Urban Distribution & Density
from the GeoInquiries™ collection for Human Geography

Target audience – Human geography	Time required – 15 minutes

Activity	Explore the location and concentration of major urban areas throughout the world.
APHG Benchmarks	**APHG: VII.A1.** Explain how the form, function, and size of urban area settlements are constantly changing. **APHG: VII.B1.** Recognize how models help to understand the distribution and size of cities.
Learning Outcomes	• Students will describe the relationship between population size and the distribution of major cities throughout the world. • Students will explain why the United States has so few world cities.
Level 2 GeoInquiry Requirements	• A free school ArcGIS Online organization account (www.esri.com/schools). Instructors or students must be signed in to the account to complete this activity. • Approximately 0.101 credits will be used per person in the completion of this activity as scripted.

Map URL: http://esriurl.com/HumanGeoInquiry15

? Ask

Where are the world's largest urban populations?

→ Click the link above to launch the map.
→ In the upper-right corner, click Sign in. Use your ArcGIS Online organization account to sign in..
→ At the top of the map, click Bookmarks and choose World Cities.
→ In the Contents pane, make sure that only the World Cities layer is turned on.
? Which regions have the most cities with large populations? *[East, South, and Southeast Asia]*
? Why are so many world cities located in Asia? *[Asia's population is considerably larger.]*

ⓘ Acquire

What is the density?

→ See the Calculate Density ToolTip on the next page.
→ Above the left pane, click Analysis, expand Analyze Patterns, and choose Calculate Density.
→ In the Calculate Density tool, set the following parameters:
  ❶ Set to: World Cities.
  ❷ Set to: Study Area (Areas).
  ❸ Add an underscore and your initials at the end of the suggested layer name.
    Keep the Use Current Map Extent box checked, although the tool will be run on the study area.
    Always click Show Credits to ensure acceptable credit usage.
    Click Run Analysis.
? What is the result? *[Series of concentric rings]*

🔍 Explore

What do the density rings show?

? What value did you set in the Calculate Density tool? *[World Cities]*
? Did you select an attribute, such as population? *[No]*
? What are you examining the density of? *[Number of cities/land area of the study area]*

more ▶

▤ Analyze

Are all cities the same size?

- → See the Transparency ToolTip below, and set the new layer's transparency to 50%.
- → Zoom in to the darkest ring.
- ? Which city is the largest settlement near this ring? *[Shanghai]*
- ? What patterns do you observe? *[One very large city and many smaller cities]*
- ? Are larger urban areas closer or farther apart than smaller urban areas? *[Farther apart]*
- → Turn on the layer, World Urban Areas.
- → Click the button, Bookmarks. SelectTokyo.
- ? Tokyo is ranked number 1 in population. Why isn't it at the center of the density ring? *[Other large cities are not located nearby.]*

☑ Act

Why are so few U.S. cities world cities?

- → Click the button, Bookmarks. Select USA.
- ? According to the World Cities layer, which two U.S. cities are the largest? *[New York and Los Angeles]*
- → Turn on the layer, USA Major cities.
- → Zoom in to a major city of your choice.
- ? What pattern do you observe? *[A major city surrounded by many smaller cities]*
- ? Is the distribution more like that of Tokyo or Shanghai? *[Shanghai]*

CHANGE LAYER TRANSPARENCY

- From the Details pane, click Contents.
- Point to a layer, click the three blue dots below the layer name, and choose Transparency.
- Modify the layer transparency to see an active layer below the top layer.

CALCULATE DENSITY

- Density analysis takes known quantities of some phenomenon and spreads these quantities across the map.
- You can use this tool, for example, to show concentrations of lightning strikes or tornadoes, access to health care facilities, and population densities.

Next Steps

Continue using an ArcGIS Online organizational account (www.esri.com/schools) to dig deeper into data using the analysis tools, and save your maps to your account.

THEN TRY THIS...

- Use the Calculate Density analysis tool to examine the density patterns of cities within the United States.
- Use the World Traffic service to compare traffic patterns for major cities throughout the world.

▦ TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these high school texts.

- *The Human Mosaic by Jordan-Byuhov and Domosh — Chapter 10*
- *Human Geography: People, Place, and Culture by Wiley Press — Chapter 9*
- *An Introduction to Human Geography by Pearson — Chapter 13*

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