ESRI Digital Elevation Tools

Activity Time: 50-60 minutes

Materials: (can be adjusted for table groups up to 4)
- Computers that can access the internet
- Whiteboard and/or easel that images can be shown and drawn on

Lesson Goal: Students use models to analyze data to illustrate that elevation determines the direction of water flow.

Directions:

Engage

1) Access the "Terrain Profile" web tool (http://esriurl.com/elevation) and ask students to navigate to a desired geographic location, preferably at the state-level view.
2) Have students make predictions, supported by justifications, about which direction the water will flow. Have students individually or in groups record their predictions on paper. As a class, record their predictions on the map projected on the whiteboard.

Experience

3) Identify a major river that is closest to the school and have students navigate to a section of the river that can be easily seen in the window viewer.
4) As a discussion topic, pose to the students which direction they think that the river flows in that area. Initiate smaller table group discussions first, asking them to use evidence from the maps that might help them to determine that, then allow for classwide sharing.
5) Activate the elevation tool by clicking on the "Measure" button [located just under the map on the right hand side, represented by a ruler icon]. Once activated, the teacher can click on several locations within the river boundary edge, forming a pathway. A quick double click of the mouse button will complete the measurement pathway and send the information to the lower window to see the elevation profile.
6) Briefly demonstrate how hovering laterally along the bottom elevation profile window will make the red "X" move in both windows, so as to show what elevation is associated with which part of the river.
7) Discuss where the highest elevation is located and the direction towards lower ground, and how that might affect the flow of water.
8) Assign students different rivers within the whole state, asking them to identify the elevation points along the body of water and ultimately which direction the river flows.
9) On the projected map of the state, ask student groups to roughly draw in where the rivers are located as well as indicate with arrows which direction the water flows.
10) If time permits, students can draw vertical and horizontal lines across the state to determine the terrain profile and explain how that coincides with the direction of the rivers.

Summary (Evaluate):

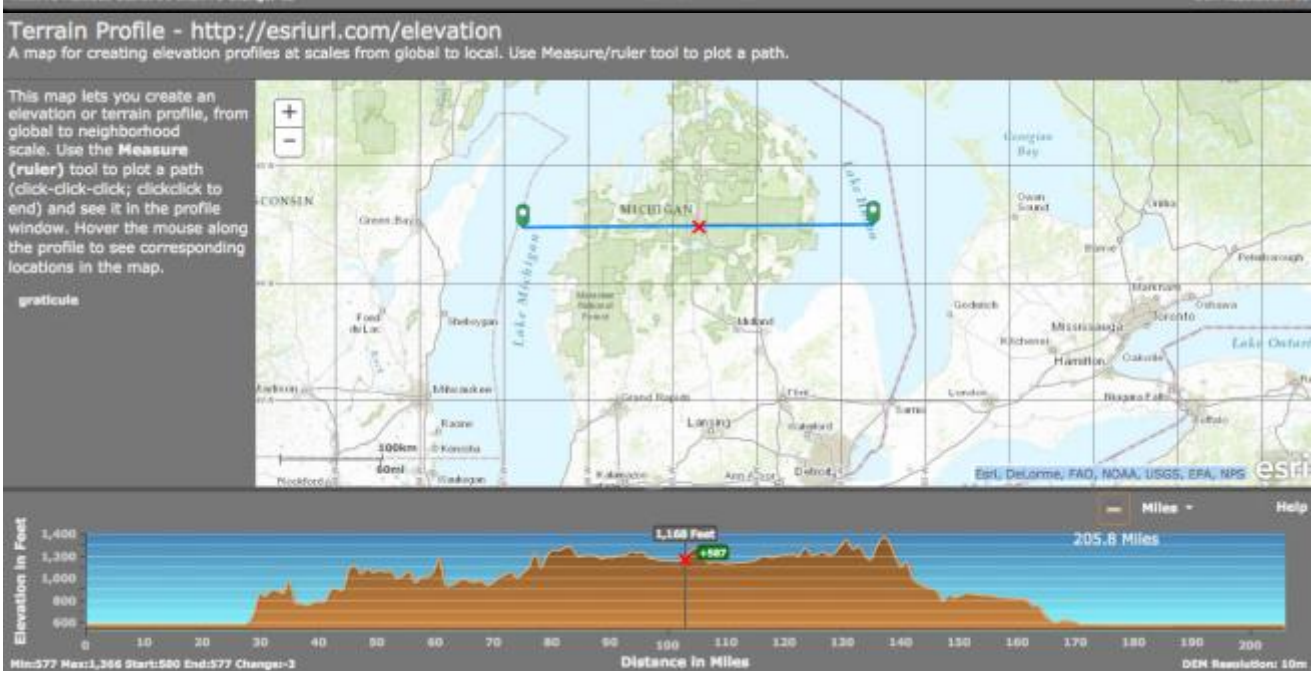
1) Describe the terrain of your state and how that contributes to the flow of water.

2) What new or surprising information did you learn from this activity? (*Answers will vary; but might include discovering water does not always flows South (a common misconception); rivers flow to lower elevation like major bodies of water; watersheds will flow into other larger watershed basins; maps can help determine the boundaries of watersheds using elevation*)

Application (Explain):

1) Where does the water in your river come from? How might the terrain profile affect what flows into your part of the river?
2) How can you predict the effects of pollution from a spill in a high elevation area?

Terrain Profile - http://esriurl.com/elevation
A map for creating elevation profiles at scales from global to local. Use Measure/ruler tool to plot a path.
This map lets you create an elevation or terrain profile, from global to neighborhood scale. Use the Measure (ruler) tool to plot a path (click-click-click; clickclick to end) and see it in the profile window. Hover the mouse along the profile to see corresponding locations in the map.
graticule
Barton Hills
Ontario Base Map, Province of Ontario, Esri, HERE, DeLorme, INCREMENT P
Miles
796 Feet
3.65 Miles
Elevation in Feet
Distance in Miles
Min:773 Max:809 Start:796 End:773 Change:-23
DEM Resolution: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graticule
MICHIGAN
Esri, DeLorme, FAO, NOAA, USGS, EPA, NPS
Miles
Help
1,168 Feet
205.8 Miles
Elevation in Feet
Distance in Miles
Min:577 Max:1,366 Start:580 End:577 Change:-3
DEM Resolution: 10m