

Range: Why Hexagons?

from the Geolnquiries™ collection for Human Geography

Target audience – Advanced human geography

Time required – 15 minutes

Activity Investigate the use of hexagons for analyzing distribution.

APHG Benchmarks APHG: I:C1. Analyze the human organization of space and reasons...
APHG: VII.B. Apply Christaller's central place theory.

Learning Outcomes

- Students explain why geographers use hexagons in the analysis of geographic data.
- Students will use geographic data to account for distribution patterns that they observe.

Level 2 Geolnquiry 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 0.36 credits will be used per person in the completion of this activity as scripted.

Map URL: <http://esriurl.com/humanGeolnquiry14>

? Ask

Where are the fast food restaurants in Houston located?

- 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.
- Click the button, Bookmarks. Select Houston.
- With the Details button underlined, click the button, Show Contents of Map (Content).
- Make sure only the Store 2 (fast food) layer is turned on.
- ? Where are most of the fast food restaurants located? [*Slightly more in the southwest*]

! Acquire

How can you use analysis tools to summarize data?

- See the Summarize Within ToolTip on page 2.
- Click Analysis, expand Summarize Data, and then choose Summarize Within.
- In the Summarize Within tool, set the following parameters:
 - 1 Click the Hexagon symbol, type 6, and make sure Miles is selected.
 - 2 Set to: Store 2.
 - 5 At the end of the default layer name, add _<your initials>.
 Leave the current map extent check box checked so that you will only compute the places in the map view. Always click Show Credits to ensure acceptable credit usage. Click Run Analysis.

🔍 Explore

What did the hexagons do?

- Zoom out to view all hexagons, if necessary.
- Change the layer transparency to 50%. (See the ToolTip on page 2).
- Click a few hexagons.
- ? What information do the pop-ups provide? [*Grid value; number of fast food restaurants in each hexagon*]

Analyze

How do hexagons support comparisons?

- Turn on the layer, Imagery Hybrid.
- ? Why might the hexagon east of downtown have no fast food restaurants? [*Low population density*]
- ? Why is population density low in that hexagon? [*Port of Houston, refineries, golf course, and so on*]
- Turn off the layer, Imagery Hybrid.
- Turn on the layer, Store 1.
- ? How do the distribution patterns differ? [*More coffee shops in the inner ring; more fast food restaurants in the outer ring*]
- ? Which location type has the larger range? [*Fast food restaurants because the distance between them is farther apart*]

Act

Why do geographers use hexagons to analyze market areas?

- Turn off the two layers hexagon and Store 1.
- Turn on the layer, Store 2 Density.
- ? What does this layer show? [*Fast food places per square mile of each "zone"*]
- On the map, click the two densest areas.
- ? What do you observe? [*Different land areas; density expressed as a fraction (example: 0.34)*]
- ? What is the advantage of using hexagons? [*Similar land areas; all areas included*]

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.

SUMMARIZE WITHIN

- This tool finds features (and portions of features) that are within the boundaries of areas in the first input layer.
- This tool is typically used to create summary statistics on points that lie within a selected area (polygon).
- A date and initials appended to the recommended name typically avoid name conflicts.

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 Perform Analysis function to create buffers to analyze the relationship between road networks and the distribution of fast food restaurants.
- Add the USA Major Cities layer and create drive times from selected cities. Then identify the types of places that fall within the various drive-time zones.



TEXT REFERENCES

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

- *Human Geography* by McGraw Hill – Chapter 17
- *The Cultural Landscape* by Pearson – Chapter 12
- *Human Geography: People, Place, and Culture* by Wiley Press - Chapter 9

