



GIS: Data Models, etc



Recall: Essential Elements of GIS

- Location, Location, Location
 - Coordinate Systems
 - Global Absolute vs Other (local, regional, personal, etc.)
 - Models of Earth
 - Geodetic Datums
 - Globes
 - Maps
 - Models of Reality
 - Data Models





Data Models

- Continuous: Raster
- Discrete: Lines, points, polygons



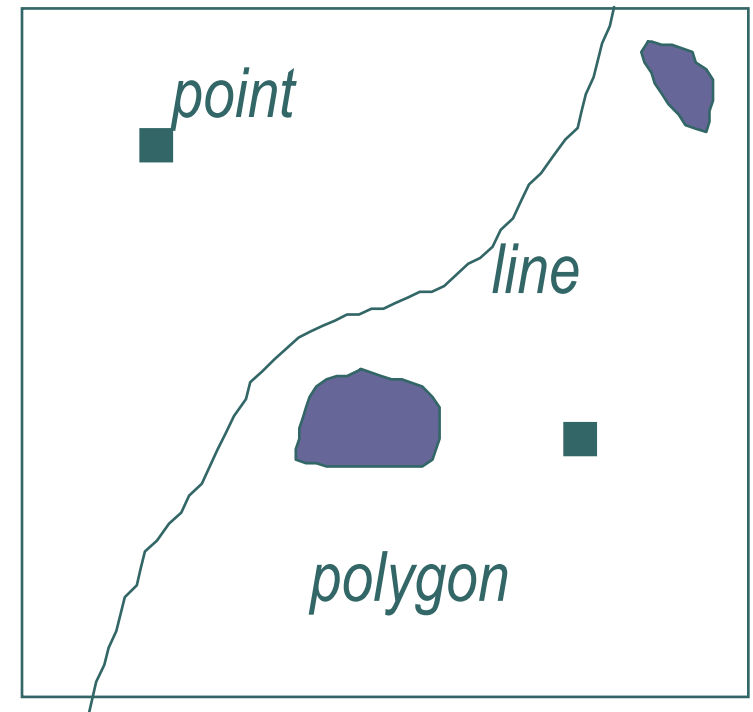
Raster vs. Vector Data



Raster Representation

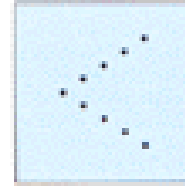
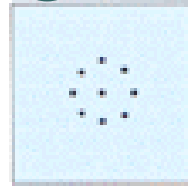
	0	1	2	3	4	5	6	7	8	9
0								R	T	
1							R			T
2		H					R			
3							R			
4					R	R				
5				R						
6			R		T	T		H		
7			R		T	T				
8		R								
9		R								

Vector Representation





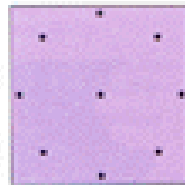
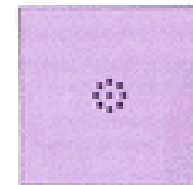
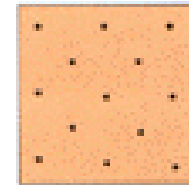
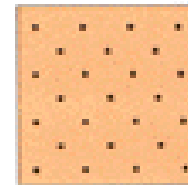
Recall: Geographic Concepts

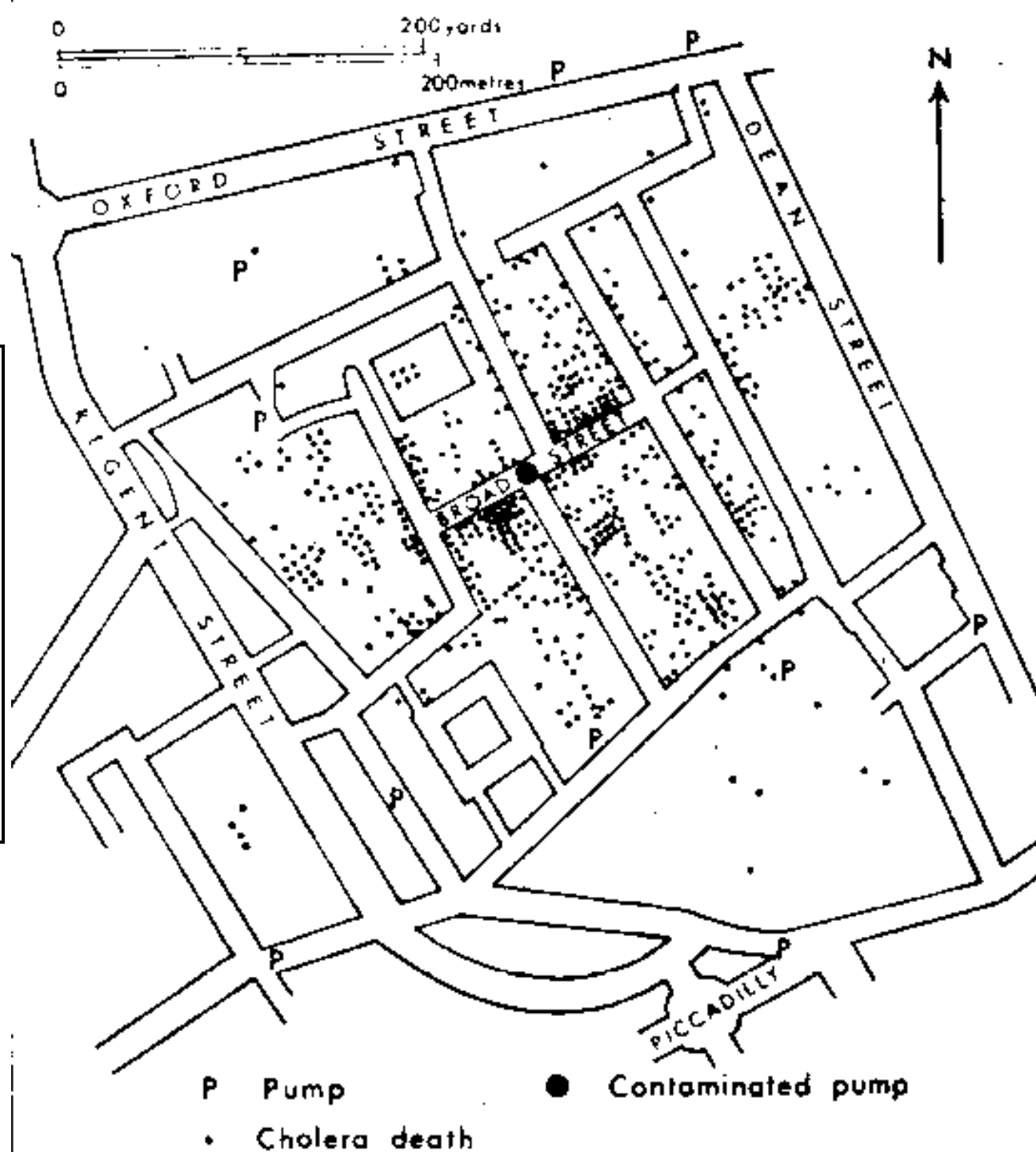
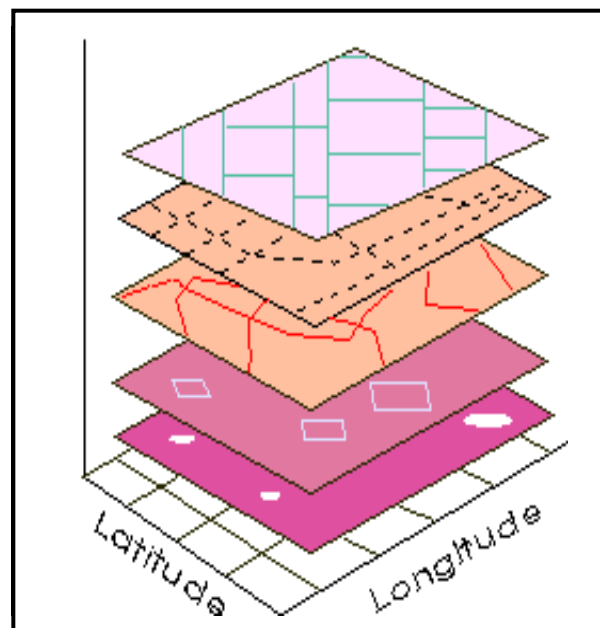


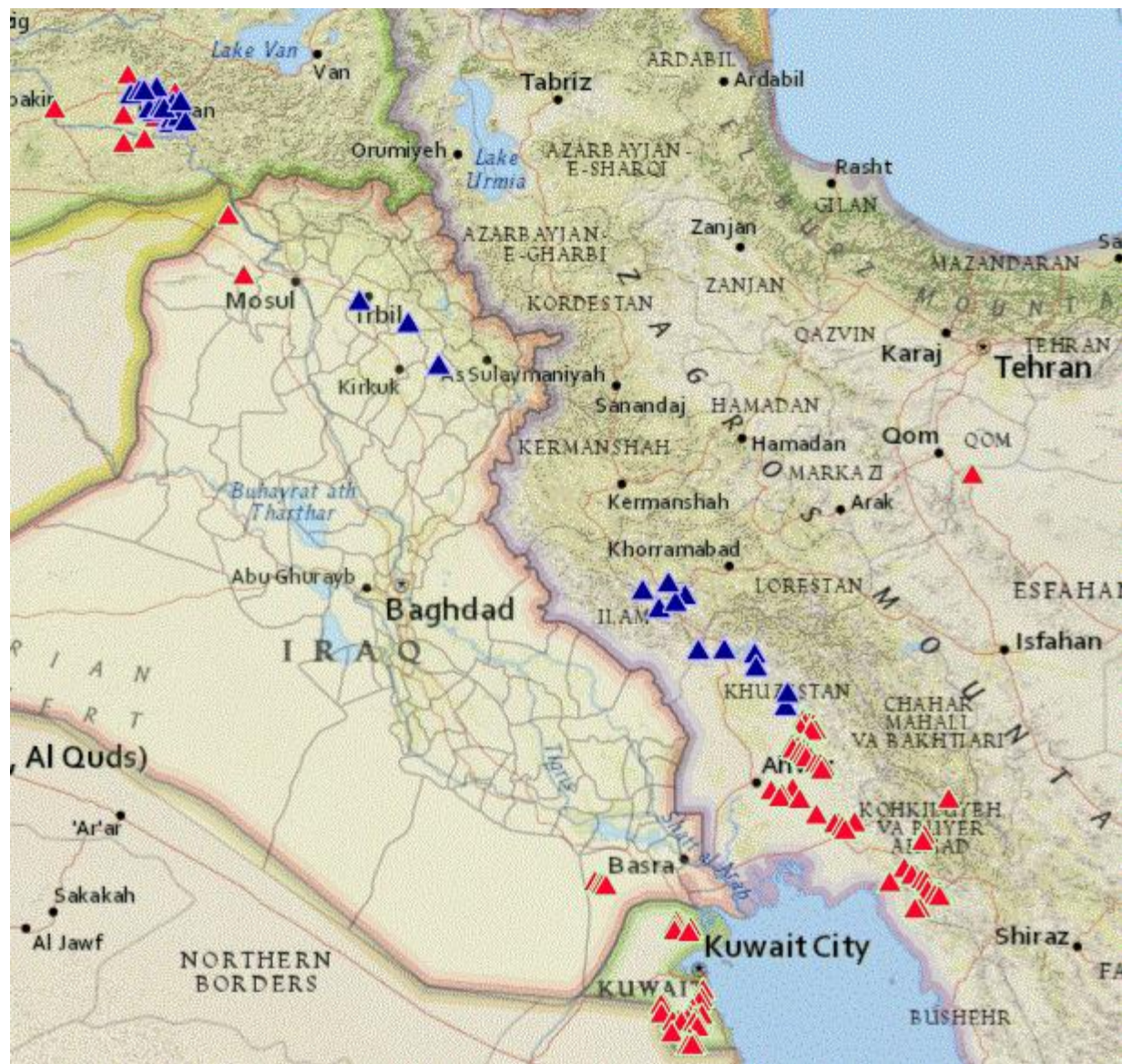
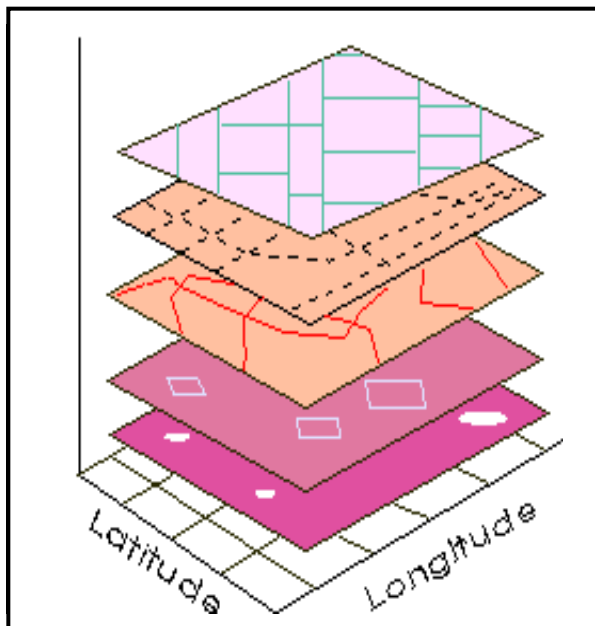
- Spatial arrangements

- Distributions, networks, areas

In GIS defined as layers that are Rasters, line vectors, polygon vectors







<http://worldmap.harvard.edu/maps/iraqwater>



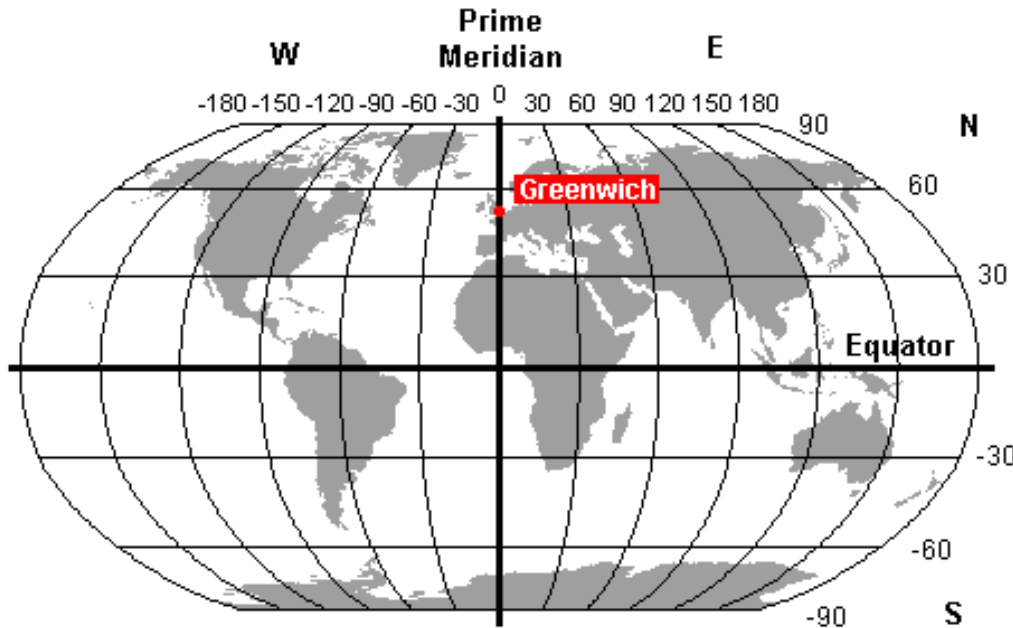
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Geographic Coordinate Systems



A Geographic Coordinate System specifies a XY location for every point on earth

Most commonly use
Latitude Longitude

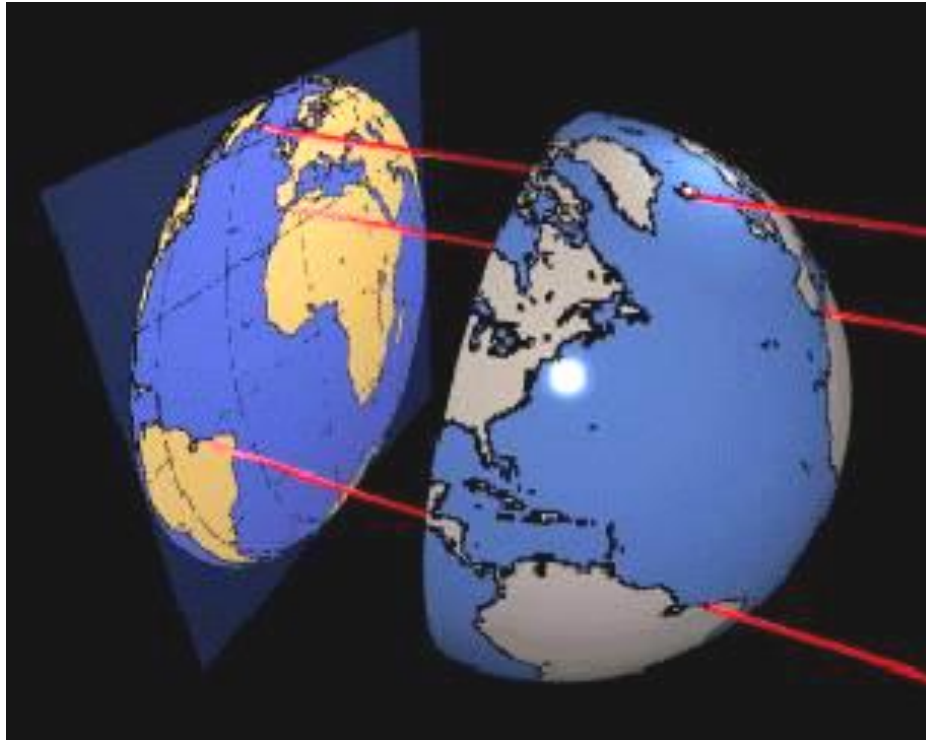


Datum

- The Earth more accurately modeled as an spheroid (ellipsoid) than a sphere
- Geodetic datums are a set of values used to define a specific geodetic system because of this imperfect shape of the earth.
 - The Global Positioning System (GPS) is based on the World Geodetic System 1984 (WGS-84)
 - NAD83, the North American Datum which is very similar to WGS84



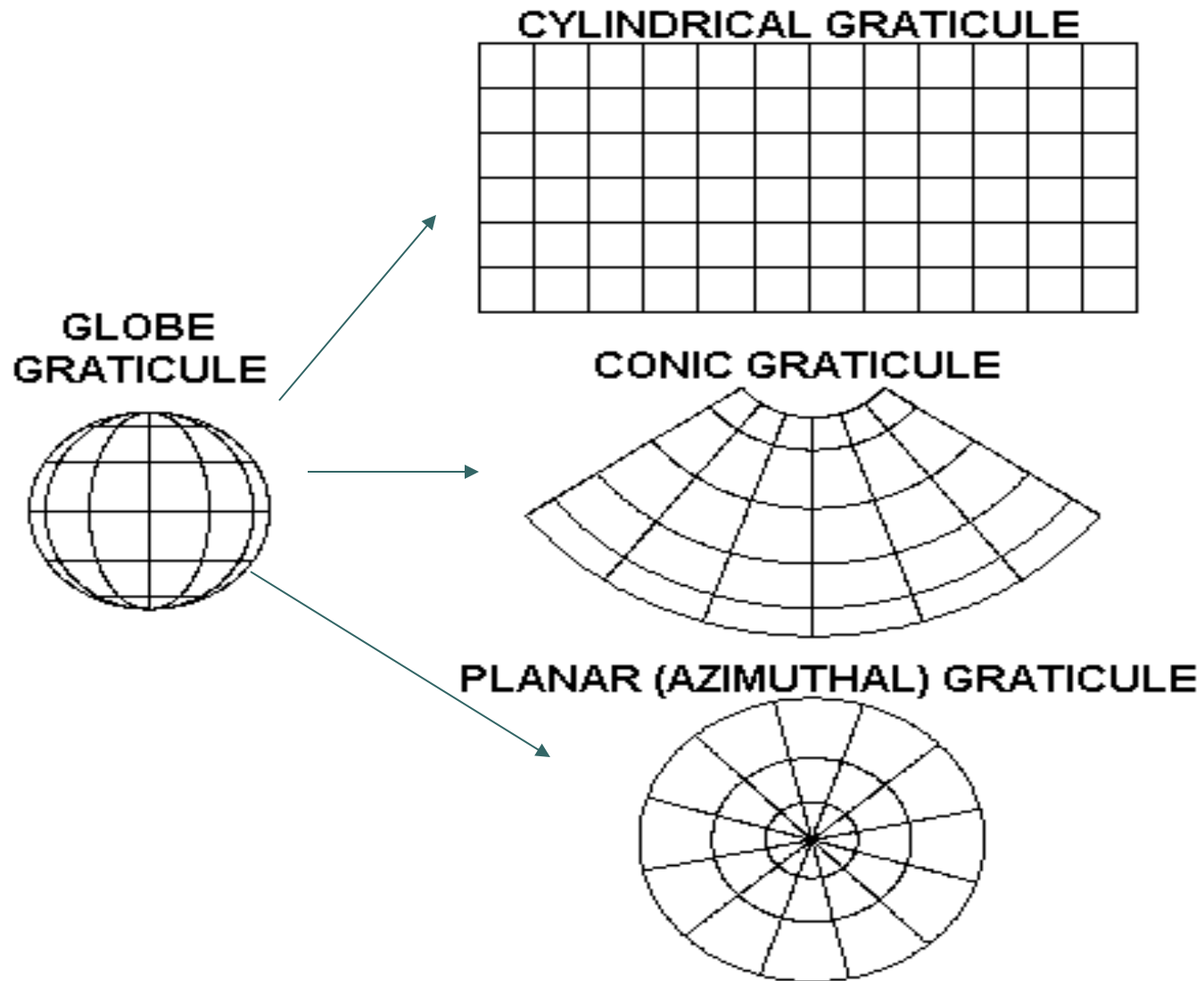
Projections



- The systematic transformation of points on the Earth's surface to corresponding points on a plane surface



Surface Projected





Projected Coordinate Systems

- When the coordinate system is defined for a flat surface (grid)
 - UTM (Transverse Mercator)
 - State Plane for Massachusetts (Lambert Conformal Conic)



At the end of this lab

- Add layers to create a map
- Identify if layer is a vector (point, line or polygon/ area) or a raster
- Know what the coordinate system, datum, etc are for a layer
- Be able to create a legend for a quantitative attribute in a layer
- Add a basemap