Five Themes of Geography

- **Location** - absolute and relative location.
- **Place** - the distinctive physical and human characteristics of a place.
- **Human-Environment Interaction** - how people interact with/shape the surrounding environment.
- **Movement** -
  - the mobility of people, goods and ideas
  - the patterns and changes in human spatial interactions
  - accessibility & connectivity of places.
- **Regions** - an area that displays a selected criteria-
  - one or more distinctive characteristics. (example- New England)
The Two Types of GEOGRAPHY

• **Physical Geography**
  - Topography
  - Climate
  - Flora and Fauna
  - soil

• **Human Geography**
  - Culture
  - Population
  - Economics
  - Political
  - Urban
  - Agriculture
Geography is the study of where things are found on Earth’s surface and the reasons for their locations. 

*Human Geographers* ask two simple questions...

1. *Where* are people and activities found on Earth?
2. *Why* are they found in these places?
Geographers work with... MAPS!

- A *map* is a two-dimensional or flat-scale model of Earth’s surface, or a portion of it.
- *Cartography* is the science and practice of mapmaking.
- Maps serve **two purposes**...
  1. As a reference tool to identify an object’s *absolute* and *relative* location.
  2. As a communications tool to convey the distribution of human activities or physical features.
Early Mapmaking

- Earliest maps were *reference tools*—simple navigation devices to show a traveler how to get from one point to another.
- Early maps reflected the *limits of knowledge and interaction* in the era of their production.
Maps have shifted from merely providing simple location reference to a tool used by geographers to communicate complex geographic phenomena.
PRINCIPLES OF MAPS AND MAPPING
Map Scale

- The level of detail and the amount of area covered on the map depend on its map scale.

- Scale is the relationship of a feature's size on a map to its actual size on Earth.
Map scale is presented in three ways...

1.) **Ratio or Fraction Scale**
   - *Ex. 1:24,000 or 1/24,000*
   - Number on *left* is one unit of distance on the map, while number on *right* represents its equivalent on Earth’s surface.
If a map has a scale of 1:6000 and you measure a distance between objects of 5 Inches, how many inches would this represent on the Earth’s surface?
Map scale is presented in three ways...

2.) Written Scale

- *Ex. 1 inch equals 1 mile*
  - Number on left is a unit of measurement on the map, while that on right represents its equivalent on the surface of the Earth.
Map scale is presented in three ways...

3.) **Graphic Scale**

- Consists of a bar marked on the map to show equivalent distance on the Earth’s surface
LG v. SM Scale

- Small scale (or *small fraction*) maps show a large area on the earth such as $1/1,000,000$.
  - *Less Detail!*

- Large scale (or *large fraction*) maps show a small area on the Earth such as $1/25,000$ or $1/1000$. 
The scientific method of depicting Earth’s round surface to a flat map is called *projection*. Earth’s spherical shape becomes *distorted* when rendering it on a flat piece of paper.

- The *shape*, *distance*, *relative size*, and *direction* in maps can be impacted by distortion.
In order to counter the impact of distortion, cartographers have created several different MAP PROJECTIONS.
But Greenland must be the size of Afr--

All that education and you STILL don't understand the Mercator projection?!!
How can a WORLD MAP convey the POWER or INFLUENCE of a particular country? Where a country is depicted and its relative size is a controversial aspect of mapmaking. This Australian map is radically different from those we know.
Geographic Grid

Geographic grid is a system of imaginary arcs drawn in a grid pattern on Earth’s surface.

- **MERIDIANS (lines of LONGITUDE)** Run North/South from pole to pole.
  - Values range from 0° (prime meridian) to 180° east or west longitude (Int’l Date Line)

- **PARALLELS (Lines of LATITUDE)** run East/West parallel to the equator from 0° (@ equator) to at 90° @ north/south poles.
Points on Earth’s surface can be communicated by referencing **intersections of latitude and longitude.**

**Ex:** Denver, Colorado’s location is 40° north latitude and 105° west longitude (40°N/105°W)
ABSOLUTE v. RELATIVE LOCATION

**ABSOLUTE** location is an *EXACT* location on earth’s surface, told using *coordinates*.

• Denver is located at 40°N, 105°W

**RELATIVE** location is *in relation to* other nearby features

• Denver is located at the foot of the Rocky Mountains on Interstate 70
The Earth is divided into 24 ‘time zones,’ each 15º longitude wide. Location in a certain time zone determines what ‘time’ it is relative to other places on Earth.

The Prime Meridian, located at 0º Longitude, is the basis for the time system. Others are either ‘ahead’ or ‘behind’ this line.

Because this line runs through Greenwich, England, this system is called Greenwich Mean Time (GMT).
• We are in the EASTERN TIME ZONE, and are 5 HOURS BEHIND (GMT -5).
• When it is 12:00pm here, it is 5:00pm in Greenwich, England
A funny thing about the GMT system is the International Date Line, @ 180º. Like the opposite of the Prime Meridian, crossing this line Westward ADDS a day (Sunday to Monday); crossing Eastward SUBTRACTS a day (Monday to Sunday).
Isoline Maps - use lines of equal value to represent data
ISOLINE MAPS

Average Temperature (°F)
MAR 18 - 24, 2001

CLIMATE PREDICTION CENTER, NOAA

Computer generated contours
Based on preliminary data
ISOLINE MAPS

MEAN ANNUAL PRECIPITATION
Choropleth Maps- maps in which a specific variable is depicted with shading, patterns, or colors.
Choropleth maps

POPULATION DENSITIES
Illinois Counties

POPULATION DENSITIES
Midwestern States
Choropleth maps

MOTOR VEHICLE THEFT BY STATE

Population Per Theft
- 81 - 235
- 236 - 389
- 390 - 758
- 759 - 1,128

*Alaska, Hawaii, & Washington, D.C. not to scale or in correct geographic position

Cartography by Jacob Jensvold

Bureau of Justice and Statistics - 2006
Choropleth maps
Proportional Symbol-maps in which the size of the symbol varies in proportion to the intensity of the mapped variable.
Proportional Symbol Maps

Traffic Fatalities in U.S. by State, 2009

Explanation

Number of Traffic Fatalities

Source: http://www.fas.usdoj.gov/states/Roads/overview/6milVictims.aspx
Proportional Symbol Maps
Proportional Symbol Maps

Total Murders per State, 2009

Source: U.S. Department of Justice, 2009
http://www2.fbi.gov/ucr/cius2009/data/table_05.html
Date: November 3, 2010
Dot Map- a thematic map in which a dot represents some frequency/occurrence of the mapped variable.
Dot Map

One dot represents 100,000 people.
Dot Map

CROPLAND HARVESTED ACREAGE, 1949

UNITED STATES TOTAL
344,398,550

1 DOT = 25,000 ACRES
(COUNTY UNIT BASIS)

U.S. DEPARTMENT OF COMMERCE

MAP NO. ASC-003 BUREAU OF THE CENSUS
Cartogram- maps using relative size of political units to convey a value.
Cartograms
Contemporary Mapping

Geographic Information Science (GIScience) is the collection/analysis of data acquired by satellites and other electronic technologies; this is called REMOTE SENSING
GPS is one of the most impressive aspects of modern mapping. It uses a constellation of satellites to determine the **ABSOLUTE** location of any object on Earth’s surface.
If you have a smartphone, you most likely have more than a few apps which track your absolute location through GPS.
Technology has enabled the rise of a powerful new form of mapping, called Geographic Information Systems (GIS). GIS uses digital maps overlaid with groups of information called 'layers.'
Contemporary Tools

GIS enables geographers to overlay several types of data; this is called a ‘mashup’
GPS uses GIS, and GIS uses GPS