The Geography of the Sky

Constellations and coordinate systems
A constellation is a region of the sky.

88 constellations fill the entire sky.
The Local Sky

- Zenith
- Meridian
- Horizon
- The local sky
- Compass points: N, S, E, W
The Local Sky

**Zenith:** The point directly overhead

**Horizon:** All points 90° away from zenith

**Meridian:** Line passing through zenith and connecting N and S points on horizon
The Local Sky

a.m.
ante-meridian
(before meridian)

p.m.
post-meridian
(after meridian)
The Local Sky-Horizon System

An object’s **altitude** (above horizon) and **direction** (along horizon) specifies its location in your local sky.

- Zenith (altitude = 90°)
- Meridian
- Horizon (altitude = 0°)

Altitude = 60°
Direction = SE
Angular Measurements

We measure the sky using \textit{angles}

• Full circle = 360°
• 1° = 60′ (arcminutes)
• 1′ = 60″ (arcseconds)
The Celestial Sphere

Stars at different distances all appear to lie on the celestial sphere.

Ecliptic is Sun’s apparent path through the celestial sphere.
The 88 official constellations cover the celestial sphere.
Our view from Earth:

- You will always see $\frac{1}{2}$ of the celestial sphere at one time.
- However, which part you see depends on your location on the Earth.
- If you are at mid latitudes then some stars will appear to never set, most rise and set, and some will never appear at all.
The Celestial Sphere
- Coordinate system

- 3 reference points, universal at all locations on the Earth
  - Celestial poles
  - Celestial Equator
  - Ecliptic (plane on which the Sun is seen)
How do we locate objects on the celestial sphere?

- Each point in the sky corresponds to a particular location on the celestial sphere.
- Equinoxes and solstices occur when Sun is at particular points on celestial sphere.
Coordinates on the Earth

- **Latitude**: position north or south of the equator
- **Longitude**: position east or west of the prime meridian (runs through Greenwich, England)
Celestial Coordinates

- **Declination**: Like latitude on celestial sphere
- **Right ascension**: Like longitude on celestial sphere
Coordinates In the Sky
(see coordinate handout)

• Declination - measured from celestial equator.
  
  +90° = celestial north pole,
  0° = celestial equator
  -90° = celestial south pole

• Right Acension - measured in hours with respect to spring equinox.

• 0 hours RA. = Vernal Equinox
  - (1 of 2 times the Ecliptic crosses celestial equator)