Chapter 2 - Studying the Earth's Surface

Section 1 - Introduction to Earth's Surface
What shape is Earth?

*Oblate Spheroid!*

40,007 km at poles
40,074 km at equator

**Why?**

**Rotation**
Motions in Space

106,000 km/hr
66,000 mph!

One trip around sun
365.25 days

Revolution
Earth's Surface

71% water

97% salt water 3% fresh

Hydrosphere
Gases surround Earth

78% N  21% O  1% CO₂
Ar
He

Atmosphere
Zones of Earth

- **Crust**: 32-70 km thick
- **Mantle**: 2,870 km thick
  - Lithosphere: Solid
  - Asthenosphere: Heat + Pressure = Plasticity
Zones of Earth

Core
Primarily Fe

Outer - Liquid

Inner - Solid
Due to moving iron core, magnetism is generated

Magnetosphere
We use maps to model Earth!

Gridlines are used like an "address"

Latitude

Longitude
Maps

Prime Meridian

Greenwich, England

Time zones based on lines of longitude
Maps

Geographic North

vs

Magnetic North
Maps

Double compass rose
Topography

Shows elevation!
Continents and Landforms

Ocean Basins
- Between continents

Continents
- Large land areas
Landforms

Earth has many different landforms

Constructive Forces
landforms grow
Landforms

Destructive Forces
    tear down/ blow apart landforms
Ocean Basins

**Continental Shelf**
100-200 meters deep
100-200 km from shore
Ocean Basins

Ocean floor is not flat!
Ocean Basins

Mid-ocean ridges

Underwater mountains!
Ocean Basins

Trenches

Mariana Trench
11 km deep

Mount Everest is 9 km tall
Section 2 - Modeling Earth's Surface
Maps have many purposes

**Geographic Maps**

**Political Maps**

**Topographic Maps**

**Climate Maps**

**Radar Maps**

**Geologic Maps**
Are Paper Maps any Good?

Yes!

Fit in your pocket

Do not require batteries

Not as fragile as electronic GPS
Map Legend

Shows various symbols used on map
Map Legend

Distance Scale

5 miles
1:100000
Map scales: a bar scale above and a fractional scale below
Map Projections

Because Earth is 3 Dimensional it is hard to put on paper accurately

Imagine laying an orange peel flat...doesn't work without tearing somewhere

Or wrapping a basketball with paper...difficult!
Imagine a light shined from middle of Earth, parts of the Earth would look "stretched out"
Gnomonic Projection

Places a flat piece of paper on a small area

Good for individual countries
Conic Projection

Two standard parallels define the map layout.
( selected by mapmaker )

Areas equal to globe.
Deformation of shapes increases away from those parallels.
Robinson Projection

More accurate

Created by calculating proper sizes
Globe

A globe is the best representation

Everything is to scale!
2.4 - Using Satellites and Computers
What can satellites do?

Map

Collect data (temp, gases, elevation, reflectivity)

Track storms
Types of Orbit

Geostationary Orbit
(Geosynchronous)

Polar Orbit

90 minutes to orbit
Nasa has MANY satellites both around Earth and throughout our solar system

Check them out on the iPad!
Global Positioning System (GPS)

30-35 Satellites, not all working all the time