World Geography

Unit 1
Physical Geography
The Geographer's Craft

Branches of Geography

Physical Geography
The study of the earth's physical features. It looks at climate, and water, plants, and animal life.

Human Geography
The study of human activity and their relationship to the cultural and physical environments. Includes political, economic, and cultural factors like population density, urban development, economic production, and ethnicity.

Meteorology
They study of weather and weather forecasting.

Historical Geography
Study of places and human activities over time and how Geography shaped them.
Physical Systems
How physical features interact with plant and animal life to create, support, or change ecosystems.
Ecosystem: a community of plants and animals that depend upon one another, and their surroundings, for survival.

Human Systems
How people shape the world

Environment and Society
The interrelationship between people and their physical environment.

The Uses of Geography
Many uses
Government, business, environmental groups
Planning
Geography and Other Disciplines

History and Government
Geographers use history to help understand what places were like in the past.

Culture
Sociology and anthropology help geographers understand the culture of societies throughout the world.

Economics
Helps Geographers understand how nations use their resources

Geography as a Career
There are various careers related to Geography such as: meteorology, government, education, etc...
Geographers at Work

Direct observation
Going out and looking at what you’re studying

Mapping: Cartography
Map making

Interviewing (primary sources)
Find out how people think or feel about certain places.

Statistics
Collecting Numerical Information on climate, census, population characteristics, etc

Technology
GIS: Geographic Information Systems
Computer tools that organize data and satellite images with other pieces of information gathered by scientists.
Information can come from a variety of Geographic Sources

GIS
Geographic Information Systems
This system collects information from a variety of sources and compiles it by computer into useful forms.

Field Work
Going out and gathering information. Taking rock samples, performing interviews, taking photos, etc... 

Satellite Images
Images taken from space have a variety of different uses

Weather
Cartography
Defense
Photographs
Images of Geographic features, monuments, architecture, and cultural characteristics from around the world

Maps and Globes
Maps and Globes are visual representations of the earth's surface

Data Base
A Data Base collects and stores statistical information on population, precipitation, etc.

Primary Source
A first hand, or eyewitness account of an event.

Secondary Source
A second hand account of an event
## Places and Regions

### Place
A particular space with physical and human meaning.

### Regions
Areas that share a unifying factor. It could be physical features, language, culture, or other things.

### Formal Region
An area united by a specific factor.

### Functional Regions
A central place and the surrounding are linked to it like a highway system.

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Spatial Divisions

Examples of spatial divisions
• Neighborhoods
• Election districts
• School districts
• Regional districts (bus lines, waste disposal, conservation districts, planning districts, area code zones)
• Cities
• Counties
• States

Reasons for spatial divisions
• Desire for government closer to home
• Need to solve local problems
• Need to administer resources more efficiently

Reasons for conflict
• Boundary disputes
• Cultural differences
• Economic differences
• Competition for scarce resources
• Political advantages (e.g., gerrymandering)

Reasons for cooperation
• Natural disasters
• Economic advantages (attract new businesses)
• Cultural similarities, ethnic neighborhoods
• Addressing regional issues (e.g., waste management, magnet schools, transportation)
The World in Spatial Terms
Latitude and Longitude
Hemispheres

A Hemisphere is half of the Earth
There are four hemispheres
Northern, Southern, Eastern, and Western.

The Northern and Southern Hemispheres are divided by the Equator.
The Eastern and Western Hemispheres are divided by the Prime Meridian

Absolute Location
An exact location on the earth’s surface, usually found using latitude and longitude.

Relative Location
A location given in relation to another place.
Location

Location: Where something is

Absolute Location
• Describes the exact location of a place. Often described using Latitude and Longitude

Relative Location
• Describes where a place is in relation to something else.
• Ex: Europe is north of Africa
Lines of latitude are measured north and south of the equator.

The Equator is zero (0) degrees of latitude.

Other lines of latitude are called parallels because they are parallel to the equator.

Lines of latitude are measured from zero to 90 degrees north latitude . . .

and from zero to 90 degrees south latitude
Longitude

Lines of Longitude are called Meridians

The Prime Meridian, or Greenwich Meridian is zero (0) degrees Longitude.

All other lines of longitude are measured east or west of the Prime Meridian.

Longitude is measured from 0-180° east and west from the Prime Meridian

These lines meet at 180°, this is called the International Date Line.

This line is both east and west.
The Global Grid: Using Latitude and Longitude

**Coordinates**

Every measurement using latitude and longitude has a set of coordinates.

One coordinate will be for degrees latitude north or south of the equator.

Ex: 30º North lat. is this line

30º South lat. is this line

The other coordinate will be degrees east or west of the Prime (Greenwich) Meridian.

Ex 30 º East Longitude is this line

30 º West Longitude is this line

Put the two together and you have a location Ex: 30 ºN, 30 ºE

Latitude should always be listed first. Your north/south will be before your east/west coordinate.
Find the Latitude and Longitude of the following cities:

Alice Springs 22ºS, 133ºE  
Sydney 34ºS, 150ºE  
Darwin 14ºS, 131ºE

Which city is closest to 20ºS Latitude? La Grange
Whenever we attempt to take a round globe and make it flat, we run into a problem.

It is impossible to take a round Earth and make it look flat without stretching or “messing up” part of the earth.

This part that gets messed up is called

**Distortion**

There are several ways that a map can be distorted:

- **Area:** The size of the landmasses change
- **Shape:** The shape of the landmasses change
- **Distance:** The distances between the landmasses change
- **Direction:** The directions between the landmasses change
The Mercator Projection is a cylindrical projection. It is distorted greatly at the poles and is least distorted near the equator. This navigation is useful for naval (ship) navigation because the directions are accurate.
The Polar map projection is a planar projection. The major problem with this projection is that it does not show all of the earth at one time. It is useful for airplane navigation because distance is shown correctly.
The Robinson Projection is a compromise projection.

It minimizes distortion.

It is used most often for Data Representation because it has minimal distortion.
Which way is up?↑

Actually, which way is north?

Maps will usually give you a way to determine orientation.

This may be a single direction arrow or a compass rose.

A Compass rose tells you two things

Cardinal Directions

Intermediate Directions
The map scale tells you the relationship between the distance on the map and the true distance on the surface of the Earth.

To calculate distance measure the distance on the map and then place on the scale to measure the true difference.

Be careful to make sure you have the correct unit.

Many maps have both miles and kilometers.
Comparing maps of different scale

Different maps need to show different levels of detail. Sometimes you need to show a lot detail for a small area, and sometimes you need to show little detail of a larger area.

A **Small-Scale Map** shows a large area with small details. It is good for relative locations.

A **Large-Scale Map** shows a small area with large details. It is good for detailed looks at small areas.
Different Types of Maps

There are many different types of maps to show different types of information.

**Physical maps**

Physical maps show physical features using shading, relief, or different colors.
Political Maps show political features such as national boundaries and borders.

The maps may be black and white, or they may use color to show different countries.

These maps may also change over time as political borders change.

Europe Before WWII

Europe After WWII

Europe After the break up of the Soviet Union
Population Maps

Population Distribution

Population distribution shows how the population of areas is spread out.

Population Density

Population Density tells how many people are concentrated in one square mile or square kilometer of an area.
Climate Maps
A climate map shows the climactic characteristics of a region.
Remember weather is different from climate. Weather is daily, climate is over the long term.

Vegetation Maps
A Natural Vegetation maps show what plants grow in areas that have not been altered significantly by human activity. Vegetation is closely tied to climate.
Special Purpose Maps are designed to show a specific type of information.

**World Religions**

This map shows how the various religions of the world are distributed.

**World Languages**

This map shows how the various official languages of the world are distributed.
An Economic Activity Map shows how countries use their resources to produce goods and services.

Where is most of the manufacturing take place in China?

In the East

What is the main economic activity in Western China?

Nomadic Herding
Contour maps, or topographic maps use isolines to connect areas of equal elevation.

Isolines can also be used on weather maps to show areas of the same temperature or air pressure.
Mental Maps

Mental maps are our mind’s representation of how something looks.

It may be the earth, it may be our house, the mall, the school, or most any place we go.

Some uses for Mental Maps
- Carry out daily activities (e.g., route to school, shopping)
- Give directions to others
- Understand world events
- Ways mental maps can be developed and refined
- Comparing sketch maps to maps in atlases or other resources
- Describing the location of places in terms of reference points (the equator, prime meridian)
- Describing the location of places in terms of geographic features and land forms (e.g., west of the Mississippi River, north of the Gulf of Mexico)
- Describing the location of places in terms of the human characteristics of a place (e.g., languages, types of housing, dress, recreation, customs and traditions)

How a child may see the world in their mind.

How an adult may see the world in their mind.

Much more complex
Getting to Know the Earth

The Solar System

The Earth is the third planet in our solar system

Water, Land, and Air

Water: Hydrosphere
Land: Lithosphere
Air: Atmosphere

Landforms

Continents

There are 7 Continents

North America
South America
Africa
Antarctica
Europe
Asia
Australia
The Earth's Heights and Depths

The highest point on earth is Mt. Everest in Nepal.

Part of the Himalaya Range the peak is 29,035 feet above sea level.
The lowest point on dry land on earth is the shore of the **Dead Sea** in Israel at 1,349 feet below sea level.

This sea is so salty that you actually float on the water.

The minerals in the Dead Sea make rich mud that people believe has healing properties.

The lowest point on the planet is the **Mariana Trench** under the Pacific Ocean at 35,827 feet below sea level.
Weather: the condition of the air at any given time.

Climate: the average conditions over an extended period of time.

Earth’s Tilt and Rotation
The earth is tilted 23.5° on its axis.
This tilt causes the seasons because part of the earth it tilted toward, or away from the Sun.

Areas near the equator are called the tropics.

The Tropics are between the equator and 23.5°N latitude (Tropic of Cancer) and 23.5°S Latitude (Tropic of Capricorn).

These are also called the Low latitudes because the numbers are low.
**Middle Latitudes** are the **Temperate** areas between the Tropics and the Arctic Circle in the north and the Antarctic Circle in the South.

They are between 23.5-66.5°N and S of the Equator.

**High Latitudes** are the **Polar/Arctic** (Antarctic) areas north of the Arctic Circle and South of the Antarctic Circle.

They are between 66.5-90°N and S of the Equator.
Low Latitudes
Tropics

Middle Latitudes
Temperate

High Latitudes
Arctic (North)

Arctic Circle
66.5°N

Tropic of Cancer
23.5°N

Equator
0°

Tropic of Capricorn
23.5°S

Antarctic Circle
66.5°S

High Latitudes
Antarctic (South)
The Sun and Latitude

1. The Sun’s energy reaches Earth.
2. Half of the energy is reflected back into space or absorbed by the atmosphere.
3. The other half is absorbed by Earth’s surface and converted into heat energy (Temperature).
4. The atmosphere traps this heat in a process called the Greenhouse Effect.
5. The Greenhouse Effect helps keep Earth warm.
The Greenhouse Effect

The Greenhouse effect is caused by excess $CO_2$ in the atmosphere.

These gases are released from industry, automobiles, and homes.

Too much Carbon Dioxide traps radiation from the sun inside the earth’s atmosphere causing the earth to become warmer.
Atmospheric Pressure

Low = Air is heated, expands, becomes less dense, and rises. Rising air cools and condenses, creating unstable weather conditions.

High = Air is cooled, becomes more dense, and sinks towards Earth’s surface. Sinking air heats and dries, bringing stable, clear, and dry weather.
Atmospheric Pressure

Polar Highs (90° N/S)

Sub-Polar Lows (60° N/S)

Sub-Tropical Highs (30° N/S)

Equatorial Lows (0° N/S)
Global Wind Belts

• Wind generally moves across the Earth from High pressure areas to Low pressure areas.

• Winds that blow in the same direction most of the time in an area are called prevailing winds.
Prevailing Winds

Polar Winds (60° + N/S)

Westerlies (60° - 30° N/S)

Trade Winds
  * Northeast (30° - 0° N)
  * Southeast (30° - 0° S)

Doldrums (Equator)

Jetstream (High Altitude)
Wind and Ocean Currents

Wind Patterns

Monsoons
Monsoons are seasonal shifts in the wind in South and SE Asia.

Affect on Climate
These seasonal winds bring rain in the summer and dry weather in the Winter.

Ocean Currents

Gulf Stream
The Gulf Stream is a warm ocean current flowing from the Caribbean Sea toward Western Europe.

Proximity to Water
Because Western Europe is close to the water and this warm current its climate is warmer than it would be based on latitude alone.
Oceans and Currents

• Water heats and cools more slowly than land. Thus, land areas near oceans do not have such great temperature ranges as areas in the interior of continents.

• Ocean currents generally flow in circular paths. They move clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere.
Oceans and Currents

• Warm currents carry heated water from the tropics toward the cooler middle latitudes. The north-ward flowing Gulf Stream, along the U.S. East Coast, is a good example of a warm current.

• Cool currents return cooled water from the middle and high latitudes towards the equator. The south-ward flowing California Current, along the U.S. West Coast, is an example of a cool current.
Weather Factors

- The process by which water changes from liquid to gas is called **evaporation**.
- The amount of water vapor in the air is called **humidity**. The higher the temperature, the more water vapor the air can hold.
- **Condensation** occurs when the air cools and cannot hold any more water vapor. (clouds, dew, fog, or frost)
- If condensed water droplets become large enough, they will fall as **precipitation**. (rain, snow, sleet, or hail)
Highland Climates
As elevation increases the temperature decreases. It drops about 3.5°F for every 1,000ft of elevation. Areas at these high elevations have cooler climates.

The Orographic Effect
Prevailing winds blow over water and are forced up a mountains. The higher elevations cool the air causing condensation and precipitation. The air is then dry when reaching the other side and causes a rain shadow desert.
Storms

• A front occurs when two air masses of widely different temperatures or moisture levels meet.
• All centers of low pressure are called cyclones.
• Some very low-pressure cyclones that have rising unstable air become very large storms:
  o Usually move from west to east in middle Latitudes pushed by jet stream.
  o Extratropical cyclones
  o Can reach up to 1,000 miles in diameter
  o Forms when cold dry polar air mixes with moist warm air from the tropics.
  o May produce thunderstorms and twisting spirals of air called tornadoes.
Storms

• Tropical Cyclones
  • Much smaller than middle latitude storms
  • Begin over warm waters of the tropics
  • No cold air present; no front
  • Mainly travel westward, pushed by trade winds
  • Hurricanes can bring heavy rains and strong winds (155 + mph)
  • Hurricanes in the western Pacific (Typhoons) can create dangerously high waves.
Desert
A region that receives less than 10 inches of precipitation per year.
They can be caused by climate, or be rain-shadow because of mountains.

Steppe
A flat plain with no trees. Short grasses are said to be the norm in the steppe. It may be semi-desert, or covered with grass or shrubs or both. Regions too dry to support a forest, but not dry enough to be a desert.
Mid Latitude Forest
Temperate forests made up of both Deciduous and Non-Deciduous Trees

Grasslands/Prairie
Large areas of flat grasslands. Temperate
Taiga
Large Coniferous Forest Biome found south of the Tundra
Found in Russia and Canada.
The largest forest in the world.

Tundra
Cold treeless plain north of the Taiga. The soil is frozen most, or all, of the year. This soil is called permafrost.
Continental Drift (Plate Tectonics)

According to fossil evidence, scientists believe that the continents of the earth drift and move from place to place over long periods of time.

Tectonic Activity

These moving plates hit each other along tectonic boundaries causing tectonic activity including earthquakes and volcanoes.

There are three types of tectonic boundaries:

- **Convergent**, where two plates collide together, usually forming mountains.
- **Divergent**, where two plates pull apart.
- **Transverse**, where two plates slide by each other.
**Weathering**

is the process of breaking down of rocks, soils and their minerals through direct, or indirect contact with the atmosphere.

**Erosion**

The movement of material that has been weathered.

Can include: Wind, Water, and Glacial Erosion

Wind erosion can lead to loss of valuable top soil.

Wave erosion can destroy coastal homes.

Glaciers carve out large areas a rock that can form lakes and rivers.
70% of the Earth is covered with water.

97% of that water is found in the oceans, gulfs, seas, and bays and is salt water.

3% of the water on earth is fresh water.

This water is found in lakes, streams, rivers, and there are also large sources of water underground.
People both affect and are effected by their environment

**Human impact on environment.**

**Water diversion/management**
- Aral Sea
- Colorado River
- Aswan High Dam
- Canals
- Reservoirs
- Irrigation

**Changing landscapes**
- Agricultural terracing (e.g., China, Southeast Asia)
- Polders (e.g., Netherlands)
- Deforestation (e.g., Nepal, Brazil, Malaysia)
- Desertification (e.g., Africa, Asia)

**Environmental changes**
- Acid rain (e.g., forests in Germany, Scandinavia, China and Eastern North America)
- Pollution (e.g., Mexico City, Chernobyl, oil spills)

**Pollution (Environmental Degradation)**

**Water and Land Pollution: From people and Industry**

**Air Pollution: Carbon Monoxide, Global Warming, Acid Rain**

**Fragile Ecosystem: Needs to be card for or will cease to be.**