


## Assignment Sheet for Lab 7: Rasters and DEMs

### Directions:

- 1) Create a folder on the desktop of your lab computer called "Lab7."
- 2) From Canvas, download the zipped file called "Lab7Data.zip" to your new Lab7 folder.
- 3) After it's downloaded, right-click on the file and "Extract All..." . Make sure it is going into your Lab7 folder!
- 4) Within Canvas, access the textbook (Instant Access – Vital Source) and find **Module 12**.
- 5) Begin ArcGIS Pro and name your project **Lab7**.
- 6) Proceed through the software instructional steps for Module 12.

**Question 1.** How many grid cells (pixels) does the land use – land cover dataset contain? (Hint: the rows and columns are available to you in the properties dialog?).


There are 1593 columns and 866 rows. Meaning there are 1,379,538 pixels. 

**Question 2:** What is the size (spatial resolution) of each pixel in the land cover data set? How many square meters does each pixel cover? So how many **square kilometers does the entire grid cover?**


The size of each pixel is one meter. Each pixel is one square meter and the entire grid covers 1379.538 square kilometers (1,379,538 square meters).

### NEW INSTRUCTION:

**Add a Text Field to the NLCDmahon attribute table called "Class." Type in all of the Classification names (11 = Open Water, etc.). SAVE the EDITS (on the Edit Tab).**

**Question 3:** Is there more forested land (of any type) than developed land (of any type) in Mahoning County? **By how many square kilometers?** 

There are 367,042 forested land pixels (355658 + 10866 + 518) and there are 361,738 developed land pixels (143951 + 42404 + 17012 + 158371). There is a difference of 5,304 pixels with developed land being higher.

**Question 4:** How many "regions" of land cover type were created when 8 "neighbors" are used? **What type of land cover is the largest contiguous region, and how many square km is that one region?** 

A total of 37873 regions were created with 8 neighbors. The largest continuous region was from type 22 (Developed, Low Intensity)

**Question 5.** How many grid cells does Evans Lake consist of when modeled with 10-m grid cells? How many with 100 m cells? What are the pros and cons of using 10-m versus 100-m cells?

Evans Lake has 228 grid cells when modeled in a 100-m cell. The lake has 22675 grid cells when modeled on a 10-m cell. The pros of using 10-m is that it accounts for lakes smaller than 100-m that the other layer would not pick up. The cons of that there is more grid cells.

## NEW INSTRUCTIONS (Not in Textbook)

1. Add the MahoningDEM dataset to your map and explore its properties.

**Question 6.** What is the spatial resolution of the DEM? How many rows and columns does the DEM have, so how many pixels? (Hint: Properties > Raster Information)

DEM has 4797 columns and 2621 rows, having a spatial resolution of 12,572,937 pixels.

**Question 7.** How does the spatial resolution of the DEM vary from the spatial resolution of the land cover data set? What difference would that make in terms of detail or accuracy for representing either the terrain or land cover?

The more pixels there are within a certain area then the accuracy increases. This is because the distance and area the pixels represent are smaller and will change at a closer interval when compared to the real landscape.

**Question 8.** What is the range of elevation in Mahoning County? (Hint: just look at the Table of Contents).

~~Range does not show in the Elevation tab of Properties.~~



2. From the Geoprocessing toolbox collection, make three new datasets based on this DEM. These are DEM “derivative” datasets. In each case, **make sure that the DEM is the input layer.**
  - a. Spatial Analyst Tools > Surface > **Hillshade.**
    - i. Input = DEM
    - ii. Name the output Hillshade.
    - iii. Use all default settings.
  - b. Spatial Analyst Tools > Surface > **Aspect.**
    - i. Input = DEM
    - ii. Name the output Aspect.
    - iii. Use all default settings.
  - c. Spatial Analyst Tools > Surface > **Slope.**
    - i. Input = DEM
    - ii. Name the output SlopePercent.
    - iii. CHANGE the **Output Measurement** to **Percent rise.**
    - iv. Otherwise, use the default settings.

**Question 9.** Look carefully at the DEM derivatives. Notice that for DEM, Aspect, and Slope, you are not able to open their respective Attribute Tables. Why do you think you cannot?

~~They cannot because the original DEM dataset does not have an attributes table.~~



3. Use the **Spatial Analyst Tools > Reclass > Reclassify** tool to change and simplify the Slope values into a new dataset with only three values.
- Input Raster = Slope
  - Reclass field = VALUE
  - Click the "Classify" button
    - Change the **Method** to **Natural Breaks** with **3 classes**
      - Change the lowest group to have an Upper value of 4.0
      - Change the middle group to have an Upper value of 8.0
      - DO NOT CHANGE the Upper value of the highest group!
      - Click OK.
  - Click Run.

Classify

Field: VALUE

Method: Manual Interval

Classes: 3

Color scheme: [Yellow to Red Gradient]

Classes Histogram

More + 0.0 - 0.0

Color	Upper value
[Yellow]	≤ 4.0
[Orange]	≤ 8.0
[Red]	≤ 67.512161

Class breaks determined from dataset

OK Cancel

Geoprocessing

Reclassify

Parameters Environments

Input raster  
Slope\_Percent

Reclass field  
VALUE

Reclassification

Reverse New Values

Start	End	New
0	4	1
4	8	2
8	67.512161	3
NODATA	NODATA	NODATA

Classify Unique

Output raster  
Reclass\_Slope

☐ Change missing values to NoData

4. NOW you can open the attribute table of the reclassified slope data (because it has been reclassified to have only 3 integer values instead of millions).

**Question 10.** How many square km of land in the DEM have a slope greater than 8%?

1413589 km of land has a slope greater than 8%.



**End of lab. If you need to complete after your lab session, save it as a Project Package and upload to your ArcGIS Online space.**