GPS Notes from REI Classes

GPS Basics: Note: **NOT a replacement for map/compass skills**

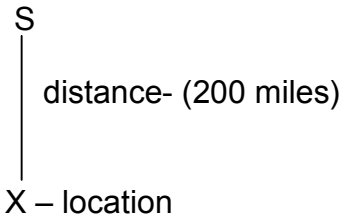
History of GPS

Military had need for GPS
- 24 hrs a day
- Regardless of weather

Only past 10 years have GPSs been available to consumers

What is GPS?

Satellites are approx 200 miles above the earth



GPS acquires a signal based on time, locks onto signal.
Triangulation

2 Dimensions- 3 Satellites
3 Dimensions- 4 Satellites includes time

Consumer Models:
- Functions
- Coordinates
- Routes- chain of waypoints
- Tracks- electronic bread crumb trail (no control over this- save or delete)
- Waypoints- virtual flag in ground to store coordinates
    - mark 10-20' before/after trail junctions
    - use nomenclature that makes sense<code
- If Compass- eats 40% of battery life
- Altitude is least accurate on GPS

Antennas- Understand where you are with the antennas
- Patch- microwave signals (moisture blocks) used in most consumer models
- Quad helix- costs more, omni directional

Uses of GPS

Cell phones newer models now have chip. Help 911 calls
On Star- Vehicle Navigation
Geocaching- Treasure hunting with GPS

WAAS- came online 2004 summer: Way to make GPS more accurate
Wide Area Augmentation System
Garmins are waterproof in 3' of water for ½ hour- Uses Lithium battery

Good Idea to follow steps below:

If GPS has altimeter: it is a good idea to calibrate it
(if know current elevation and set it> put # o elevation in GPS

Clear all Tracks

Don't forget to Stop Navigation

Use Trip Computer to reset stuff!!!!

If GPs has not been on for 1 month, it takes 15-20 minutes to update the almanac.

US QUADs- 7 ½ min, 1" = 24000 inch in real life (55,000 quads- public domain)
All USGS 7.5 topos use datum NAD27
1"= 100,000 inch in real life

Topo maps
- contour lines show elevation and steepness gulleys ridges/points down/nose
(The way they point, determines direction)

Looking for "v's"—Which way is up? Water helps determine up vs. down. Look for small stream or gulley. Contours show the descent of water by making the "V" shape, with the point of the "V" pointing up hill.
- green- riparian
- blue- moisture

Declination- Variance of magnetic north from true north

MAP DATUM- Model used to take the round earth and flatten it.
Must know the datum or else plan on getting 150-200 meters of error. **Always check the datum on the map**
The way you lay out the lines on the map for which you are measuring

NAD27 – North American Datum 1927 CON US

NAD 83 became = WGS84 (World Geodesic System)

Datum- reference point & coordinate system

GPS and map need to be using the same datum – Hidden treasure death bed scenario

Lat/Long is a tricky system to use with quads and topo maps
Based on 60 -- 00, 00, 00 00,01,00=60 seconds
degrees minutes seconds

coordinate- where a unit is on the Earth, referencing grid on a map

UTM- Universal Transverse Locator
metric version of lat/long
military from WW2
Goal is to never have a negative number

UTM is an easier coordinate system to use - helps prevent you from getting lost
Square grid system superimposed on the curved Earth…for dividing the Earth - Earth is divided into meters, Base10 (not as accurate over long distance
(Garmin units are UTM UPS)

walk around the equator = 24000 miles
walk around the north pole – walking distance is shorter

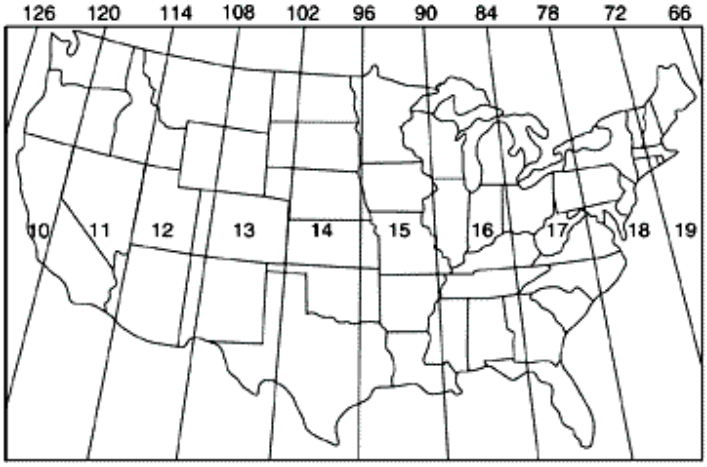
60 Easting zones each is 6° wide Why 6°?

6° is never more than a million meters.
Easting always have 6 digits

Does not extend all way to North 84° and South Pole 80° called the Polar Coordinate System

Utah is Zone 12 T and S

Read - Right - Up
Numbers always get bigger when going East and up North.



Complete UTM Coordinate:

Zone: ____ Easting #
Northing #
Datum WGS 84

Zone 12 T 425820 Easting, 4513172 Northing, WGS84-datum

On 7.5-minute quadrangle maps (1:24,000 and 1:25,000 scale) and 15-minute quadrangle maps (1:50,000, 1:62,500, and standard-edition 1:63,360 scales), the UTM grid lines are indicated at intervals of 1,000 meters

Map Projection- a map projection is a systematic representation of a round body such as the Earth on a flat (plane) surface. Each map projection has specific properties that make it useful for specific purposes.

TOPO! Tips

Right click to erase elevation profile

Use +zoom tool to get percent grade