Unit 1: Thinking Geographically

Class	Human Geography

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Unit Overview

Geography provides a particular perspective of a spatial concern for the *interaction between humans and our physical environment*.

Spatial → related to space

- **Spatial Patterns:** how and where different geographic features occur on the Earth's surface

Branches of Geography

Physical Geography: study of the spatial characteristics of various elements of the physical environment

Human Geography: study of the spatial characteristics of humans and human activities

- Concerned with *population*, *culture*, *politics*, *urban areas*, and *economics*
    - Concerned with *landforms*, *water bodies*, *climate*, *ecosystems*, and *erosion*

The Four-Level Analysis Spatial Framework

- Guides thinking and helps to *think like a geographer*

Level	Key Questions
Comprehension (1)	- What? - Where? - When? - Scale? - Source?
Identification (2)	- Patterns?
Explanation (3)	- Why? - How?
Prediction (4)	- Impact? - Future Implications?

The Geo-Inquiry Process

1. **ASK** — explore and understand an issue
2. **COLLECT** — collect data needed to answer the question at hand
3. **VISUALIZE** — display data in maps or other visual forms
    - Makes complex data easier to understand
    - Reveals connections and patterns
4. **CREATE** — walks other people through the issue
    - Communicate your story through the right means for your specialized audience

5. **ACT** — take action based on those findings

Essential Geography Skills

Concepts and Processes

- Analyzing geographic theories, approaches, concepts, processes, or models in theoretical and applied contexts

Analyze: to break down into parts and study each part carefully

- **Analysis:** thinking about data and coming to conclusions about it

Theory: system of ideas and concepts that attempt to explain and prove why or how interactions have occurred in the past or will occur in the future

Concepts: key vocabulary, ideas, and building blocks that geographers use to describe our world

Processes: a series of steps or actions that explain why or how geographic patterns occur

Models in Geography

Models: representations of reality or theories about reality to help geographers see general spatial patterns, focus on the influence of specific factors, and understand variations from place to place

- Help to explain, describe, and sometimes predict spatial activity and phenomena

Spatial Models → look like stylized maps, illustrate theories about spatial distribution

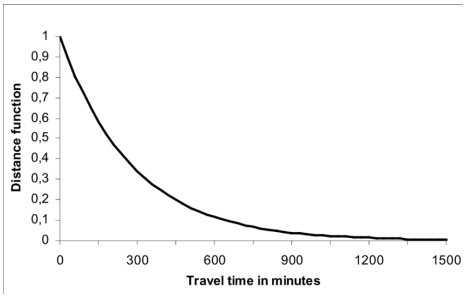
Nonspatial Models → illustrate theories and concepts using words, graphs, or tables

- Often depict changes over time rather than space

Data-Driven Models → use mathematical formulas to explain how the world works

Time-Distance Decay → as time / distance passes, a variable reduces

- Ex. Mail delivery speeds over time



Spatial Relationships

Geographers examine maps to look for clues and patterns in the location and distribution of phenomena.

Spatial Perspective → refers to where something is (location-based).

- Where things are located and why they are located there

Ecological Perspective → refers to the relationships between living things and their environment

- Interactive relationships in societies of living things

Spatial Patterns → focuses on the general arrangement of things to be studied

- General arrangement of things being studied and the repeated sequences of events that create them
- Geographers look at the networks, patterns, and relationships that exist between locations, how they evolve, and what their effects are

Networks: a set of interconnected entities

- Also called *nodes*

Geographers must have a *deep understanding of different regions* and *an ability to understand the strengths and weaknesses of various models and theories* to apply spatial relationships.

Data Analysis

- Analyzing and interpreting quantitative geographic data represented in maps, tables, charts, graphs, satellite images, and infographics

Quantitative Data: any information that can be measured and recorded using numbers (ex. total number of immigrants to a city)

Geospatial Data → quantitative and spatial

- Has a geographic location
- Often used with *geographic information systems* because it lends itself to analysis using formulas (is mappable)
- All information that can be tied to a specific place

The ability to interpret quantitative statistical data in numerical format is required to apply data analysis skills.

- Uses concepts, models, and theories to explain why and how these patterns occurred and their future impacts and implications

The most difficult part of data analysis is *recognizing the limitations of the data*.

- Requires an understanding of trustworthy information, incomplete data, inaccurate data, and mistakes in gathering data

Source Analysis

- Analyze and interpret qualitative geographic information represented in maps, images, and landscapes

Qualitative Sources → collected as *descriptions* (interviews, photographs, images, or cartoons)

- Not represented as numbers

Using the Four-Level Analysis for Sources

Level	Descriptions
Comprehension (1)	- Information within the source - Types of information within the source
Identification (2)	- Patterns within the source - Similarities and differences within the source
Explanation (3)	- Why / how geographic concepts & ideas explain the patterns
Prediction (4)	- Possible impacts of the patterns

The Census

Census: official count of the number of people in a defined area

- Conducted by the U.S. Census Bureau every year
- Published to the Internet for people to gain information

Scale Analysis

Scales of Analysis: different views from zooming in and out to understand the topics being studied

- Local, regional, country, or global scale
- Helps to develop a more complete understanding of the topics being studied

1.1 — Introduction to Maps

Maps are one of the most important tools of geographers.

- Used for thousands of years

Cartographers: creators of maps

Maps

- Help to organize complex information
- Communicates spatial information that most effectively
- Essential to highlight and analyze patterns

Reference Maps → designed for people to refer to for *general information about places*

- **Political Maps** → show human-created boundaries and designations (ex. countries, states, cities, capitals)
- **Physical Maps** → show natural features (ex. mountains, rivers, deserts)
- **Road Maps** → show highways, streets, and alleys
- **Plat Maps** → show property lines and land ownership details

Thematic Maps → show spatial aspects of information or phenomena

- **Choropleth Maps** → use various colors or shades to show the location and distribution or spatial data
  - Often show rates or quantitative data
- **Dot Distribution Maps** → show the specific location and distribution of something across a map
  - Each dot represents a specified quantity
  - Doesn't necessarily have to be dots
- **Graduated Symbol Maps** → use symbols of different sizes to indicate different amounts of something (larger size = more, smaller size = less)
  - Also called *proportional symbol maps*

- **Isoline Maps** → use lines to connect points of equal value to depict variations in data across space
    - If the lines are closer together, there is *rapid change*
    - The most common types of isoline maps are **topographic maps** (connect points of equal elevation)
    - Ex. weather maps (can show changes in barometric pressure, temperature, or precipitation)
- **Cartograms** → compares statistics of countries by changing their sizes to indicate the statistic
    - Allow for distance and distribution to be visible

Reference Maps → show geographic *LOCATION*

Thematic Maps → show geographic *INFORMATION*

Scale

A map is a *reduction of the actual land it represents*.

Scale: ratio between the size of things in the real world and the area it represents

- The area of the world being studied

Map Scale: the mathematical relationship between the size of a map and the part of the real world it shows

- Allows you to measure *absolute distance*

Cartographic Scale → refers to the way the map communicates the ratio of its size to the size of what it represents

- Words → scale is expressed verbally
- Ratio → scale is expressed as a comparison through a ratio

- Line → scale is expressed as equality through a line
- Scale → **small-scale maps** (larger amount of area with less detail) & **large-scale maps** (smaller amount of area with more detail)

Regions

Region: an area of Earth's surface with certain characteristics that make it distinct from other areas

- Human constructs

Regions help synthesize geographers' understanding of the world.

Formal Region: an area that has one or more shared traits

- Also referred to as a *uniform region*

Functional Region: an area organized by its function around a focal point (the center of an interest or activity)

- **Node:** focal point of a functional region
  - The node is the focus of the region
  - Serve a function that ties the region together

Perceptual Region: a type of region that reflects people's feelings and attitude about a place

- Also called a *vernacular region*

Suburbs: the residential areas surrounding a city

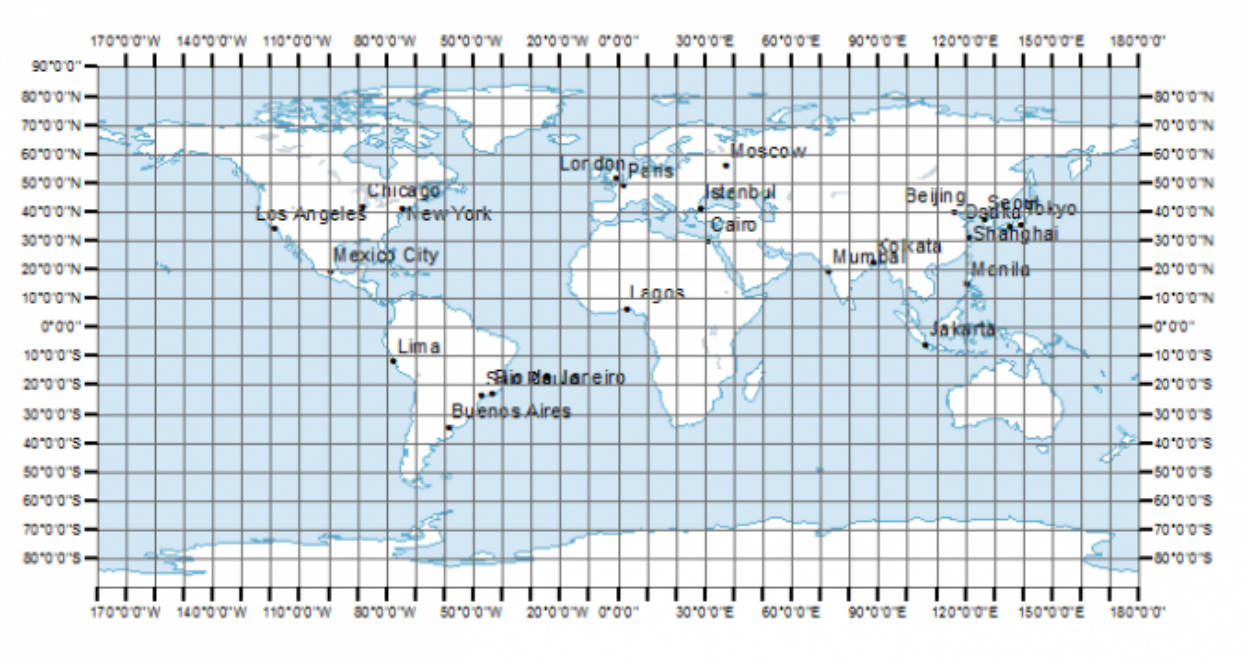
Representation of Spatial Patterns

Location

- position that an object occupies on Earth

Absolute Location: precise spot where something is, according to a system (ex. latitude and longitude grid)

- **Latitude (*Parallels*):** distance North or South of the *equator* (an imaginary line that circles the globe halfway between the North and South poles)
  - The equator is designated as 0°
  - The North Pole is designated as 90°N
  - The South Pole is designated at 90°S
- **Longitude:** distance East or West of the *prime meridian* (an imaginary line that runs from pole to pole through Greenwich, England
  - The prime meridian is designated as 0°
  - On the opposite side of the globe is 180°
    - Approximately followed by the **International Date Line** because it makes accommodations for international boundaries



Relative Location: description of where something is in relation to something else

- Often described in terms of **connectivity** (how well two locations are tied together (by roads or other links) and **accessibility** (how quickly and easily people in one location can interact with people in another location)

Place: a location on Earth distinguished by its physical and human characteristics

- "sense of place" → emotions attached to an area based on personal experience

Places change over time.

- Society alters the place it occupies

Mental Maps: internalized representations of portions of Earth's surface

- Depends on each individual person's perspective

Direction is used to describe where things are in relation to each other

Absolute Direction: definite direction (always the same)

- Cardinal directions (ex. North, South, East, West)
- Intermediate directions (ex. Southeast, Southwest)

Relative Direction: direction based on people's perceptions (used to describe direction and location when interpreting maps)

- Ex. left, right, up, down, front, behind

Relative location **CAN** change, but absolute location *usually* doesn't change.

Site vs. Situation

Site: characteristics of an immediate location (ex. temperature)

- absolute location & physical characteristics

Situation: location of a place in relation to its surroundings (ex. “Houston is southeast of Austin.”

Patterns

Geographers consider the *arrangement of things*.

Space: the area between two or more things on Earth’s surface

- Helps to analyze the organization of people, places, and environments on Earth

Density: number of things in a specific area

- Population Density → amount of people in a certain area

Pattern: how things are arranged in a particular space

Flow: movement of people, goods, and information and the effect of those movements on society

- The world is constantly in motion

Distance

- measurement of how far or how near things are to one another

Absolute Distance: definite measure of distance (ex. measured in feet, miles, meters)

Relative Distance: degree of distance based on time or money

- Often dependent upon the mode of travel

Elevation

Elevation: distance of features above sea level (usually measured in feet or meters)

- Impacts climate, weather, agriculture, etc.
- Higher elevation → Cooler temperature & Higher difficulty in growing crops

Pattern Distribution

Distribution: the way a phenomenon is spread out over an area

- Essentially a description of the pattern of where specific phenomena is located

Geographers look for **patterns** (general arrangement of things) in the distribution of phenomena that give clues about causes or effects of the distribution.

Common Distribution Patterns:

- **Clustered / Agglomerated Phenomena** → arranged in a group or concentrated area
- **Linear Phenomena** → arranged in a straight line
- **Dispersed Phenomena** → spread out over a large area
- **Circular Phenomena** → equally-spaced from a central point, forming a circle-type shape
- **Geometric Phenomena** → in a regular arrangement
- **Random Phenomena** → having no order in position

Clustered → closer together

Dispersed → more spread out

Projections

All maps distort some aspect of reality since the Earth is a sphere and maps are flat.

- The Mercator → designed for navigation, distorted size

Comparing Map Projections

PROJECTION	PURPOSE	STRENGTHS	DISTORTION (WEAKNESS)
Mercator	Navigation	- Directions are shown accurately - Lines of latitude and longitude meet at right angles	- Distance between lines of longitude appears constant - Land masses near the poles appear large
Peters (Gall—Peters)	Spatial distributions related to area	- Sizes of land masses are accurate	- Shapes are inaccurate, especially near the poles
Conic (Lambert, Albers, Polyconic)	General use in midlatitude countries	- Lines of latitude are curved - Lines of longitude converge - Size and shape are both close to reality	- Direction isn't constant - Longitude lines should converge at only one pole
Robinson	General use	- No major distortion - Oval shape appears more like a globe than does a rectangle	- Area, shape, size, and direction are all slightly distorted
Azimuthal	Point-to-point communication	- Preserves direction - No country is seen as center	- Distorts shape and area - Only shows half of Earth

The **Robinson projection** is the most preferred because it has minimal distortion all around, but is a sort-of mix between the *Mercator* and *Peters projections*.

1.2 — Geographic Data

Geographers refer to the current era as part of a *geospatial revolution* because they gather data through technical mapping and aerial photos.

- Have the ability to gather data by visiting places, interviewing people, or observing events in the field

Landscape Analysis

Landscape Analysis: the task of defining and describing landscapes

1. Careful Observation
    - Geographers observe phenomena carefully and collect data
    - **Field Observation** → physically-visiting a location, place, or region and recording information there
    - **Spatial Data**: all of the information that can be tied to specific locations
        - **Remote sensing** gathers information from satellites that orbit Earth
            - Visualizes geospatial information
        - **Aerial photography** provides professional images captured from planes in the atmosphere
        - Ground-level photography, sound recordings, and chemical analyses capture information about landscapes.
2. Interpretation of Data
    - All data must be put together
    - Answer questions

Geospatial Data

- Quantitative or qualitative

Who Collects Geographic Data?

1. Individuals (field observations, travel narratives, media reports)
2. Organizations (businesses, government agencies)
    - More budget for more data collection
3. Governments

Geographers collect geospatial data by doing **fieldwork** (observing or recording information on location, or in the field).

- Can also come from government policy documents, articles and videos from media outlets, or photos of an area

1.3 — The Power of Geographic Data

> **Data** drives *decision making*.

When used properly and ethically, geographic data can have many positive benefits for individuals, companies, government, and society.

- Misusing geographic data leads to inaccurate conclusions or poor decisions

Geovisualizations: 2D or 3D interactive maps created from collected data

- Help people better understand the world in which they live

All data has limitations.

- Geographers must be careful in gathering and interpreting the data accurately.

Maps are only as valuable as the data used to create them.

- Data can be incorrect, excluded, or unrepresented

Geospatial Technologies

TYPE	DESCRIPTION	USES
Global Positioning System (GPS)	*GPS receivers on Earth's surface use the location of multiple satellites to determine a receiver's exact location*	- Locating borders precisely - Navigating ships, aircraft, and cars - Mapping lines (ex. trails) and points (ex. fire hydrants)
Remote Sensing	*Cameras and sensors mounted on aircraft or satellites collect digital images or video of Earth's surface*	- Determining land cover and use - Monitoring environmental changes - Assessing spread of spatial

TYPE	DESCRIPTION	USES
		phenomena - Monitoring the weather
Geographic Information Systems (GIS)	*Computer systems that can store, analyze, and display information from multiple digital maps or geospatial data sets*	- Analysis of crime data - Monitoring the effects of pollution - Analyzing transportation / travel time - Planning urban areas
Smartphone and Computer Applications	*Location-aware apps that gather, store, and use locational data from computers and personal devices*	- Suggesting restaurants, stores, and best routes - Contact tracing related to tracking diseases or exposure to chemicals - Mapping of photos from geotags

Topography

- The shape and features of land surfaces
- Displays demographic information about the people who live in a certain place

Geographic information systems display information about topography.

Solutions in Action

Geographers can use geospatial technologies to identify problems in the real world.

- Helps to observe humanitarian concerns (ex. water shortages, famine, rising conflicts)

Community-based solutions increase the likelihood of success because they use local residents, who will be more accepted.

- Work with governmental and non-government organizations (NGOs)

Human-Environment Interaction

- People always depend upon, adapt, and modify their environment

Environmental Determinism: theory that argues that human behavior is largely controlled by the physical environment

- A region's climate and soil fertility dictate how a society develops as it adapts to the environment
- Favored during the 19th and 20th centuries
- Unfavored since it mentions that western Europe and North America are most suited for human development

Possibilism: theory that argues that humans have more agency (ability to produce a result) than environmental determinism would suggest

- Humans are active, not passive, agents
- Society responds to environmental challenges in different ways

Possibilism → "whatever environment humans find themselves in provides different *possibilities* for the formation of cultures"

Time-Space Compression: relative distance between spaces shrinks

- Due to faster transportation and worldwide networks (ex. Internet)

Sustainability

- The use of Earth's land and natural resources in ways that ensure they will continue to be available in the future

Sustainable land use requires consideration of whether a natural resource is renewable (nature produces it faster than humans use it) or non-renewable (humans use it faster than nature produces it)

1.4 — Spatial Concepts

Spatial Approach → considers the arrangement of phenomena being studied across the Earth's surface

- Ex. Location, distance, direction, orientation, flow, pattern, interconnection, etc.

Spatial Concepts: the ways in which different phenomena are organized in space

Major Spatial Concepts

Location

- Where specific phenomena is on a grid / relative to another location

Locations can be described using *toponyms*.

- Provides insight into physical geography, history, and culture
- Can be misguiding (ex. Iceland & Greenland)

Place

- Human and physical characteristics of a location

Region: group of places in the same area that share a characteristic

Distance & Time

Time-Space Compression: reduction in relative distance over time

- Improved methods of transportation and communication
- Culture is influenced everywhere
- Local diversity is reducing

Spatial Interaction → the contact, movement, and flow of things between locations

- Physical or through information

Friction of Distance → when things are farther apart, they are less connected

- Shown in *time-distance decay*

Patterns & Distribution

Spatial Association: matching patterns of distribution

- Multiple phenomena may be related or associated with one another

1.5 — Human-Environmental Interaction

Human Environmental Interaction: the connection and exchange between humans and the natural world

Human-Environmental Interaction Concepts

Natural Resources

- Items that occur in the natural environment that people can use (ex. air, water, fish, oil)

Renewable Natural Resources → will not be depleted by their use

Non-Renewable Natural Resources → exhausted by human use

RENEWABLE NATURAL RESOURCES	NON-RENEWABLE NATURAL RESOURCES
Air (wind power	Fossil fuels (petroleum, natural gas, coal)
Water (surface water & hydroelectric power)	Minerals (natural inorganic substances)
Solar (sun’s energy)	Underground fresh water (aquifers)
Biomass (organic material)	Soil

Sustainability

- Trying to use resources to allow their use in the future
    - Minimize negative impacts on the environment

Land Use: how land is utilized, modified, and organized by people

- Environment → nature and things

Built Environment: artifacts that humans have created (ex. fences, roads)

- **Cultural Landscape:** unique built environments coming from different places

Theories of Human-Environmental Interaction

Cultural Ecology: study of how humans adapt to the environment

- **Environmental Determinism:** belief that landforms and climate are the most powerful forces shaping human behavior and societal development (ignores cultural influence)
- **Possibilism:** view that acknowledges limits of the effects of the natural environment
    - Focuses more on the role of human culture

1.6 — Scales of Analysis

- Also called *levels of generalization*
- Allow geographers to look at local, regional, national, or global scales

Geographic Scale → the area of the world being studied

- Also called *relative scale*

SCALE	AREA SHOWN
Global	The entire world

SCALE	AREA SHOWN
World Regional	Multiple countries
National	One country
National-Regional	A portion of a country / region(s) in a country
Local	Province, state, city, county, or neighborhood

Data Aggregation

Aggregation: organization of data into different scales

- Allows for easier mapping and organization in charts and graphs

Patterns differ based on the scale of analysis.

- Make sure to apply scale of analysis information when viewing graphs.
    - Don’t make **false conclusions** or inaccurate generalizations

1.7 — Regional Analysis

Regions have boundaries, characteristics, cover space, and are created by people.

Formal Regions

- Also called *uniform regions* or *homogeneous regions*

Formal regions are united by political, physical, cultural, or economic traits.

Functional Regions

- Also called *nodal regions*

Functional regions are united by networks of communication, transportation, and interaction.

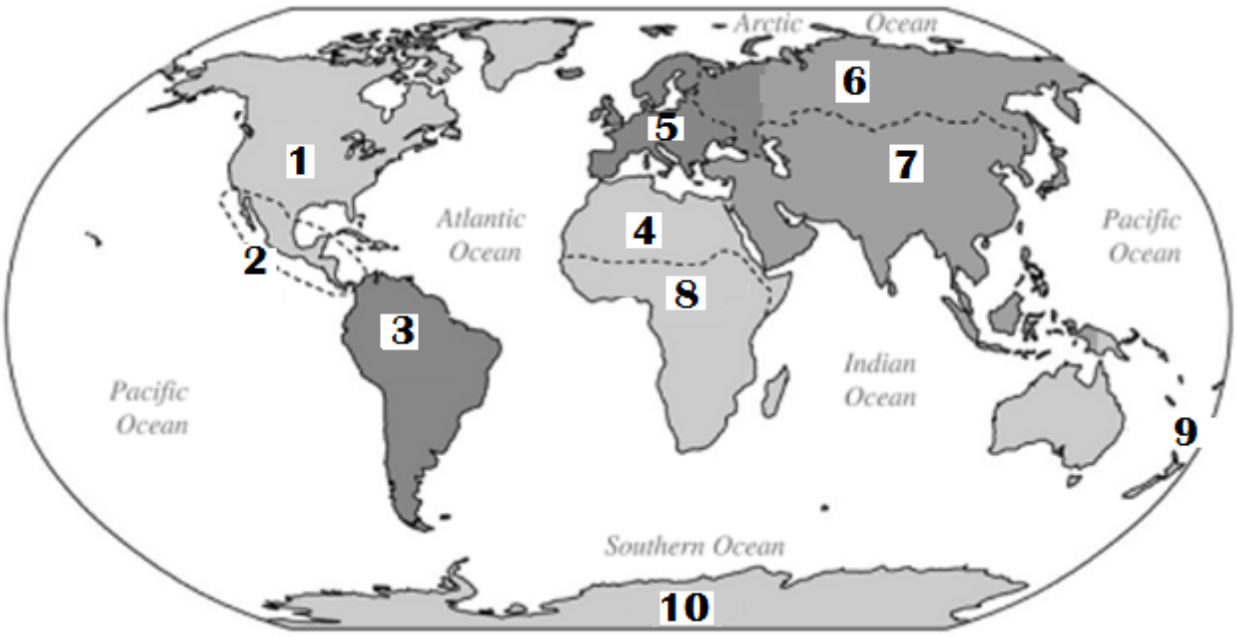
- Centered around a focal point

Perceptual Regions

- Also called *vernacular regions*

Perceptual regions are defined by people's emotional connection to a place.

> The world is divided into regions.



1. North America
2. Central America
3. South America
4. Africa
5. Europe
6. Russian Federation
7. Asia
8. Sub-Saharan Africa
9. Oceania
10. Antarctica

Regions are divided into **subregions**.

Subregions can be further divided into *national*, *subnational*, and *local* regions.

Regions can bring problems.

- They are generalized
- They can bring territorial conflict

Contested Boundaries: boundaries between regions that are under *dispute*