1.6: Scales of Analysis
Learning Objective

- Define scales of analysis used by geographers.
- Explain what scales of analysis reveal.
Essential Knowledge for Topic 1.6

- Scales of analysis include *global*, *regional*, *national*, and *local*.
- Patterns and processes at different scales reveal variations in, and different interpretations of, data.
What is scale?
Map Scale (different from the “scale” we talk about here)

- The relationship of a distance on a map to the corresponding distance on the ground

**SCALE 1:24 000**

- 1 Kilometer = 0.5 Miles
- 1000 Meters = 3300 Feet
- 1000 Kilometers = 2000 Miles

CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
What is Scale?

- Scale is a fundamental concept in geography, but sometimes it can be tricky.
- Earlier you learned about map scale (the relationship of a distance on a map to the corresponding distance on the ground).
- Today we will discuss scale in different way: scale as the size or scope of a phenomenon. We will practice identifying the scales of analysis presented by maps, quantitative and geospatial data, images and landscapes.
Scale of Analysis

- Observation of data at the global, national, and/or local scale
Cumulative confirmed COVID-19 deaths per million people, Jan 1, 2021

Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.

Source: Johns Hopkins University CSSE COVID-19 Data – Last updated 2 January, 06:06 (London time)
State/National Scale
Sub-national/Sub-state Scale & Regional Scale

- Organizations below the national level
- A specific region of the state
Local Scale

- County level
- Individual city or settlement
- A **census tract** (smallest classification)
What is a “State”?

- A geographic area organized into one political unit
- E.g., country (notice the different between “state” as a country and “state” as a sub-national level of government)
Why is scale important?

- Scale can **provide focus for research**.
- A geographer might need to look at a phenomena at a **range of scales** to draw conclusions.
- For example, imagine a geographer wants to research the impacts of the farming practice of intercropping in Sub-Saharan Africa. This is a very large area, so how can they focus their research?
Why is scale important?

- The geographer may start at a **local scale**, like the province of Tabora in Tanzania, then collect data across the **country** of Tanzania to be able to generalize about the practice at the **regional scale**.
- The geographer would select the **scale that is appropriate** to address their specific research questions.
Why is scale important?

- Geographers think about phenomenon ranging from the **local scale to the global scale**.

- The **global scale** is more important now than ever before because we have more sophisticated geospatial technology to understand how change in one place on earth may affect change elsewhere.

- We also recognize that **various scales interact with each other**. For instance, the **global** economy may lead to specialization at a **local** scale (a concept you will learn about more in Unit 7).
What does “Scale of Analysis” mean?

- Scale determines the level at which we analyze geographic data.

- For example, we could analyze the scores of APHG students at different scales.
Population density, 2023
The number of people per km² of land area

Source: HYDE (2017); Gapminder (2022); UN WPP (2022); UN FAO (2022)
OurWorldInData.org/world-population-growth • CC BY
Global Scale & Global Scale of Analysis
Global vs. National Scale of Analysis

GDP per capita, 2018
This data is adjusted for differences in the cost of living between countries, and for inflation. It is measured in constant 2011 international-.$

GPCC Precipitation Climatology Version 2020 0.5 degree precipitation for July in mm/month
National Scale and Local Scale of Analysis
National Scale & Regional Scale of Analysis
Scale of Analysis in Maps

How USA voted 2016

The winning Electoral Votes

Dnetromphotos / Shutterstock.com

R. L. Coleman / Shutterstock.com
Scale of Inquiry

- Analyze data and maps to determine the scale of analysis and scale.
Scale of Analysis in Maps

Mean Temperature in Fahrenheit
December-January-February

In the winter, Chicago is nearly as cold as Moscow.
Geographers use census data to analyze phenomena at different scales.
### Table 1: Median Household Income and Gini Index in the Past 12 Months by State and Puerto Rico: 2017 and 2018

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**Notes:**
- * margin of error is in relation to the size of the estimate; the less reliable the estimate. This number, when added to and subtracted from the estimate, forms the 90 percent confidence interval.
- For more information, see [v.s.ers.census.gov/acs/servlets/www.census.gov/popprofs/](https://www.census.gov/popprofs/).
Scale of Analysis in Images and Landscapes

Songquan Deng / Shutterstock.com

Songquan Deng / Shutterstock.com
Main Takeaway: Why is Scale of Analysis Important?

- If geographers are to solve problems and draw conclusions, they must use data at the appropriate scale.
What can different scales of analysis show us?

- Scales of analysis can be very powerful.
- The scale someone uses to analyze data can:
  - Inform
  - Change
  - Influence
Patterns

- Geographers will analyze different phenomena at various scales to see if patterns remain the same or look different depending on which scale is used.
Estimated age-standardized incidence rates (World) in 2020, all cancers, both sexes, all ages
Review: Small Scale Map

- A map that shows a large portion of the Earth’s surface but has less details in the data it is displaying.

- Small scale map has more generalities since the map is zoomed out.
Review: Large Scale Map

- A map that shows less of the Earth’s surface but has more details in the data it is displaying.
- Large scale map has **less generalities** and more details since it’s zoomed in.
Rates of New Cancer Cases in the United States
All Types of Cancer, All Ages, All Races/Ethnicities, Both Sexes

Rate per 100,000 people
No Data/Data suppressed
363.7 - 431.5
433.6 - 445.4
450.1 - 457.5
459.9 - 511.7
Age-Adjusted Invasive Cancer Incidence Rates in Kentucky
All Sites, 2012 - 2016
By County
Age-Adjusted to the 2000 U.S. Standard Million Population
Kentucky Rate: 520.9 / per 100,000
- 404.5 - 502.3
- 502.7 - 525.0
- 525.4 - 551.3
- 553.2 - 646.2

All rates per 100,000.
© 2019 Kentucky Cancer Registry.
Processes at Different Scales

- Geographers will **analyze** how processes may work differently at various scales.
- For example, how governance may function differently at each level.
Variations in Data

● Data at one level may tell a different story than data at another level.

● This can lead to people drawing contradicting conclusions based on what scale they are using.
Different Interpretations of Data

- How one geographer sees the information may differ than another geographer depending on what scale they are looking at. They may reach different conclusions.
Let’s Practice!
1. Identify the scale and scale of analysis in the map below.

Natural population growth, 2021

Natural population growth is the population increase determined by births and deaths. Migration flows are not taken into account. Future projections are based on the UN’s medium-fertility scenario.
2. Identify the scale and scale of analysis in the map below.
3. Identify the scale and scale of analysis in the map below.
4. Identify the scale and scale of analysis in the map below.
5. Which scale is most useful?

1) Which scale would be most effective if you were a town mayor trying to decide on the best location for a new traffic light?

2) Which scale would be most effective if you were trying to compare life expectancy in Western Europe with life expectancy in Eastern Europe?

3) Which scale would you use if you were trying to figure out which state had the greatest need for funding based on population?

4) Which scale would you use if you wanted to analyze the territory size of Canada compared with Russia?
6. Which of the following sets of maps would help explain how scale of inquiry affects truth?

A. Maps showing the area of France before and after surveying
B. Maps of Hudson Bay drawn by Native Americans and by the earliest European travellers
C. Maps showing Michigan’s population density by counties and the United States population density by state.
D. Map showing the number of auto thefts per block in Seattle in the decades before and after depression.
E. Maps of gang graffiti in Philadelphia
Main Takeaway: The Power of Scale Analysis

- Scales of analysis can be very powerful.
- The scale someone uses to analyze data can inform policy decisions, change the way people understand risk during a pandemic, alter where a company decides to locate a factory, influence a politician’s campaign strategy, and so many other important decisions.