Lab 1: The Geographic Grid
- Cartographers have devised a grid system to cover the entire earth
- The earth is spherical, therefore the grid must be able to follow a curved path (not rectilinear)
- Maps are flat representations of the spherical earth, therefore they are always skewed in some way
- Parallels of Latitude: run East-West, vary in length – longer at Equator, narrower at poles
- Meridians of Longitude: run North-South, same length, pass through both poles
- We use coordinate pairs (coordinates) to locate places, measured in degrees (ex. 43°30'N, 10°E)
- Know: Equator, Prime Meridian, International Date Line, North and South Poles

Lab 2: Earth-Sun Relationships
- The earth's orbit around the sun is elliptical (perihelion & aphelion)
- The earth is tilted 23.5° off the orbital plane
- The tilt is always pointed in the same direction resulting in:
  - Different heating/cooling patterns (seasons) because of different sun angles & lengths of day
- Arctic and Antarctic Circles (degrees & importance)
- Tropic of Cancer and Tropic of Capricorn (degrees & importance)
- Winter and summer solstices (dates & sun location)
- Spring and fall equinoxes (dates & sun location)

Lab 3: Sun Angle Calculations
- The sun angle (or altitude angle) is the angular distance from the ground to the sun
- The zenith angle is the angular distance from the sun to a point exactly overhead (90°)
- These are complementary angles (add up to 90°)
- You can determine the sun angle by knowing the observation latitude and the latitude of 90° sun
- Salem gets higher sun angles in the summer, lower in the winter
- The sun is always 90° between the Tropics: Tropic of Cancer (23.5°N) & Tropic of Capricorn (23.5°S)

Sun Angle Experiment:
- I may ask you a question regarding the experiment process and/or hypothesis development

You may choose which questions to answer (4 of 6 for example), expect problems of a similar type as we have done in these labs. All formulae will be provided, no formulas need to be memorized, nor will you need to perform anything but the four basic math functions (addition, subtraction, multiplication and division). You should bring a calculator – cell phones may not be used. You will be allowed one sheet of 8.5" x 11" paper with any notes you choose to write on it. You may write on one side only.