

Name: _____

Lab : _____

Per : _____

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COMPANION WEBSITES: <http://www.google.com/earth/index.html>
<http://www.discoverearthscience.com/regentses/units/mapping/labs/genystopotour/genystopotourshort.kmz>

INTRODUCTION:

When visualizing the earth’s surface it’s often difficult to envision three-dimensional features on a two-dimensional surface (i.e., a piece of paper). To help resolve this problem, scientists and anyone interested in the shape of the earth, rely on topographic maps – a tool that shows changes in elevation and surface features (roads, buildings, rivers, etc.) on earth.

To help understand how topographic maps illustrate the shape of the earth’s surface, you will tour various areas of the earth using Google Earth® software. Specifically, to support your understanding of topographic maps, you will examine topographic maps as overlays – maps placed over the earth’s surface – in this Google Earth® activity.

TERMS TO BE AWARE OF BEFORE STARTING THIS ACTIVITY: (Use the textbook/review book to define these terms.)

Topography _____

Landscape _____

Field _____

Isoline _____

Contour Line _____

Gradient _____

Benchmark _____

DIRECTIONS:

As you work through this activity you’ll notice a box, □, at the start of many paragraphs and sentences. That box is there for you to check off once you’ve read and understood the content that follows it. Doing so will help you keep your place on the worksheet as your attention moves back and forth between your computer screen, your instructions, and your answer sheet. This symbol ♦ indicates that you must record an answer on your answer sheet. Be sure to keep in mind that the numbered directions below correspond to the numbers shown in the accompanying diagrams.

Task 1: GOOGLE EARTH® PREFERENCE SETUP:

Open up the following Google Earth® file here:

1. □ Open the “tools” and “options” menu. If done properly, your screen should appear as shown here.
2. □ Change the “Show Lat/Long” section to “Decimal Degrees”.
3. □ Change the “Units of Measure” section to “Feet, Miles”.
4. □ Change the “Elevation Exaggeration” section to the value of “2.5”.

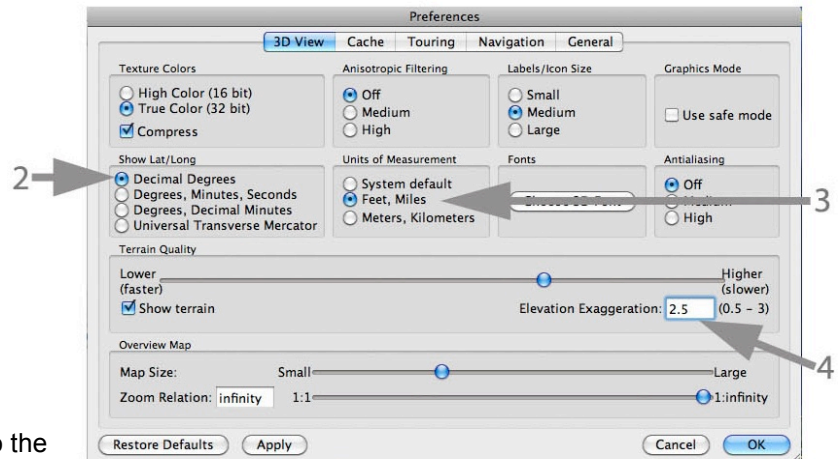


Fig. 1

Technical Note:

In some instances you'll note and record the elevation data shown within Google Earth® **elev 85 ft** at the bottom of the map area within your screen. This elevation data shown within Google Earth® is gathered from a variety of sources and collectively termed "Digital Elevation Model" (DEM) data. The different sources of Google Earth® DEM data, along with inaccuracies occasionally found within Google Earth®, can be researched on your own. In other instances you'll note and record **only** the values shown on the contour maps as part of the topographic map



overlays. Pay close attention to the directions below requiring the use of either Google Earth® DEM data, or topographic map overlay data.

Task 2: Observations on Long Island, New York.

5. Once the Google Earth® file opens, you will see that you are viewing Long Island, New York, and surrounding areas from approximately 187 miles above the earth's surface!

6. Read and follow the directions shown to the right for placemarks and map overlays under the "Places" menu. (See Fig. 2)

7. Double click on placemark "A". You can do this clicking either the pushpin within the map area, or in the "Places" menu.

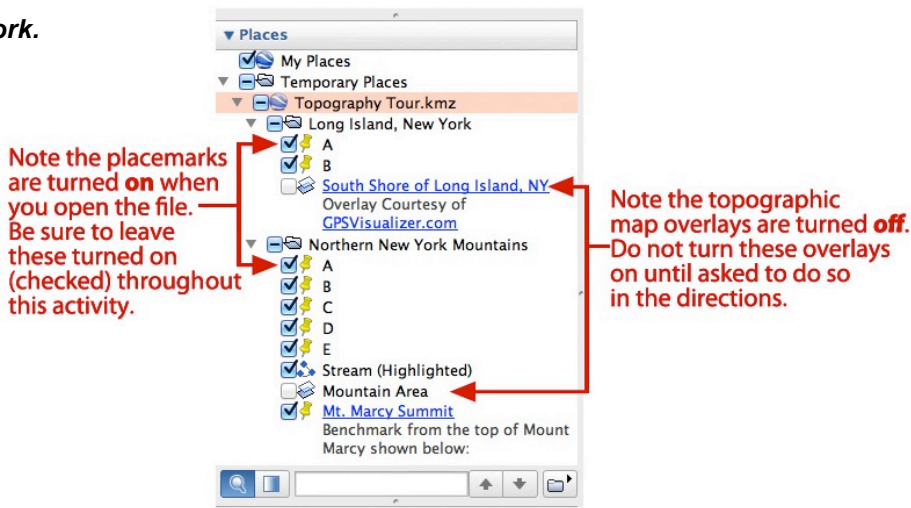


Fig. 2

8. ♦ Describe the shape of the landscape in this southern area of Long Island, NY:

9. ♦ Mouse over the bottom of placemark "A" (the point of the pushpin) within the map area and record its elevation to the nearest foot, with units, shown at the bottom of the map area.

10. Double click on placemark "B" in the "Places" menu.

11. ♦ Mouse over the bottom of placemark "B" (the point of the pushpin) within the map area and record its elevation to the nearest foot, with units, shown at the bottom of the map area.

12. On the menu bar, click "tools", and then "ruler". Be sure that the units in the pull-down menu are in miles.

13. ♦ Single click on placemark "A" within the map area to start a line, and then single click on the "B" placemark to end the line. Record the distance to the nearest 0.1 value, with units, from A to B shown in the menu ruler box.

14. ♦ Use the equation for gradient from Page 1 of the Earth Science Reference Tables (ESRT's) to determine the gradient from A to B (express your answer to the nearest 0.1 value, with units):
WORK SPACE (SHOW ALL WORK)

Final Answer: _____

Task 2: Observations on Long Island, New York (Cont'd)

15. ♦ Using pages 2 and 3 of your ESRT's, name the landscape region that Long Island is a part of:

16. ♦ Using your observations, calculations, and responses to the above questions, write a complete description that defines the gradient and landscape of Long Island. Be sure to use numerical data (values with units) to support your observations!

(Note: You must use the following words in your answer "plain", "flat", and "gradient".)

17. Turn on the map overlay – a topographic map overlaid on top of the natural landscape – by clicking on the box immediately to the left of the words, "South Shore of Long Island, New York" in the "Places" menu area. (See Fig. 3)

18. ♦ What do you notice about the contour lines in the area (circle your answer)? Are they....

widely spaced or closely spaced

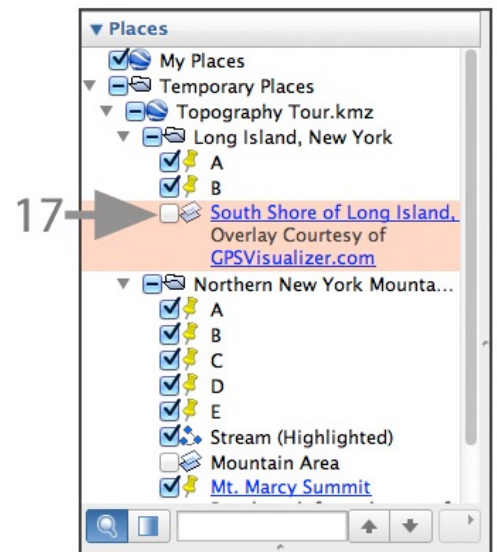


Fig. 3

TASK 3: Northern New York Mountains

19. Double click the folder titled, "Northern New York Mountains" within the "Places" menu.

20. Note that Mt. Marcy is in the center of your screen.

21. ♦ Using your "Landscapes" map on ESRT's p. 2, and ESRT's p. 3 (note Mt. Marcy on this page), name the landscape region you are currently viewing.

22. **Important:** Refer to #3 on p. 1 of this activity. In the same manner as you did in #3, change the settings of Google Earth® to metric values – "**meters, and kilometers**".

TASK 3: Northern New York Mountains (Cont'd)

23. ◆ Using your mouse scroll over the top of this mountain and determine an approximate elevation (with units) shown at the bottom of the map area. (Hint: You may want to zoom by double clicking at the top of the mountain to help determine an approximate summit elevation.)

24. ◆ What is the elevation value you wrote in #23 based upon? (Hint: It is how many meters above what?)

25. Click on placemark "B" to fly into a valley on the west side of Mt. Marcy.
NOTE: Do not turn off the check box for placemark "B" as you click on this placemark.

26. Turn on the map overlay for the "Mountain Area" in the "Places" menu area.

27. ◆ Using the overlay map contour lines, and **not** the elevation shown within the bottom of the map area within Google Earth®, determine the elevation of placemark "B" (note that the point of the pushpin is exactly on a contour line).

28. ◆ Using the overlay map contour lines, and **not** the elevation shown within the bottom of the map area within Google Earth®, determine the elevation of placemark "C" (note that the point of the pushpin is exactly on a contour line).

29. ◆ Determine the difference in elevation (not the horizontal distance) between placemarks "B" and placemark "C" to the nearest whole meter. (Don't forget those important units...)
WORK SPACE:

Answer: _____

30. ◆ Considering your answer to #29, and the number of contour lines between placemarks B" and "C", what is the contour interval on this map:

31. Double click placemark "E". This will fly you to a top-view (map or satellite view) of the stream valley.

32. ◆ Describe how your elevation would change if you were to hike from placemark "D" to placemark "E".

33. ◆ Describe the shape of the index contour line (1200 meters) which placemarks "D" and "E" are located on.

TASK 3: Northern New York Mountains (Cont'd)

34. □ Take a look at Figures 4a and 4b. Both figures were created by tracing the contour topographic map you see within Google Earth®. The points shown on Fig. 4a are similar (although not exactly the same) to placemarks “D” and “E” noted above. Fig. 4b. will be used to construct a topographic profile from one side of the valley (point X), across the low point of the stream, and up the other side of the valley (point Y).

35. □♦ Using a scrap sheet of paper, mark the intersection of profile X-Y and the edge of your sheet of scrap paper.

36. □♦ Using the data from #35 (your scrap sheet), complete the y-axis scale on both sides of Fig. 4b.

37. □♦ Construct a profile using your scrap sheet of paper on Fig. 4b.

38. □♦ What is the horizontal distance between points X and Z on Fig. 4a (units included)

39. □♦ What is the change in elevation between points X and Z on Fig. 4a (units included)

40. □♦ Determine the gradient between points X and Z on based on Fig 4a (again, units included)

WORK SPACE:

Δ Elevation = _____

Distance = _____

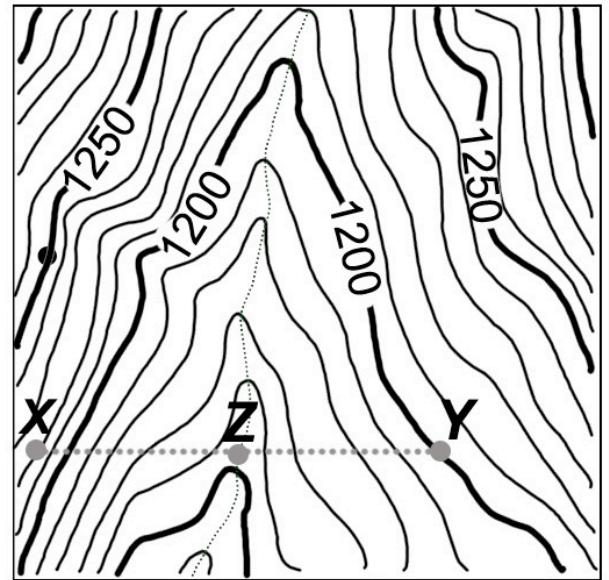


Fig. 4a

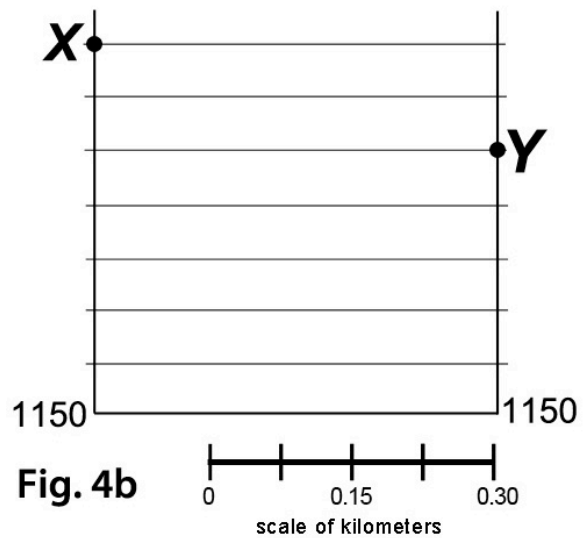


Fig. 4b

Answer: _____

41. □♦ Repeat # 38, #39, and #40 to determine the gradient between points Y and Z on based on Fig 4a (again, units included)

WORK SPACE:

Answer: _____

Task 3: Northern New York Mountains (Cont'd)

42. ◆ Based on the profile you completed in #37, and the gradient calculations you performed in #40 and #41, compare and describe the relationship between the steepness of the slopes on your profile and the magnitudes (the size) of the gradients you calculated.

Lab Conclusion

43. ◆ Using your observations, calculations, and responses to the above questions describe the relationship between gradient and the appearance of isolines (contour lines, in this case) on a topographic map to one another.
