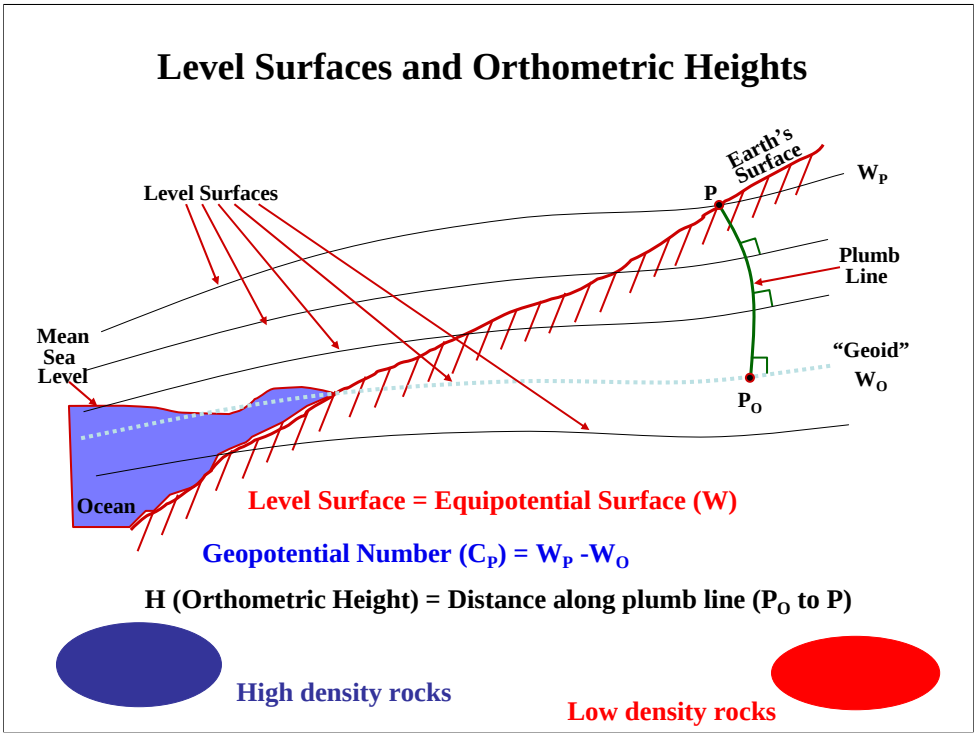

Level surfaces - imagine earth standing still - ocean standing still; no effects such as currents, tides, winds; except for slight undulations created by gravity effects = level surface.

Geoid is this level surface relating to today's mean sea level surface - this does not truly coincide with mean sea level because of the non-averaging effects of currents, tides, water temperatures, salinity, weather, solar/lunar cycle, etc. The geoid is a best fit mean sea level surface.

Equipotential surfaces - add or subtract water and level surface changes parallel to previous surface = infinite number of possible level surfaces. Each equipotential surface has one distinct potential quantity along its surface.

Point on earth's surface is the level surface parallel to the geoid achieved by adding or subtracting potential. Lines don't appear parallel; they are based on the gravity field and are affected by mass pluses and minuses.

Geopotential number is the numerical difference between two different equipotential surfaces. **W** = potential along a level surface. C_P = geopotential number at a point.

Plumb line (over exaggerated in drawing) - is a curved distance due to effects of direction of gravity- known as deflection of the vertical.

Orthometric height is exactly the distance along this curved plumb line between the geoid and point on the earth's surface. We can make close approximations but to be exact we would need to measure gravity along this line requiring a bored hole which is impractical.