



Working with ArcVoyager: A Jump Start Lesson

Exploring U.S. race and ethnicity

Background: The United States is a nation of many races and ethnic groups. From pre-Columbian time to present, people of many heritages have come to this land under a range of circumstances. The result is a rich human mosaic. As a single nation approaching 270 million inhabitants, the United States is not necessarily a geographic melting pot. Where different racial and ethnic groups live today is, in part, a legacy of their histories in this land and more recent settlement choices. What do these patterns look like? How do they vary across differing levels of geography?

Using wall maps of the United States, atlases, and *ArcVoyager's United States--Race and Ethnicity* project (*Designing Global Adventures: Point Me*), you will:

Task 1. Hypothesize about the areas of concentration for the nation's major race and ethnic groups. (Where do you expect to find the greatest numbers or proportions of African Americans, Native Americans, Asian and Pacific Islanders, and Hispanic Americans. Why? What mental maps and other knowledge are you using?)

Task 2. Explore and describe the actual geographic patterns of racial and ethnic residence for differing levels of geography (i.e. across states and counties).

Failsafe: If you have a technical problem with an ArcVoyager project, don't panic. Simply use the QUIT button (or if need be, the EXIT feature in the FILE menu) to quit out of that session of ArcVoyager and reopen a fresh copy of the project from the ArcVoyager Guide.

Critical step! ArcVoyager (ArcView) skills already in place? This exercise assumes that you are familiar with a few key ArcVoyager (ArcView) operations. These include: turning themes on and off, making a theme active, reordering themes in the table of contents, using the identify tool, navigating within a view, and working with the legend editor. If these are not familiar, review the *How to Use the Atlas* section of the ArcVoyager Guide and practice these operations using the World Atlas. For more practice, work with the *Exploring Earthquakes and Related Processes* exercise prior to this lesson. It will help you learn the basics of legend editing.

Detailed help also can be found in the ArcView online Help system. To open the ArcView help, click the HELP TOPICS menu. Pay particular attention to the topic CREATING AND USING MAPS. (To see a listing of topics, click on the CONTENTS tab.)

Procedures for Task 1: Hypothesize about the areas of concentration for major race and ethnic groups.

- 1-1. You will examine where different groups of people reside in the United States. The groups of interest are those directly identified in the U.S. census--African Americans, Native Americans, Asian and Pacific Islanders, and Hispanic Americans.
- 1-2. Discuss and describe what you know about historical and recent settlement patterns of these groups. Using wall maps, atlases, and similar tools, make predictions about the recent patterns (1990 census) in the nation's states and counties. Record these in some manner for use during the discussions in Task 2.

Procedures for Task 2: Explore and describe the actual geographic patterns of racial and ethnic residence.

- 2-1. Use ArcVoyager to evaluate your hypotheses. Open *ArcVoyager's United States--Race and Ethnicity* project found in *Designing Global Adventures: Point Me*.
- 2-2. Focus your attention on the Native American population. The map of the 48 contiguous United States presents the distribution of Native Americans as a proportion of the total population.
- 2-3. Describe the map display (the VIEW). It shows the distribution of Native Americans (American Indians, Eskimos, and Aleuts) as a percent of the total population measured in the 1990 census. What states have high percentages of Native Americans? Does the pattern match their hypotheses?

What's that list in the gray area on the left? This is also a good time to notice the list of theme names in the legend (the TABLE OF CONTENTS) and identify which themes are currently visible in the map. (These have a check mark next to their name in the TABLE OF CONTENTS.) Scroll down the list of themes in the TABLE OF CONTENTS. Notice the county theme for Native Americans as well as the pairs of state and county themes for the other racial/ethnic groups.

- 2-4. The map is focused on the 48 contiguous states. What about Alaska and Hawaii? To change the map's focus quickly, click the ZOOM TO ACTIVE THEME(S) button.



Wondering what each button and tool does? Without clicking, slowly move your cursor across the button and tool icons. A brief description of each is displayed in the STATUS BAR. (On a Windows machine, this is at the bottom of the ArcVoyager window. For a Macintosh, it is the line just below the ArcVoyager tools.)

Lost on the map? With a U.S. STATE or COUNTY layer as the ACTIVE THEME ("raised"), click the ZOOM TO ACTIVE THEME(S) button to get back to a full U.S. view. To get back to the previous 48-state view, click the ZOOM TO PREVIOUS EXTENT button. This button stores up to five previous map extents (the area that is visible in the display window).



- 2-5. What does the 50-state perspective show? Are the percentages for Alaska and Hawaii higher or lower than those in other states? Which of the contiguous 48 states have similarly "high/low" Native American percentages? What are the top ten Native American states?
 - A. Make some of these observations first simply using the theme's legend. Also, notice that no state is actually in the 25-50% or the >50% ranges. (**Note:** The use of these ranges will become clear in Step 2-6.)
 - B. To see the precise percentages, use the IDENTIFY TOOL.



1. What is the actual 1990 percentage for Alaska? With the Native American (State) theme as the ACTIVE THEME, click on Alaska. This opens the IDENTIFY RESULTS window. By clicking, holding, and dragging on the IDENTIFY RESULTS TITLE BAR, move this window to allow you to see it and all or most of the 50 states. You can also widen the window in order to see the left side more fully.

2. The right side of this window contains a set of FIELD NAMES (like STATE_NAME and POP1990) and VALUES for those fields (like Alaska and 550,043). Using the SLIDER BAR on the right, begin scrolling down the list of information about Alaska. Notice there is much information about this state--all of it can be mapped (see Step 3-1 for more on this).
 3. Continue scrolling until you see a series of FIELD NAMES beginning with P. Find P_AMERI_ES. This is the database name for the PERCENT OF THE POPULATION ENUMERATED AS NATIVE AMERICAN (AMERICAN INDIAN, ESKIMO, AND ALEUT) IN THAT STATE IN THE 1990 CENSUS. Although P_AMERI_ES is a little cryptic, it is handier than the full name. Alaska's 1990 Native American percentage is 15.58.
 4. What is the Native American value for Oklahoma? Return to the map and click on Oklahoma. In the IDENTIFY RESULTS window, Oklahoma is added to the list. The right side of the window now displays the Oklahoma data. Here, P_AMERI_ES equals 8.02%.
 5. Identify the percentages for other states, especially the states in the same class on the map (Arizona, New Mexico, South Dakota, and Montana). Which are higher or lower than Oklahoma? Close the IDENTIFY RESULTS window when finished.
- C. To explore, sort, and rank the data base for all states at once, open the data table.





1. To see this state data table, click the OPEN TABLE button.

Wait a minute, something's changed! Notice that the menus, buttons, and tools are now different. By clicking the OPEN TABLE button, you have left the map area (VIEWS) and have now opened the database area (TABLES). Notice that the TITLE BAR for the map is "grayed out." Something called ATTRIBUTES OF % NATIVE AM. 1990 (STATE), the TABLE of information about the states, is now the ACTIVE WINDOW.

Tip: Moving between windows. To toggle between the map and table, click the WINDOW menu. In the list near the bottom, select UNITED STATES--RACE AND HISPANIC ORIGIN. The map is now the ACTIVE WINDOW. To return to the table, click the WINDOW menu again, select ATTRIBUTES OF % NATIVE AM. 1990 (STATE) (or click the OPEN TABLE button again). The table is in front and active again.

2. Position this window so you can see all or most of the map and the table itself. Clicking, holding, and dragging on the TITLE BAR is the best way to move the window.
3. On the left end of the tool bar, notice the two gray boxes with numbers inside and some text to the right of each. They should read 0 OF 51 SELECTED, meaning that 0 states are selected from the 51 records in the database (DC is included here as a state equivalent).
4. In the table, scroll down through the table using the SLIDER BAR on the right. These are the 51 records, the states. Move the UP/DOWN SLIDER back to the top when done.
5. Explore the table contents going across using the SLIDER BAR along the bottom of the table. Note that the fields are the same ones you saw when using the IDENTIFY tool This is a long list, so there is an additional STATE_NAME field at the very end of the list.

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6. To see a rank-ordered listing of the Native American percentages from high to low, find P_AMERI_ES in the listing. Click once on the field name, P_AMERI_ES. It darkens. Click the SORT DESCENDING button. (**Note:** To see the top of the listing, push the UP/DOWN SLIDER back to the top.) Alaska should be at the top.

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7. To see them in reverse order, click the SORT ASCENDING button. Pennsylvania comes in with only 0.12% of its total 1990 population enumerated as Native American.

Long list! Is there a way to move fields? Yes, you can click on a field name, hold, and drag it to a new location. For example, you can move the STATE_NAME field to a location in the list nearer to the data you are reviewing. Although it may seem so, you are not permanently moving the item. The move remains in effect only during the current ArcVoyager session. The next time you open this project it will return to its original location.



You also can remove (again, temporarily) fields from the list by changing a field to “invisible.” Simply click the TABLE menu, select PROPERTIES, and click the checkmark next to the name of any field you don’t want to see in the data table. Turning off a number of fields is a good way to avoid information overload. Also in this area, field names can be given aliases. So instead of P_AMERI_ES, a field can be named “% Native American.”

8. Sort in descending order again (from high to low). Identify the top ten states in the data table and on the map.


Do this by clicking the cursor on each of the top ten states in the ranked-ordered list. Click first on the Alaska record in the table. It becomes YELLOW in the table and on the map. Hold down the SHIFT key on the keyboard and click the next nine states in the list.

Safety tip! Do not click your cursor on a record inside the data table unless you want to change the items selected. With the SELECT tool (cursor) engaged, an errant click will change the selected set.

9. ZOOM the map to focus on the top ten states.
- Close the data table. Notice that the YELLOW selection on the map does not disappear. Notice that the map is now the ACTIVE WINDOW and the set of menus, buttons, and tools you started with have returned.

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- Click the ZOOM TO SELECTED button (left of the four arrows pointing in). The map focuses on the western U.S. and displays the top ten Native American states based on percentage distribution. When done, click the SELECT NONE button to clear the selection.

10. Are the top Native American states based on percentage the same as those based on total numbers?

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- Reopen the THEME TABLE
 - In the table find the field name AMERI_ES (which is near the beginning of the table). Click once on the field name, AMERI_ES. It darkens.

- c. Click the SORT IN DESCENDING ORDER button. (**Note:** To see the top of the listing, push the UP/DOWN SLIDER back to the top.) What state is at the top? The answer can be found by clicking on the top row and observing the map or by scrolling to the left to find the state name.
- d. What about the remaining nine in the top ten? Hold down the SHIFT key on the keyboard and click on the next nine records.

You may not be able to see all of the states in this new grouping. Instead of closing the table, bring the map to the front by going to the WINDOW menu and selecting UNITED STATES--RACE AND HISPANIC ORIGIN. Click the ZOOM TO SELECTED button. Eastern states have joined the mix.



- e. When done, click the SELECT NONE button to clear the selection.



2-6. Describe what you expect to see on a map displaying the same information for counties.

- A. Find the theme % NATIVE AMER 1990 (CNTY) and turn it on (click the check box to the left of the theme name).

Note: the county layer will “overwrite” the state data. Watch this. It may be useful to display it again. Turn off the county layer. Wait a moment and turn it back on. Compare the differences between mapping this field by state and by county. What areas change, disappear, or appear?

- B. Notice the lack of the black border around each of the county color boxes in the TABLE OF CONTENTS. This indicates that there is no outline for each area (each county) drawn on the map. Choosing to remove the county boundary outline helps make sub-state patterns more visible. To give the county display a state-level context, turn on the topmost layer, STATE OUTLINES.

2-7. What do you see? How is this geographic distribution by county different from or similar to the distribution by state? How does the map match your predictions?

2-8. To see regional and state variations better, use the navigation buttons and tools (ZOOM and PAN) to move around the map. For more geographic context, turn on city, highway, lake, and river themes.

(**Note:** These layers are currently below the race/ethnicity themes, they will have to be moved toward the top. Click on a theme name, hold, and drag it to a new location.)



To find out more about individual counties use the IDENTIFY tool. The theme of interest must be made the ACTIVE theme (by clicking on its name). When finished, close the IDENTIFY RESULTS window.

To rank the top Native American counties, use the discussion in Step 2-5. Open the data table for counties and sort the counties on percent and number of Native Americans. The results may surprise you.

2-9. When this portion of the exploration is complete, hide the legend for both of the Native American layers (using the HIDE/SHOW LEGEND button) and turn both off. Finally, use the ZOOM TO ACTIVE THEMES button to get back to a U.S. view.



- 2-10. Discuss and explore the other race/ethnic groups, repeating the steps described above with the themes % African America (State), % African American (Cnty), % Asian American (State), % Asian American (Cnty), % Hispanic (State), % Hispanic (Cnty).
- 2-11. To make comparisons between different racial groups, it might be helpful to print some of the maps. You can create a LAYOUT that includes the map, a title, a scale and the legend.
- With the map as the ACTIVE WINDOW, turn on the desired themes and turn off any unnecessary themes.
 - Click the VIEW menu and select LAYOUT.
 - Pick LANDSCAPE as the TEMPLATE. A ready-to-print version of the map complete with title, scale bar, north arrow, and legend is created.
 - Adjust each piece of the LAYOUT as desired. For instance, the map title is currently UNITED STATES--RACE AND HISPANIC ORIGIN. This is a function of the VIEW's title. If you are mapping Percent African-American by County in 1990, you can change the title to reflect that. Simply double click on the title and type the desired title.



To move individual components, click once on the item using the POINTER tool. Graphic handles will appear. Click again and hold and drag the component to the desired location.

- When finished making adjusts to the LAYOUT, click the FILE menu and select PRINT SETUP and select a printer. As with other software applications, pick your printer, paper size, and orientation. Click OK.



- Click the PRINT button. Click OK to print the layout to your printer.

- You also can EXPORT the LAYOUT to a graphics file such as WMF, BMP (Windows formats) or PICT (Macintosh format). To do this, click the box labeled PRINT TO FILE. You will be prompted for a file name. Enter a file name and click OK. This will return you to the PRINT dialog box. Click OK again to create the file.

Going further and reinforcing concepts.

- 3-1. As you discovered earlier in this exercise, there are many fields in the state and county data bases that can be mapped. To do so, use the theme COUNTIES (U.S.) or the theme UNITED STATES near the bottom of the TABLE OF CONTENTS.
- Double-click on either of these themes to open the LEGEND EDITOR.
 - For the LEGEND TYPE, select GRADUATED COLOR.
 - For the CLASSIFICATION FIELD, select a field such as AMERI_ES. The software defaults to five classes. To change the classification, click the CLASSIFY button. Select a different classification method or a different number of classes.

- D. Select a COLOR RAMP. The software defaults to RED MONOCHROMATIC. Click APPLY and close the LEGEND EDITOR.
- E. Turn on the layer.
- F. Notice in the TABLE OF CONTENTS that the theme name now carries an added descriptor "BY ...". This indicates the FIELD being mapped. This "BY ..." is a function of the "USE SUFFIX?" option being selected in the theme's PROPERTIES.

Can't read the entire name in the TABLE OF CONTENTS? You can adjust the width of the TABLE OF CONTENTS. To accomplish this, drag the cursor slowly across the border between the map display portion of the window and the gray TABLE OF CONTENTS box. When the cursor becomes a double-arrowed pointer, click, hold, and drag the TABLE OF CONTENTS frame to the right. Let go.

- G. Continue exploring and observing the patterns of race and ethnicity in the United States.