IMPORTANT: *Please refer to the Preface for Topographic Map Activities for preliminary instructions and information common to all Topographic Map Activities in the series.*

Topographic Map Activity 9 - UTM Grids (Revision 061620)

Objective: Introduce the topic of Easting and Northings on Universal Transverse Mercator (UTM) Grids.

Background: Topographic (Topo) Maps show location with UTM grid lines. In previous activities we have found the UTM Grid Zone designation on the map. The UTM Grid Zone designation determines what 6° longitude and 8° latitude grid of the world the current map you are viewing is in. The Grid Zone Designation is indicated by a number (zone representing longitude) and a letter (zone representing latitude). We found the Red Rock Canyon NCA Topo Maps are in Grid Zone Designation 11S of the UTM grid zones of the earth.

UTM Grid Zones can be further split into smaller grids until each grid is 1000 meters long x 1000 meters tall, representing a smaller UTM grid like the Red Rock Canyon NCA Topo Maps. Coordinates are measured east (right) and then north (up) in meters in a zone. Meters east (Eastings) are measured from the central meridian of each 6° wide zone. This meridian is given a value of 500,000 meters. West of this central meridian, the Eastings are less than 500,000m. East of this central meridian the Eastings are more than 500,000m. Meters north (Northings) are measured from zero at the equator and meters increase heading north. Similar to an X,Y graph, Eastings are the X-axis, and Northing are the Y-axis and reading right (Easting) then up (Northing).

UTM coordinates are written as Grid Zone Designation (11S) Easting (E) in meters, Northing (N) in meters – for example **11S 123456m E, 1234567m N**.

Activity: Find UTM Easting and Northing coordinates on a Topo Map.

Step 1. Open the Blue Diamond Topographic Map with a Ctrl + Click on the hyperlink: Blue Diamond

Step 2. Once the map opens, ensure that all layers are being shown (refer to instructions in Preface for assistance).

Step 3. Find Pine Creek Spring in the upper left of the topo map. The name of a single UTM grid is where the Easting and Northing lines cross at the south west (or lower left) corner. What is the lower left Easting and Northing of the box that Pine Creek Spring is in?

Step 4. The Easting and Northing numbers can be simplified. Look at the map on the edges. Find the Easting and Northing numbers now are 2 digits and not 6+ digits, representing the 10,000 and 1,000 places. The remaining numbers are then hidden from view. With the Answer from Step 4- highlight the 10,000 and 1,000 numbers in the Easting and Northing. Can you write those numbers as E x N (for example 10 x 20)?

Step 5. Find the UTM grid that Oak Creek Spring is in. What are the UTM coordinates, Easting and Northing, of this grid? What are the 2 digits shorthand numbers for the UTM grid box with Oak Creek Spring?

You have just found the UTM points for the grids with Pine Creek Spring and Oak Creek Spring!

Feedback

The Universal Transverse Mercator Grid

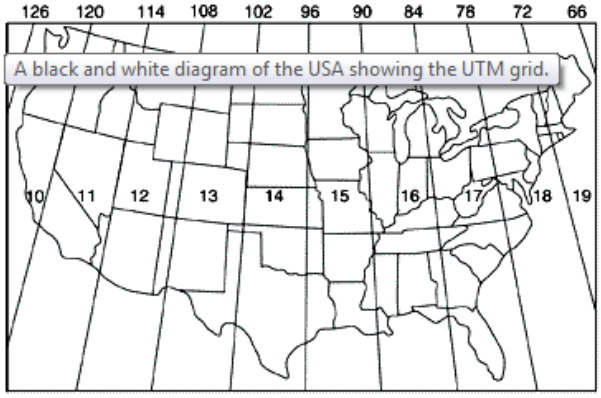

Figure 1: Diagram of the U.S. with UTM grid zones. The top numbers are degrees while the middle numbers are the zone designation. Note that Nevada is in zone 11. (Public Domain)

Additional information on UTM lines may be found here: https://pubs.usgs.gov/fs/2001/0077/report.pdf.
More information on lateral bands may be found here: https://earth-info.nga.mil/GandG/coordsys/grids/utm.html.

Answers (AS stands for answer step):

AS3 (11S 635000m E and 3998000m N, or 11S 635000, 3998000)

AS4 (11S 6**35**000m E, 39**98**000m N), (35 x 98)

AS5 (11S 636000m E, 3996000m N), (36x96)