box is checked. Next to the check box is a circle called a radio button. This makes a data layer **Active**. Only one layer can be active at a time.
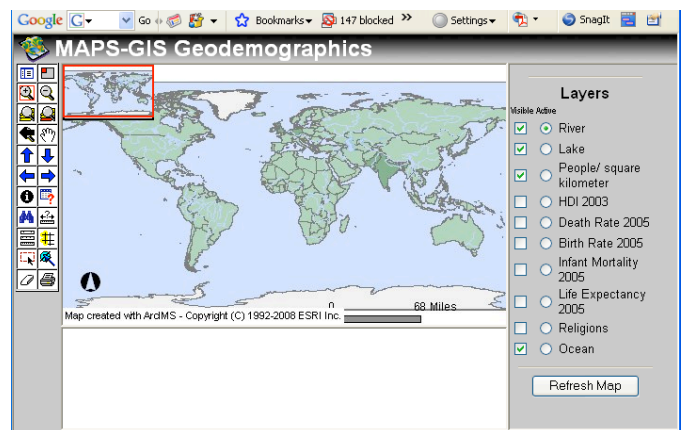
> ► Click on the visible layer box marked People/square kilometer to uncheck the box.

▶ Click on the visible layer box marked HDI 2003 to check the box and make it visible.

▶ Click on the active layer circle marked HDI 2003 to make HDI the active layer and then "Refresh" the map at the bottom.

To understand what these values mean you need to switch to the legend by clicking on the legend box in the tools menu.

Remember the HDI (human development Index) is a composite(a mixture) of four statistic that is developed by combining measures of **life expectancy**, **literacy**, **educational attainment**, and **GDP per capita** for countries worldwide.

Q1) What is the lowest HDI range?

Q2) What is the highest HDI range?

Q3) Look at the map. Several countries have no reported data. Name one of those countries without data. Please do not use Greenland!

Q4) Hypothesize reasons that countries might not have reported data and list them.

Let's consider 61-81 an average range for HDI**.**

Look at the spatial pattern of the HDI for areas that are above average and areas that are well below average HDI.

Is it clustered (grouped together) or dispersed (spread out)?

Is it in one particular area over another? (For example, is the above average HDI seen in the southern hemisphere or only in countries with coastal boundaries, perhaps around the Mediterranean Sea? Provide a description of the relative location.) Be sure to answer each part of this question for the following:

Q5) Describe the pattern of countries with an above average HDI.

Q6) Describe the pattern of countries with a below average HDI.

▶ Toggle back to the layers menu by clicking the menu box.

▶ Click on the Identify tool and click on the country of India. The geodemographic data related to India appears in a data table below the map. You will need to use the slider bar below the table to see all the data fields.

		HDI 2003														
Rec	FID	ID	NAME	pop_den_07	per_urb_05	per_urb_95	per_urb_85	D_RATE05	B_RATE05	INF_MORT05	LIF_EXP05	NET_MIG05	FR_UN05	HDI_2003	COLONIZER	DATE_COL	DA
1	85	416	India	393	29	27	24	9	25	68	63	-1400	3	60	England	1805	194

▶ Locate the following fields:

      <u>Name</u> – Country name.
      <u>Life Exp 05</u> - Life Expectancy for 2005. The highest are 81-83 and the lowest are 32-40.
      <u>HDI 2003</u> - Remember the average range 61-81.
      <u>Colonizer</u> (a country),
      <u>GDP 2003 </u> - Aaverage GDP/Capita for high income countries 27, 000 for low income
countries 211).

Q 7) Complete the following table by using the Identify tool and recording data from the data table to our table below. India has been done for you.

    Fill in the table for the other countries by clicking on the Identify tool and then clicking on the countries listed in the table.

Name of Country	Life Expectancy 2005	HDI 2003 Rating	Colonizing Country	GDP Per Capita 2003
India	63 years	60 (below aver)	England	2729
China				
Mozambique				
Niger				
Afghanistan				
Iraq				
Australia				
France				
United States				

Data Analysis

Is there a correlation (connection) between any of the statistics? If so which statistics seem to be connected? For example: are countries with lower life expectancies countries with higher or lower GDP per capita? Can we summarize any data by connecting it to the colonizing countries? For example: do all countries that were colonized by England have any similar statistics?

    Q 8) Consider the data table above. Summarize what you can tell from the data in at least three sentences below. Focus on the connections.

You can query the data to select or highlight specific pieces of information from a large data set. You could set a query to find all the countries with a HDI less than 61 or greater than 61.

For this query you will identify all the countries colonized by England

    ▶ Select the query tool. . This will open up a new window at the bottom of your screen.

The following five steps are used to build a query:

Step 1) Field designates which data to use.
Step 2) Operator is the mathematic symbol =, >, <
Step 3) Value is the data value
Step 4) Add the set information to the Query String
Step 5) Execute the query.

►   Field - select HDI_2003. This will designate which data field to use which is marked with an
   A on the following page.
►   Operator - use =. This will select all areas that are equal to the designated field
►   Value - Select the "Get Samples" button (marked with a C), and choose England for the value.
►   Add to Query String"

Your query should look like the window below.
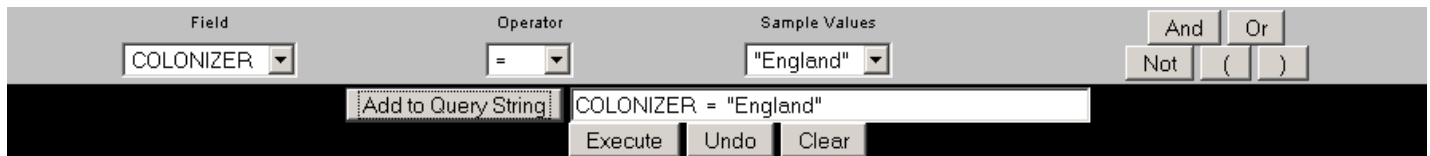
►   Press Execute (

The query should highlight 54 countries and there will be a data table at the bottom of the map.

Q9) What continents did England have a colonial presence? Were there any continents that did not have a country colonized by England. Make sure to look carefully. Did the sun ever set on the British Empire?

Q 10) Look at the table you created on page three. Which of the countries listed here were colonized by England? Is there a correlation or connection between Colonization and any of the demographic variables listed in your table? Discuss any patterns you see.

Career Extension
► Go to the website: http://www.esri.com/industries.html
► Find a career that might be of interest to you. For example in the Natural Resources list there is a link to Forestry. In the forestry link there are several job descriptions in the Industry Focus.

► Prepare a half-page summary of the types of things that someone would do in this career using GIS.

► Search the internet and look for job possibilities, salary, and locations.