

DOGSTAILS in Clay Mountains

Some common varieties of landforms include—hills, mountains, valleys, and plateaus. What distinguishes hilly or mountainous terrain from relatively flat terrain? The amount of "relief"—that is, the amount of elevation change in the land surface within a given area. Sometimes it is important to have a map that shows the elevation of land on a flat paper surface—a topographic map. Why is this useful? Can hikers carry small three-dimensional models of the hills they walk? Not very easily! Maps are more convenient. In this exercise you will craft a miniature mountain from a lump of clay. You will then translate your mountain into a topographical map. The map will include vital features and information such as **date, orientation, grid, scale, title, author, index, legend, and sources**—or **DOGSTAILS**, for short. You will learn how to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Objectives:

Students will

- make a clay model of a mountain and then use it to create a topographic map; and
- analyze the spatial distributions and patterns shown on the resulting topographic map.
- learn what goes into creating a representational map

Materials:

- One ball of clay per student or group
- Toothpick
- Colored pencils
- Two sheets of drawing paper per student
- Rulers
- Thin fishing line
- Pencil

Procedure:

1. Knead the clay until it is very soft.
2. Place on a sheet of drawing paper.
3. Shape the clay into a mountain.
4. Once the mountain is complete, mark its peak with a dot.
5. Draw a straight line that passes through the dot while running from "north" to "south" across the mountain.
6. Draw a second line—running "east" to "west"—perpendicular to the first. The mountain should now appear to be divided into quadrants. These *orientation lines* will be important later.
7. About 0.5 cm from the base of the mountain draw a ring around the entire mountain.
8. Continue drawing horizontal lines around the mountain about every 0.5cm all the way up the mountain.
9. Lay the fishing line along the top line you have drawn (closest to the peak). Cross the fishing line over itself and hold the fishing line taut. Gently pull the two ends of the fishing line away from each other to slice through the clay along the line you have just drawn.
10. Repeat step 9 for each of the lines you have drawn all the way to the bottom line of the mountain. You should wind up with five to seven layers.
11. Place the bottom layer on a fresh sheet of paper and outline it. Be sure to mark where the orientation lines meet the paper.

12. Take the clay off the paper. Center the next layer up within the outline, using the orientation lines to make sure the clay is in the right position. Outline this layer. Then do the same thing with the remaining layers.
13. Assume that the base of the mountain was at sea level. Then assign elevations to the remaining levels. [Note: The intervals must be consistent.]
14. Color each layer and create a map key. [Note: Do not use blue, which is reserved for representing water.]
15. Add the other map essentials: date, orientation, grid, scale, title, author, index, legend, and sources—DOGSTAILS!
16. If time allows, exchange your paper map with another group and have them construct the corresponding mountain.

Conclusion:

On a separate piece of paper write what you have learned about topographical maps.