**5E Template- Science**

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| **Content Area: Earth Science** | **Grade Level(s): 6 -8** | **Topic(s): Reading topographic maps.** |

**Standards (SOL)**

ES.1 The student will plan and conduct investigations in which

1. scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted;

ES.3 The student will investigate and understand how to read and interpret maps, globes, models, charts, and imagery. Key concepts include

1. maps (bathymetric, geologic, t***opographic***, and weather) and star charts;

**Objectives (UKD’s)**

*The student will gain an understanding of topographic maps and demonstrate their basic understanding of how to read a topographic map.*

**Materials & Resources**

**Potato, knife, marker, prepared handouts, topographic maps.**

**Safety Considerations**

*Whenever using a knife, be sure that all students use precautions.*

**Engage – Time Estimate \_5 minutes\_\_\_\_\_\_\_**

*Issue students a potato and tell them to begin thinking of this potato as some sort of land structure like a mountain etc..*

**Explore – Time Estimate \_\_15 minutes\_\_\_\_\_\_**

Have student cut out one gap/crevis into the side of the potato. With the crevis facing up, have students draw six horizontal lines across the entire potato, number each layer 1-6. Have students cut through each layer completely, resulting in six pieces of the potato. Have the students put the potato back together (use toothpicks if needed). Prepare a handout about contour lines, distribute.(provided below, at end of lesson). On a separate piece of paper 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. On the same piece of paper, have students place the whole potato on its side and trace the outline of the potato. This will represent the side view of what contour lines would look like if raised. Have students identify the smallest and steepest slope on their drawn map of the potato. Have them label an example of all four characteristics on their drawn maps.

**Explain -- Time Estimate \_\_5 minutes\_\_\_\_\_\_**

Discuss with student handout #1.- Characteristics of contour lines.

Ask students how they think maps show curved surfaces like mountains, hills, valleys etc.

Explain that their drawing represents the contour lines seen on a topographic map. Show students a real topographic map.

Explain to the students that as the slopes are not as steep, their contour lines should be further apart.

Discuss with the class the four characteristics of contour lines.

**Extend -- Time Estimate \_\_\_10 minutes\_\_\_\_\_**

Divide the students into groups of four and hand each group a topographic map. Have each member point out one of the four characteristics of a contour lines, continue until all four have been noted. Now use the same map but the members of the group have to identify a different characteristic than before and keep this process going until each member has identified all four characteristics on a topographic map.

**Evaluate -- Time Estimate \_\_\_10 minutes\_\_\_\_\_**

Provide students with an assessment that allow them to connect pictures with the below map descriptions. Or for you higher students, you can have them draw their own contour lines representing each of the four descriptions below.

1.Gentle slope on all sides.

2. Round hill with two peaks.

3.Steep south side.

4.Two peaks, with east side higher.

**Plans for Diversity**

*This lab could be difficult for students with dysgraphia. You can provide an already made sheet with the contour lines drawn and the student will simply need to match the appropriate number to the correct drawing.*

**Connections**

*This objective will allow student to begin recognizing how to read a topographic map and could relate various earth science topic such as water sheds/flows, faults, folding etc. as related to earth science. By keeping the topographic maps available, you can continuously go back to the topographic maps and have students identify the areas or natural resources and how the lay of the land might impact/regulate the resource.*

**Handout 1**

**READING A TOPOGRAPHIC MAP \***

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.**

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