

Reading/Understanding Topographic Maps — School of Forest Resources

<http://sfr.psu.edu/youth/sftrc/lesson-plans/earth-sciences/6-8/potato-mountain>

March 2, 2011

Goals for the Lesson

- Students will gain an understanding of topographic maps.
- Students will demonstrate their basic understanding of how to read a topographic map.

Materials Needed

State Standards Addressed: E & E Standards: Watersheds and Wetlands (4.1)

Subjects Covered: earth science, geography

Topics: introduction to topographic maps

Teaching Model: The 4MAT System: Motivation, Information, Practice, Application.

Preparation

Have handouts prepared. May want to have potatoes sliced prior to presentation in the classroom.

Doing the Lesson

1. As part of an ongoing unit on earth science/geography, ask students how one draws a flat, two-dimensional map of a three-dimensional surface like that of the earth. How do maps show different elevations?
2. If someone does not mention topographic maps, lead the conversation to the topic.
3. Using the information from [Appendix A](#), demonstrate how the three-dimensional potato can be mapped two dimensionally.
4. Distribute copies of handout "[Reading a Topographic Map A.](#)"
 - Read and discuss the information presented on the handout.
 - Have students work together in pairs to answer the four questions on the handout.
 - Review the answers to ensure accuracy of answers.
5. Distribute copies of handout "[Reading a Topographic Map B.](#)" Assign Part 1 and Part 2 to be completed as homework.

Assessment

The quality of students' performance on "[Reading a Topographic Map B](#)" will give an indication of their understanding of the concept of topographic maps.

Extension

This lesson is followed up with students working with actual topographic maps, identifying various aspects of the landscape.

References

Hansen, Robert (1996). [Trees + Me = Forestry](#). University Park, Pa.: The Pennsylvania State University.

Author

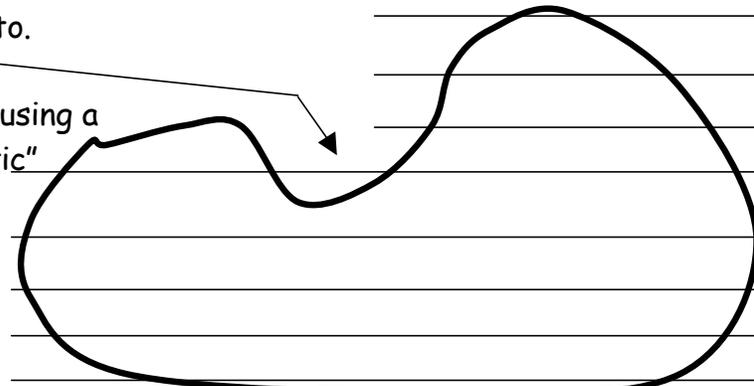
George Ness, BLaST IU17; LaSaQuik Alternative Education Program

The Language of Maps (1983). Pitman Learning Inc.

Reading and Understanding Topographic Maps - "Potato Mountain" - Appendix A

1. Carve a "valley" into a potato.

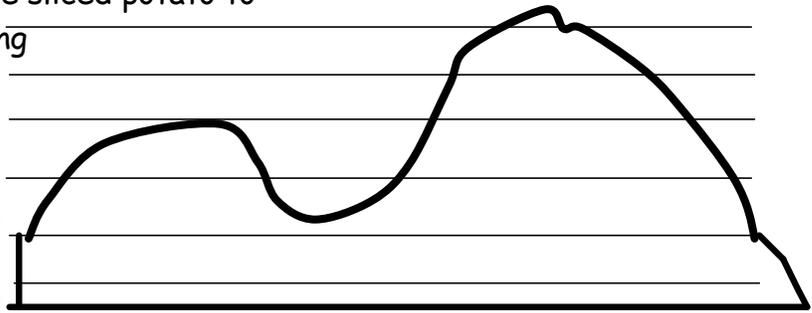
2. Slice the potato into layers using a food processor, "veg-o-matic" or a sharp knife.



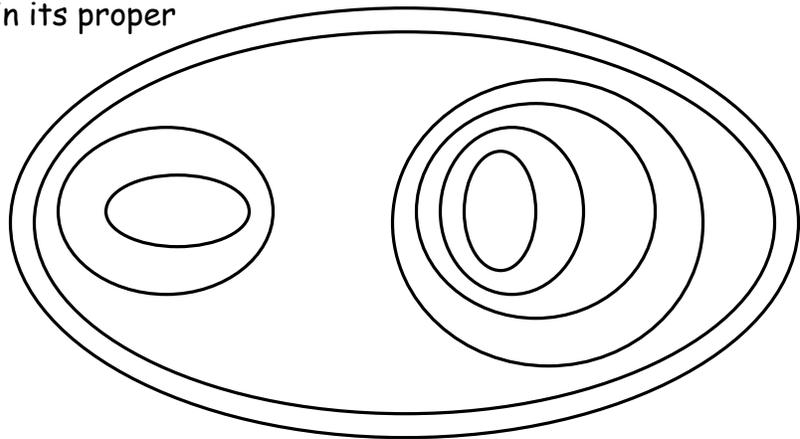
Side view of prepared potato

3. Use only the top half of the sliced potato to represent two hills of varying heights with a valley in the middle.

Hold the potato in position so the class can see the representation of hills and valley.



4. On the whiteboard in front of the class, trace each layer of the potato, being sure to keep each layer in its proper position in regard to the previously traced layer. The resulting pattern will be a topographic representation of the potato hills and valley.



5. Point out how the contour lines represent steep slopes, gentler slopes, peaks, and lowland areas.

READING A TOPOGRAPHIC MAP - A*

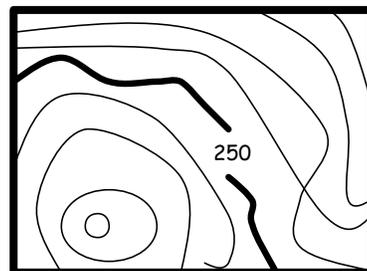
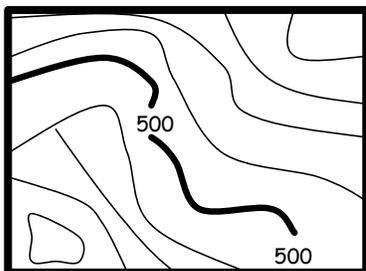
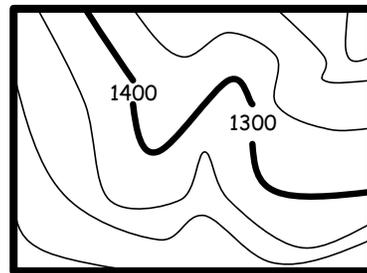
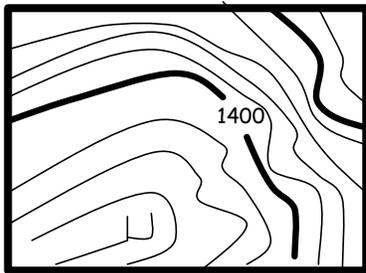
The most obvious way in which topographic maps differ from other maps is that they contain many thin, curved lines that appear to wrap around certain areas. These lines are called **contour lines**. They connect points of equal **elevation**. This means that if you were to walk along the ground represented by a contour line, you wouldn't go up hill or down hill.

A **topographic map** will tell you whether an area is steep or level. Places where the lines are close together are very steep. Where the lines are far apart, the land is relatively flat. The actual elevation is written on every fifth line. In the United States we measure elevation beginning with 0 feet at sea level.

Contour lines have four important characteristics.

1. All points along the same contour line are at the same elevation.
2. All contour lines eventually connect with themselves.
3. Contour lines never cross each other.
4. Contour lines never split or branch.

Each drawing below violates a rule of contour lines. Match each rule with the drawing that violates the rule.



* adapted from Penn State / 4-H publication *Trees + Me = Forestry*

READING A TOPOGRAPHIC MAP - A* Key

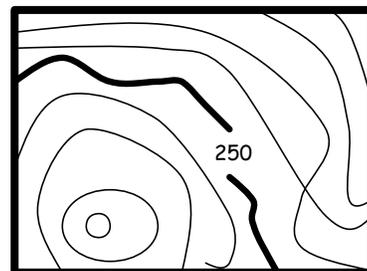
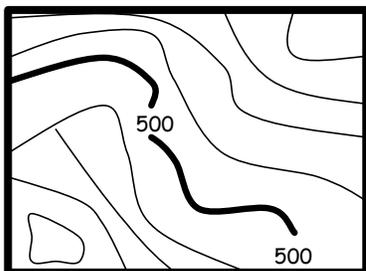
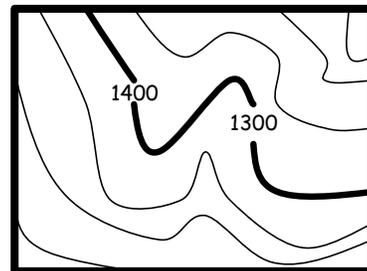
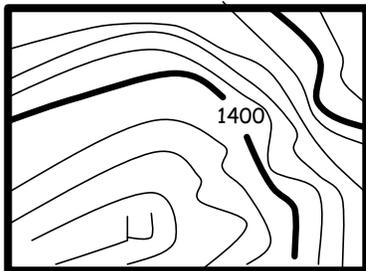
The most obvious way in which topographic maps differ from other maps is that they contain many thin, curved lines that appear to wrap around certain areas. These lines are called **contour lines**. They connect points of equal **elevation**. This means that if you were to walk along the ground represented by a contour line, you wouldn't go up hill or down hill.

A **topographic map** will tell you whether an area is steep or level. Places where the lines are close together are very steep. Where the lines are far apart, the land is relatively flat. The actual elevation is written on every fifth line. In the United States we measure elevation beginning with 0 feet at sea level.

Contour lines have four important characteristics.

1. All points along the same contour line are at the same elevation.
2. All contour lines eventually connect with themselves.
3. Contour lines never cross each other.
4. Contour lines never split or branch.

Each drawing below violates a rule of contour lines. Match each rule with the drawing that violates the rule.



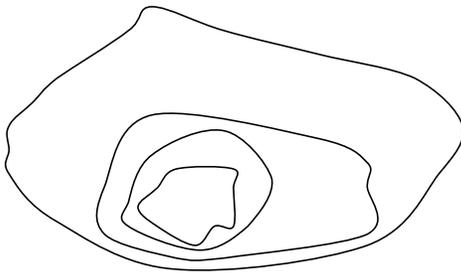
* adapted from Penn State / 4-H publication *Trees + Me = Forestry*

READING A TOPOGRAPHIC MAP - B*

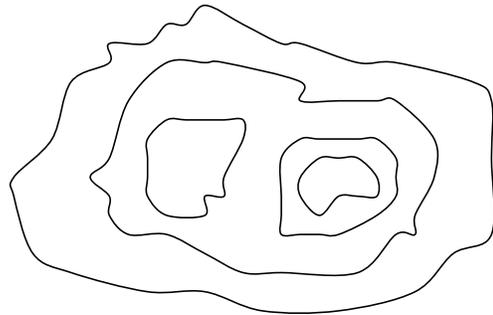
PART 1 Match each image below with the appropriate word description.

1. _____ Gentle slope on all sides.
2. _____ Round hill with two peaks.
3. _____ Steep south side.
4. _____ Two peaks, with east side higher.

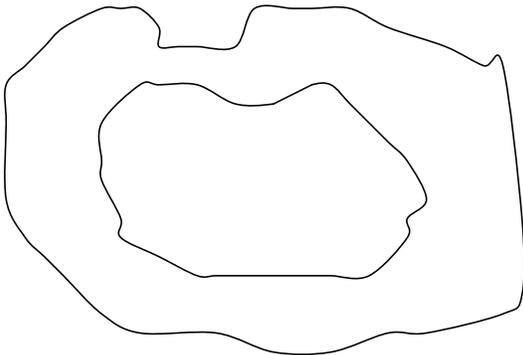
A.



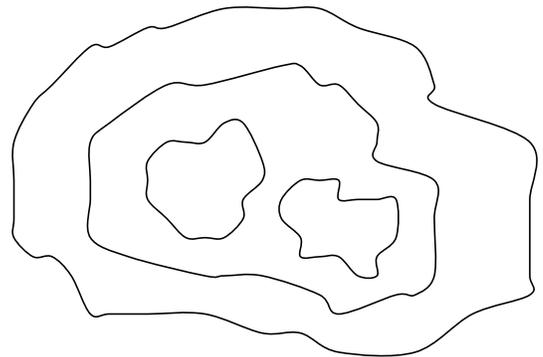
B.



C.



D.



* adapted from *The Language of Maps* - 1983 by Pitman Learning Inc.

READING A TOPOGRAPHIC MAP - B* Key

PART 1 Match each image below with the appropriate word description.

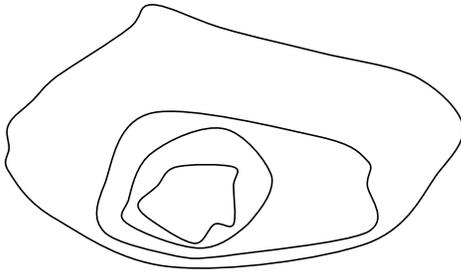
1. C Gentle slope on all sides.

2. D Round hill with two peaks.

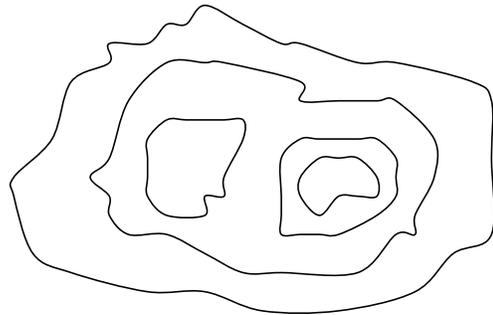
3. A Steep south side.

4. B Two peaks, with east side higher.

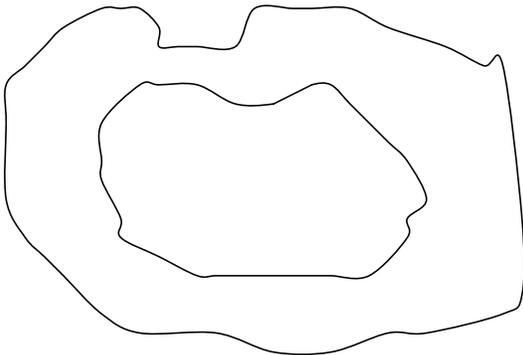
A.



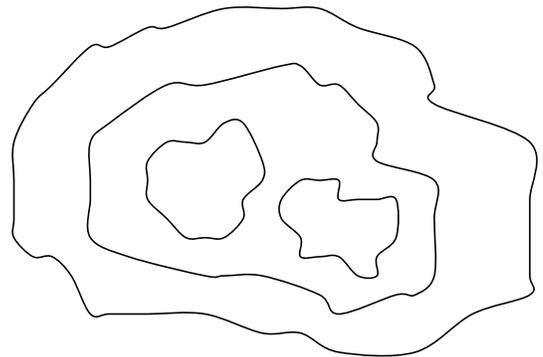
B.



C.



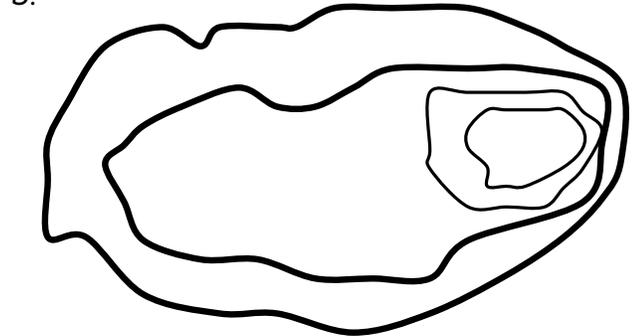
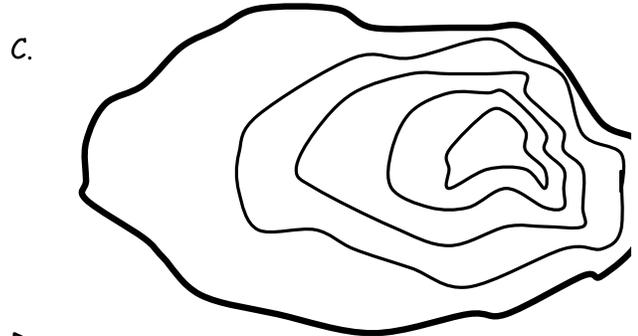
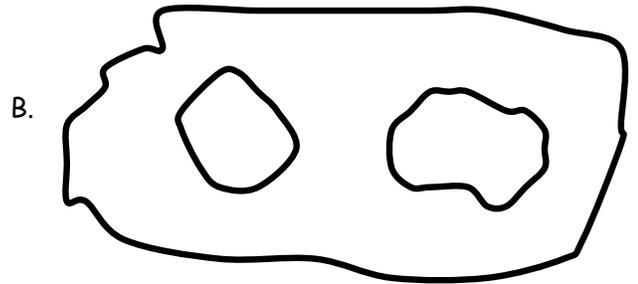
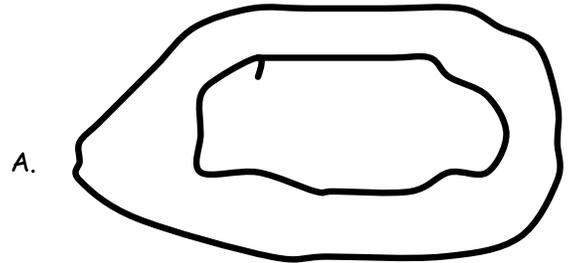
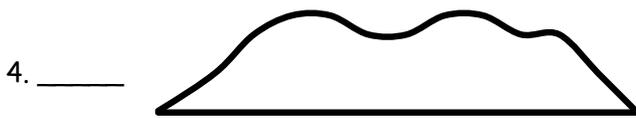
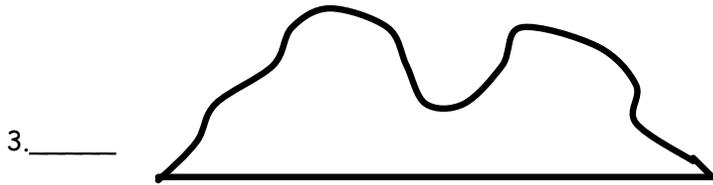
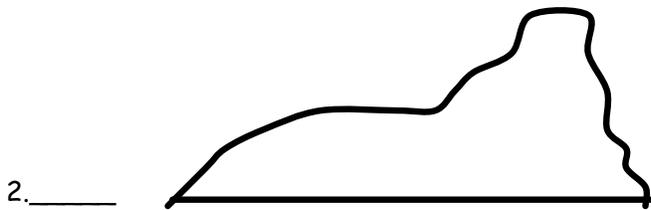
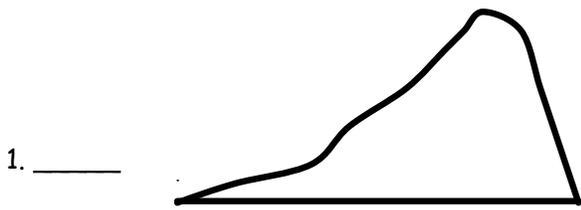
D.



* adapted from *The Language of Maps* - 1983 by Pitman Learning Inc.

READING A TOPOGRAPHIC MAP - B*

PART 2. Match each side view image with the appropriate set of contour lines.

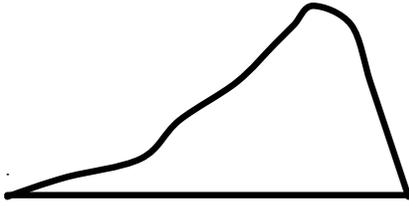


* adapted from *The Language of Maps*, 1983 by Pitman Learning Inc.

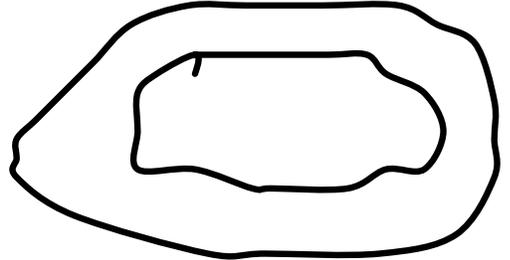
READING A TOPOGRAPHIC MAP - B* Key

PART 2. Match each side view image with the appropriate set of contour lines.

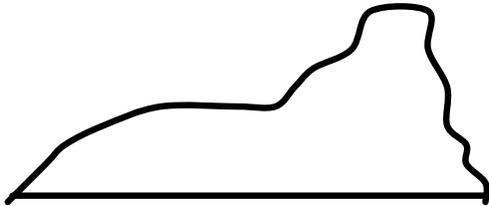
1. C



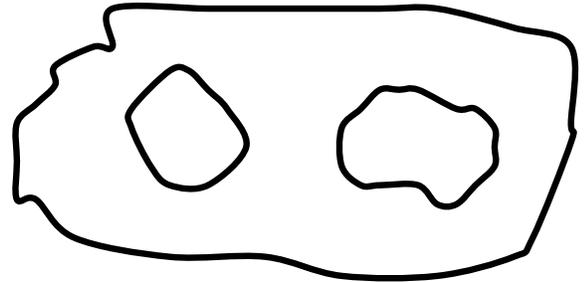
A.



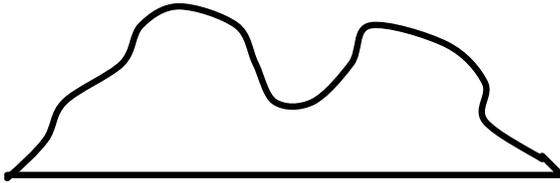
2. D



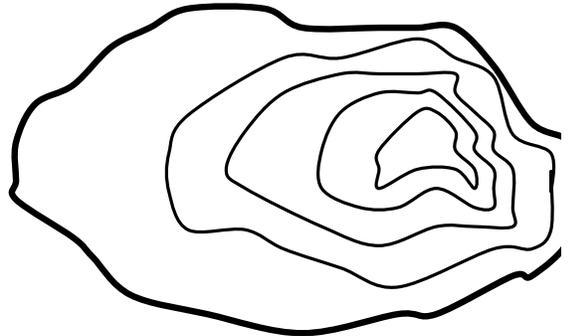
B.



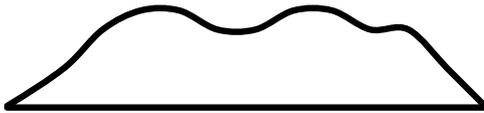
3. B



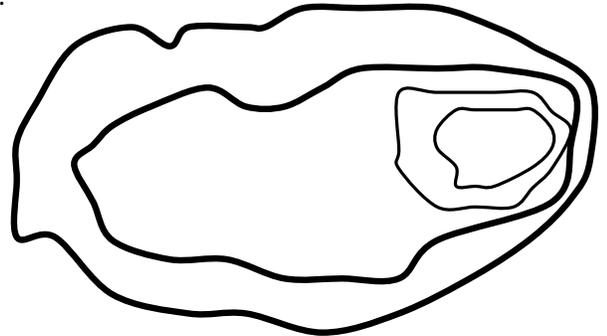
C.



4. A



D.



* adapted from *The Language of Maps*, 1983 by Pitman Learning Inc.