1. Coordinate reference systems (crs)

It is a coordinate-based local, regional or global system used to locate geographical entities.

1. EPSG registry

* 4326
* 29616

It is a public registry of geodetic datums, spatial reference systems, earth ellipsoids, coordinate transformations, and related units of measure. Each entity is assigned an EPSG code between 1024-32767, and the standard machine-readable well-known text representation.

EPSG 4326 is the world geodetic system 1984, which is a widely used geodetic system in GPS.

1. Geographic coordinate system

* Longitude/Latitude

The geographic coordinate system (GCS) is a spherical or ellipsoidal coordinate system for measuring and communicating positions directly on the Earth as latitude and longitude.

1. Projected coordinate system

* Northing/Easting
* Universal Transverse Mercator (UTM)
  + Lansing is in UTM 16N or (more specifically) 16T

The projected coordinate system is a type of spatial reference system that represents locations on the Earth using cartesian coordinates (x,y/ Northing/Easting) on a planar surface created by a particular map projection.

In Universal Transverse Mercator (UTM) the origin of each northern zone is a point on the equator 500km west of the central meridian of the zone (the edge of the zone itself is just under 400km to the west).

1. Datum

A datum is a set of reference points on the earth's surface against which position measurements are made, and (often) an associated model of the shape of the earth (reference ellipsoid) to define a geographic coordinate system.

1. Why do we need to use different datums?

During our research, there are multiple needs for us so we have to use diverse mathematical models to the surface of the Earth. That is why we need to use different datums depending on specific aims.

1. What is a false northing/easting? Why is this used?

In order to guarantee the northing and easting coordinates on a map are not negative, map projections may set up a false origin, specified in terms of false northing and false easting values, that offset the true origin.