Distance and scale
from the Esri GeoInquiries™ collection for Human Geography

Audience – Human geography
Time required – 15 minutes

Activity
Explore how not all distances are equally distant.

APHG Benchmarks
APHG:I.B. Enplain major geographical concepts underlying the geographical perspective (scale, location, and place)
APHG:I.C. Analyze changing interconnections among places.

Learning Outcomes
- Students will be able to visualize and analyze variations in the time-space compression.

Map URL: http://esriurl.com/humanGeolnquiry1

Ask
Are all miles “equally” distant?
- Click the URL above to launch the map.
- Why might distances of the same length feel longer or shorter? [Distance can feel larger or smaller because of cultural similarity, transportation connectivity, telecommunications, and so on.]

Acquire
How far can you get?
- With the Details button underlined, click the button, Show Contents of Map (Content).
- Check the box to the left of the layer name, Drive Time From Boston (60, 90, 120 Minutes).
- Which major city in New Hampshire can you reach in less than an hour? [Manchester]
- How long would it take to get to Providence, R.I.? [about 75 minutes]

Explore
Are we taking the long way around?
- Both Manchester and Worcesters are at the outer edge of the 60-minute drive time zone. But, as the crow flies, it is 38 miles to Worcesters and 48 miles to Manchester.
- Why might driving a longer distance take the same time? [access to interstate highways]
- What city located less than 50 miles from Boston (as the crow flies) but cannot be accessed in a 120-minute drive (hint: water contributes to the time)? [Provincetown]
- Why is the travel time so long? [because you must drive around Cape Cod Bay]
- What other forms of transportation might change the travel time and accessibility? [water or air travel]
How is population density related to travel time?

- Click the button, Bookmarks. Select BOS-MHT/WOR.
- Turn on the layer, Population Density - Census Tracts.
- Compare the Population Density and Drive Time layers by turning them on and off.

What is the relationship between the drive time and population density? [shorter drive-time areas have higher population density]

How do highways affect travel time?

- Turn off the layers, Drive Time from Boston (xx xx xx Minutes).
- Change the transparency of the Population Density- Census Tracts layer to 50% (see ToolTip below).
- Click the button, Bookmarks. Select Traffic.
- How are major roads and population distribution related? [density is higher along the major highways]
- Would travel be faster through a more density populated or less densely populated area? [Travel is faster through more densely populated regions than less densely populated areas because of the high-volume transportation networks that are most commonly found there. Access to major roads, even if they are congested, enables faster commutes.]

### MEASURE

- Click the Measure tool.
- Select Distance, and then choose the unit of measurement.
- Click once to start measuring, click once to change direction, and double-click to stop measuring.

### TRANSPARENCY

- From the Details pane, click the Content button.
- Click the three small blue dots and hover your pointer over the word “Transparency” to open a drop-down list.
- You can modify transparency to see an active layer below the top layer. Set it to 50%.

### Next Steps

**DID YOU KNOW?** ArcGIS Online is a mapping platform freely available to public, private, and home schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at http://www.esri.com/schools.

**THEN TRY THIS...**

- Create hot spots around local transportation hubs and corridors to visualize something closer to home.
- Use analysis tools such as Find Nearest to calculate straight-line distance between cities or buffers to visualize distance from the Boston City Center.

### TEXT REFERENCES

- Human Geography: A Short Introduction by Oxford University Press – Chapter 1
- The Cultural Landscape by Pearson – Chapter 1
- Human Geography: People Place and Culture by Wiley Press – Chapter 1

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