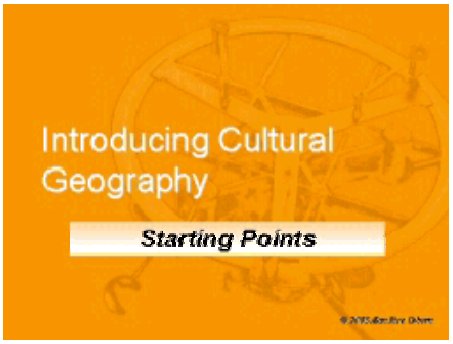
Introducing Cultural Geography
Starting Points



Science, Social Science, Geography

- What do we mean when we say something is a science?
- What do we mean when we say something is a social science?
- Just what is Geography?

Science

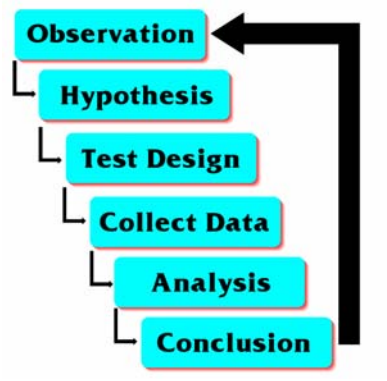
- Sci"ence (?), *n*. [F., fr. L. *scientia*, fr. *sciens*, *p.pr*. of *scire* "to know." *Cf.* Conscience, Conscious.]
- Science means knowledge — but knowledge comes from many valid sources:
  - Experience
  - Experiment
  - Faith
  - Authority

The Scientific Method

- For the past 400 years, the word *science* has meant knowledge acquired using a process we call the scientific method (this is a slightly misleading term – there is no single method of doing science, but all truly scientific analyses have certain basic characteristics).
- Science should be:
  - Rational — based on reasoning, logic.
  - Objective — free from bias, prejudice.
  - Systematic — thorough, methodical, organized.
  - Predictive — testable ("repeatable").

- ❖ But science <u>should not</u> be:
  - Dogmatic — science should be open to new ideas.
  - Ideological — science should not be based on beliefs or opinions.
  - Trivial — science should not be a pointless accumulation of facts.

One Path to Science

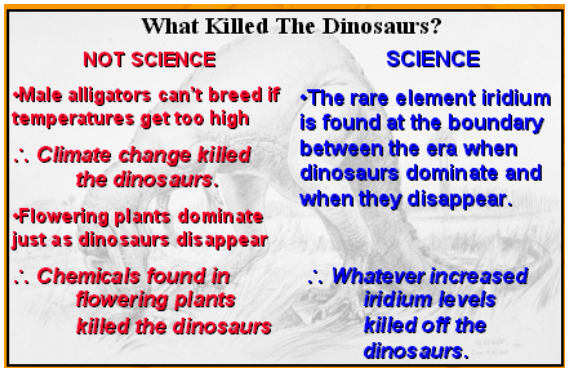


- ❖ Note that this is **not** the only way to do science — it is an effective and efficient way, but **any** process which meets the criteria we just talked about (that's rational, objective, systematic, predictive) can be considered "scientific."

The Crucial Step: *Testing*

- ❖ If you don't make <u>testable predictions</u> it's not science!

An Example: Science & Not-Science



- ❖ NOT SCIENCE
  - Observation: Male alligators can't breed if temperatures get too high.
    - Hypothesis: Climate change killed the dinosaurs.
    - Problem: How do you prove it? How do you test it? What evidence would prove that it was climate, and not something else?
  - Observation: Flowering plants dominate just as dinosaurs disappear from the fossil record.
    - Hypothesis: Chemicals found in flowering plants (psychotropics) killed the dinosaurs
    - Problem: How do you prove it? How can you tell if fossil dinosaurs were intoxicated?
- ❖ SCIENCE
  - Observation: The rare element iridium is found at the boundary

between the era when dinosaurs dominate and when they disappear.
- Hypothesis: Whatever caused the increase in iridium levels killed off the dinosaurs
- This can be tested — look for a source of iridium (meteor); look for meteor crater (Yucatan)
- Today, this is the most commonly accepted theory – but not everyone accepts it, and the search goes on – and that's the way science is supposed to work!

Note: More information on these examples can be found in Gould, S.J. 1985. "Sex, Drugs and the Extinction of Dinosaurs," in The Flamingo's Smile: Reflections in Natural History, pp. 417-426. NY: W.W. Norton.

Is Science Always Right?

- NO!
- Science is done by people — and people are only human!
  - Sometimes people make mistakes!
  - Sometimes people are reluctant to change!
  - Sometimes people lie!
  - Sometimes people don't want a "scientific" answer!

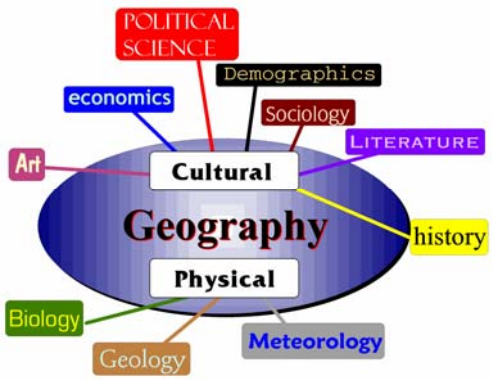
Science & Social Science

- Science is a way of getting knowledge using the scientific method.
- A social science is a field of study that uses the scientific method to look at the social and cultural environment.

Geography

- Is Geography a social science?
- Yes! — and No! (and Sometimes!)
- Geography is a unique discipline
- Geography connects and overlaps other disciplines
- Geography emphasizes space
- BUT — Geography isn't always easy to define!

Realms of Geography



What is Geography?

- "Geography is the study of where things are located on Earth's surface and the reasons for the location." (*Rubenstein 2005, xiii*)
- "…the scientific study of the location of people and activities across Earth, and the reasons for their distribution." (*Rubenstein 2005, 3*)

What do Geographers Think About?

- **Place** – location.
- **Regions** – unique and distinctive areas.
- **Space** – mapping regular patterns.
- **Scale** – similarities at local, regional and global levels.
- **Connections** – relationships among places.

PLACE: Location

- What features make places unique & distinctive? Where are places located?
- Important Concepts:
  - Place Names ("toponyms")
  - Site (physical location)
  - Situation (relative location)
  - Mathematical location (latitude and longitude)

REGIONS: Regional Integration

- Culture: "The body of customary beliefs, material traits, and social forms that together constitute the distinct tradition of a group of people."
- Culture is made up of:
  - What people care about (ideas, beliefs, values)
  - What people take care of (food, clothing, shelter)
- Cultural Ecology: the relationships between culture and the environment.

REGIONS: Cultural Ecology

- Different groups of people modify their environment in different ways, producing unique regions.
- BUT – does the environment make people behave and develop in certain ways?
  - Environmental determinism: culture is largely determined by the physical environment (*this is pretty much discredited today*).
  - Possibilism: the environment imposes limits, but people can adapt and adjust their culture to their environment.

SCALE: Local to Global

- Some things work differently, and have different effects, at different scales:
  - Globalization of Economy:
    - At the global scale, we are increasingly interconnected and interdependent.
    - At the local scale, this has lead to increasing specialization – places try to focus on their unique assets (if they have any!)
  - Globalization of Culture:
    - At the global scale, we are becoming more culturally uniform – fast food, hotels, cars, cell phones, are pretty much the same over much of the world.
    - At the local scale, some groups are fighting to retain their local culture – sometimes violently.

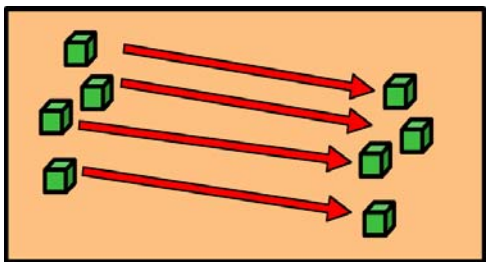
SPACE: Distribution

- How are things arranged? Where are they located?
- Important Concepts:
  - DISTRIBUTION
  - DENSITY
  - CONCENTRATION
  - PATTERN

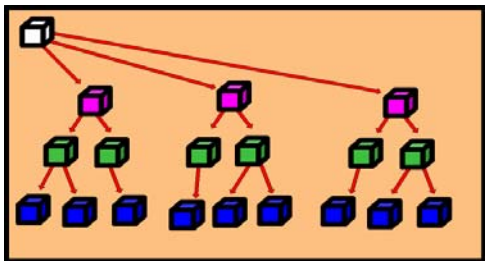
SPACE: Connections

- How are places and regions connected? How do they interact?
- Important Concepts:
  - SPATIAL INTERACTION
    - Networks, transportation systems, distance decay
    - Cultural diversity
  - DIFFUSION
    - Relocation Diffusion (physical relocation)
    - Expansion Diffusion (spreading through a population)
      - Hierarchical (through a social or physical hierarchy)
      - Contagious (from person to person)
      - Stimulus (spread of an underlying idea)

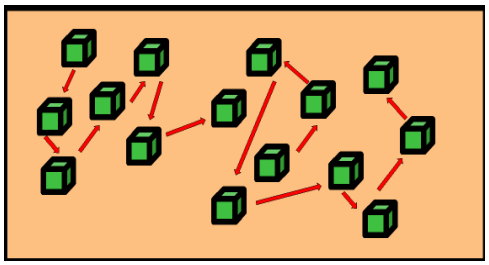
Types of Diffusion



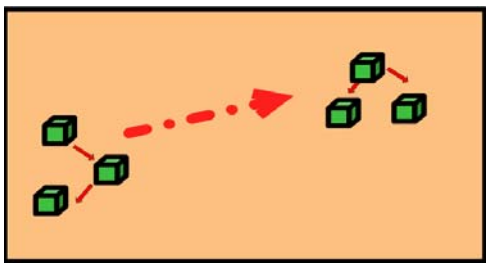
- ❖ Relocation diffusion
  - Physical movement, across space – people migrate, taking their culture with them.



- ❖ Expansion diffusion
  - Ideas spread through a population.
    - o Hierarchical – spreading through a hierarchy of people or places.



    - o Contagious – spreading through contact, like a disease, from person to person.

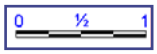


    - o Stimulus – spread of an underlying idea, even when the actual idea doesn't diffuse.

Maps & Mapmaking

- ❖ All maps are made for a specific purpose.
- ❖ Although they're not always labeled, all maps have four characteristics:
  - Scale — the relationship between distance on the map and distance on the ground.
  - Projection — a way of showing the round earth on a flat map.
  - Symbols — arbitrary shapes, colors or patterns that make distributions or arrangements clear.
  - Grid system — a system of coordinates; a way of determining a place's location.

Map Scale

- Scale can be expressed in three ways:
  - Verbal – "One inch equals one mile."
  - Fraction – "1:63,360"
  - Graphic – 
- Each has advantages and disadvantages.

large & SMALL

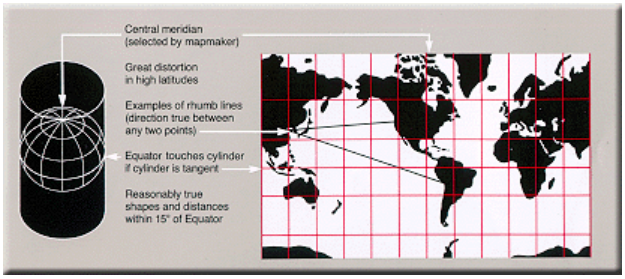
- Scale is expressed as a fraction
- Stupid question & answer session:
  - Question: Which is bigger: $^{1}/_{10}$ or $^{1}/_{100}$? (Answer: $^{1}/_{10}$, of course!)
  - But isn't "100" bigger than "10"?!?
  - Sure — but these are fractions.
- Since scale is expressed as a fraction, 1:25,000 is large scale and 1:250,000 is small scale.
- "Large Scale" means
  - Large fraction
  - Large detail
  - Maps of small areas
- Small Scale
  - Small fraction
  - Less detail
  - Maps of large areas
- Although this sounds weird, there are actually many examples of this in everyday life – camera F-stops (F-2 is much larger than F-11), wire gauges (8 gauge is much larger than 24 gauge wire), etc.

The Problem of Projection

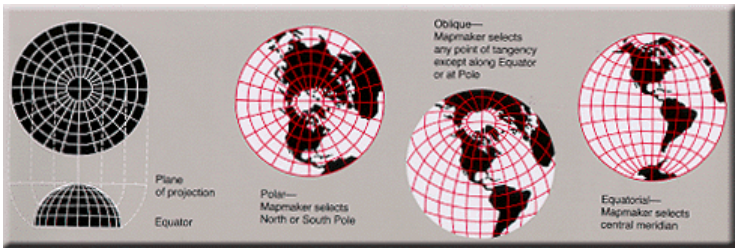
- The Problem: You can't go from round to flat without something being distorted!
- Every flat map is distorted in some way —but we can choose the kind of distortion.
  - Shape
  - Area
  - Distance
  - Direction

Projections: Examples

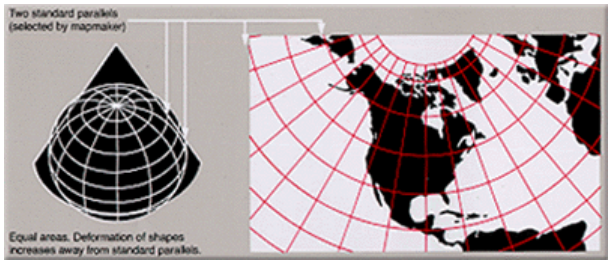
- Cylindrical (Mercator Projection)



- Azimuthal Equidistant



- Conic



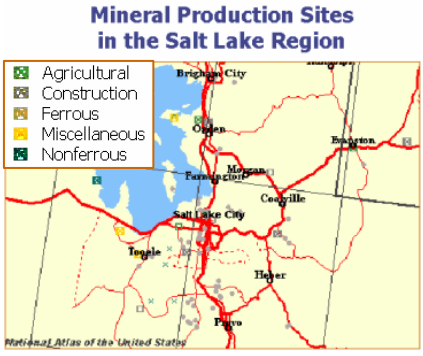
Source: http://erg.usgs.gov/isb/pubs/MapProjections/projections.html

Symbols

- A huge variety of symbols are used in maps.
- There are basically four kinds of symbols:
  - Pictures:
  - Dots:
  - Colors & patterns:
  - Lines ——— --------- ==========

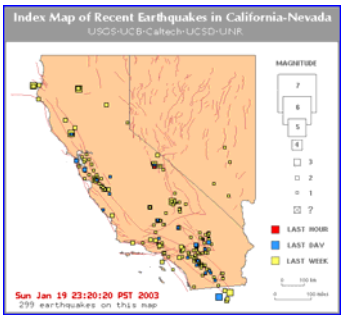
Symbols: Pictures

- Pictures — either representative images or arbitrary shapes — can be an effective way of showing where things are located on a map.
- Note how important the legend is. Without it, the symbols would be meaningless.



Produced online, using the National Atlas of USA: http://nationalatlas.gov/

Symbols: Dots



- Dots — plain, colored, or varying in size — are another effective way of showing distributions.
- Again, note how important the legend is.

Source: http://quake.wr.usgs.gov/recenteqs/latest.htm

Symbols: Color & Shading

- This is a shaded relief map — a map in which elevation is indicated using colors.
- Like all map symbols, color is useful — but if you don't know what the colors actually mean, a map like this can be very misleading!

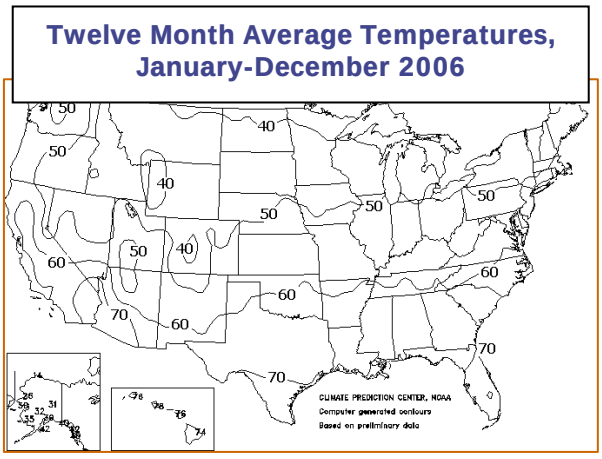
This map was produced using ICEMAPS2 online:
http://icemaps.des.ucdavis.edu/icemaps2/ICEMapInit.html

Symbols: Colors & Lines

- There are many ways to show data on a map.
- Sometimes colors and shading patterns are effective.
- At other times, using various kinds of line symbols may be a better choice.
- Consider this map of San Diego county. Some of the information here (cities, bodies of water) is conveyed using colors, some (highways, areas of congestion) using colored lines.

Source: http://www.dot.ca.gov/dist11/d11tmc/sdmap/showmap.html

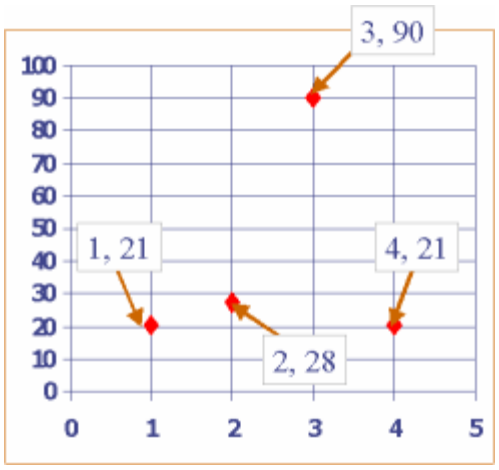
Symbols: Isolines



- Isolines (technically "**isopleths**") are lines that connect points on a map with equal values.
- The name of the isoline varies depending on what you're mapping:
  - TEMPERATURE – **isotherms**
  - AIR PRESSURE – **isobars**
  - ELEVATION – **contour lines**

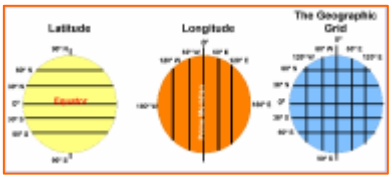
Adapted from:
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/us_12-month_avgt.html

Grid Systems



- Cartesian coordinates (named for French philosopher and mathematician René Descartes (1596-1650)) are an example of a grid or coordinate system.
- Using the horizontal ("x") axis and vertical ("y") axis, we can specify the position of any object.

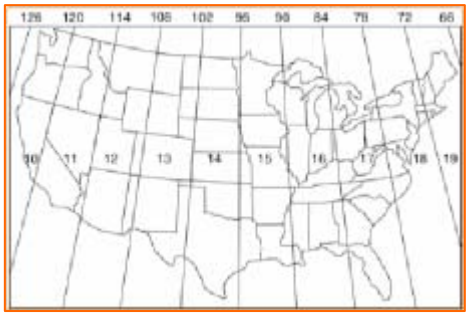
Latitude & Longitude



- Using parallels of latitude we determine the angular distance (in degrees) north or south of the equator, from 0º to 90º North or South
- Using meridians of longitude we determine the angular distance (in degrees) east or west of the prime meridian, from 0º to 180º East or West

Other Grids

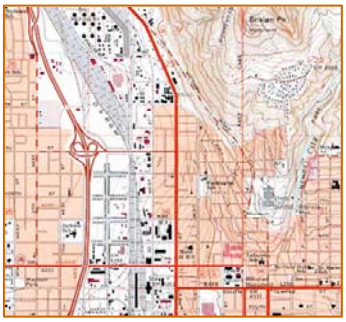
- There are a number of other grid systems in use that you may encounter:
  - UTM
    - Divides the world between 80º North and 80º S into 6º by 8º numbered rectangles



  - Township & Range
    - Used in most of the US for land surveys
    - Divides land into 36 mi^2 "townships"

Source: http://mac.usgs.gov/mac/isb/pubs/factsheets/fs07701.html

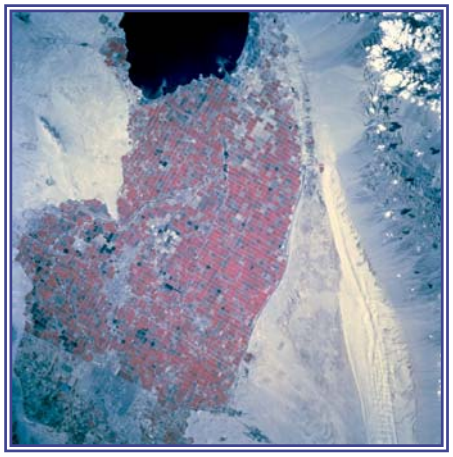
The "All-Purpose" Map



- All maps are made for a specific purpose — to show something the map maker thinks is interesting or worthwhile.
- "All-purpose" or "general use" maps are also made for a specific purpose — to be useful to the widest possible number of users.
- To do this, general purpose maps have to include a lot of information. To do that they use a lot of different symbols — colors, lines, pictures, etc. For more information about the types of symbols used on USGS maps, see http://mac.usgs.gov/isb/pubs/booklets/symbols/index.html

Source: http://interactive2.usgs.gov/learningweb/images/mapsshow4_topo.jpg

But is this a map?



- No — this is false-color infrared photograph taken from the Space Shuttle
- A photograph is not a map (but it can be used to make a map)— the image is not projected, the scale may vary from top to bottom or side to side, there is no legend, etc.

Source: http://earth.jsc.nasa.gov/

Geographic Information Systems

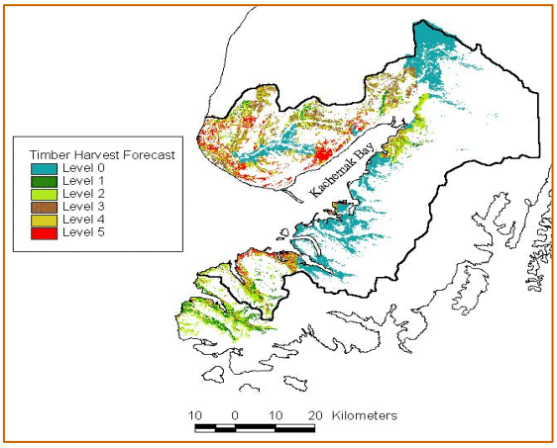
- A Geographic Information System (GIS) is a computer-based system for acquiring, analyzing, processing, and displaying spatial data — that is, information such as location (where a particular point is located) and various characteristics (for example, elevation, vegetation, population, hydrology, slope, etc.).
- Using a GIS, we can analyze and display an enormous amount of information — we can produce new and better maps.

Using a GIS

- A GIS can be used for a wide range of applications — urban planning, emergency response systems, resource management, etc.
- Using a GIS it is possible to
  - Produce maps using whatever scales, projections, symbols or color schemes best display the information.
  - Store, retrieve and analyze the data associated with various locations
  - Model and analyze site characteristics.

GIS Examples:

- Timber Harvest Forecast for Kachemac Bay:
  - The following variables (layers) were used to produce this analysis:
    - land-cover classification
    - site harvest history
    - infestation by spruce bark beetles
    - proximity to existing roads
    - proximity to power lines
    - percent slope
    - slope aspect (orientation)
    - proximity to anadromous (salmon) streams
    - concentration of bear and moose
    - designated wetland areas
    - land use
    - land ownership



Source: http://www.csc.noaa.gov/lcr/kachemak/html/gishtml/forharmo.htm

- The San Diego-Tijuana Interactive Atlas:
  - The San Diego Association of Governments (SANDAG) uses a GIS to produce an interactive online atlas.
  - By specifying what data you want, what scale, what level of analysis, etc., you can produce a huge variety of different maps.
  - Go to SANDAG's interactive atlas: http://cart.sandag.cog.ca.us/sdtij/intro.html
- The National Atlas Map Maker:
  - Using an amazing amount of data from many different sources, you can create maps of the US using a huge number of different variables (everything from population density to distribution of threatened amphibians!): http://nationalatlas.gov/natlas/Natlasstart.asp

Mathematical Models

- A model is a representation of reality.
- Mathematical models try to represent reality using equations and algorithms to simulate and predict what will happen in the real world.
- Models can be combined with GIS to produce maps of what is happening, what may be happening, and what might happen.

Mathematical Models: Example

- Climate model, showing possible future changes.

Source: http://www.nersc.gov/research/annrep00/sh_BER_10.html