



North Pond Restoration: Topo Map

Learning the shape of the land

As part of the restoration of the North Pond Nature Sanctuary, (learn more at <http://lincolnparkconservancy.org/the-campaign-for-north-pond/>) we asked experts to make a topographic map (topo map) that tells us about the shape of the land around the pond, and another map (a bathymetric map) that shows us the shape of the land that makes the pond.

A topo map tells us about the elevation of the land, how high or low the hills are, how steep or gentle the slopes are. A topo map shows lots of concentric lines called contour lines. Each contour line shows the same elevation, or distance above (or below) a starting point. Two rules of contour lines are that 1) they can never cross each other and 2) they always connect in a “circle” (though sometimes the circle is off the edge of the map). When reading a topo map, imagine that you are a bird, or in an airplane looking straight down at the earth. When lines are closer together, that part is steeper, possibly even a cliff. When they are farther apart, that area is flatter. It may even look flat when you are there in person.

At the North Pond, a topo map tells us how high and how steep the land around the pond is. This helps us know where the water might flow into the pond after a rain, and where it might wash away the bank, potentially hurting the plants and the animals who want to live there. We can use this information to create places for water to flow, and plant plants that will thrive, so it helps the pond, rather than hurts it.

When we want to see how deep a pond, lake, or the ocean is, we call that a bathymetric map. Bathymetric maps also use contour lines to show how deep the water is in certain places. The bathymetric map we made of the North Pond tells us the pond is very shallow and helps us know where we need to make it deeper so the fish, turtles, and birds that want to live there can be healthy.

Materials: Collect a potato (or ball of clay or playdough), a sharp knife, toothpicks, a pencil, a sheet of paper, cardboard for under the paper, and a ruler.

Motivating Questions: How can you tell how tall something is? Could you do the same thing to figure out how deep it is? How many different ways could you draw it? Could you just use circles to make things look very tall or very short?

NOTE for Grownups: it is fun to do these activities with your children, but remember they (not you), should be the ones leading the activity. Letting them lead helps them to learn confidence and problem-solving skills.

Directions to make a Topo Map of Potato Mountain:

1. Cut the potato so it has a flat bottom. It is now Potato Mountain!
2. Use the ruler and a toothpick to draw a line all around the potato half an inch from the flat bottom. Draw another line all the way around one inch from the bottom. Keep



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drawing lines every half inch until you can't draw any more. You could also try making marks that are the same distance apart using a pastry cutter, a fork, or something similar.

3. These lines that you just make are your contour lines. Make your contour lines stand out by coloring them in with a marker, or possibly with food coloring.
4. Take a minute and look at your potato mountain. Look at it from the side and from the top. What do you notice about it?

When you look from the side, you can see that each line represents the same amount of height. When you look from the top, you get a preview of what the topo map will look like. Where the lines are closer together, the mountain is steeper.

Where they are farther apart, the mountain is gentler.

5. You can stop here or cut the slices and trace them to make a map on a sheet of paper. It can be helpful to stick a couple of toothpicks into the mountain so that you can always line up the slices.
6. Congratulations! You've just made a topo map of your potato mountain!
7. Try making a topo map of your hand. Draw circles around your knuckles and work your way down towards your wrist. What happens when you flatten out your hand?
8. Now that you've made a map of a mountain and of your hand, can you make a bathymetric map? Line a container with playdough and make the surface a little uneven. Create topo lines by gradually filling your pond with water.

Explore more topo map ideas and lesson plans:

<https://scouts.ie/Scout/Ideas-Games/21S-Map-and-Compass-Exercise-Potato-Contouring.pdf>

<https://laine.wordpress.com/2013/07/20/teaching-of-map-skills-potato-mountains/>

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

<http://homeschoolden.com/2013/03/25/earth-space-science-topographic-maps/>

<https://sites.google.com/site/geographymapskills/contours>

<https://spaceplace.nasa.gov/topomap-clay/en/>

https://pubs.usgs.gov/gip/19/downloads/Chapter_3/Activities/Play-dough_topo.pdf

http://koopsterscience.weebly.com/uploads/3/7/1/2/37128641/playdoh_topography.pdf

<http://scouterlife.com/blog//2012/05/topographic-map-activity.html>

<https://kids.kiddle.co/Bathymetry>

https://windows2universe.org/?page=/teacher_resources/teach_bathymetry.htm

<http://coexploration.org/ostv/pdfs/lesson2.pdf>

<https://nationalgeographic.org/encyclopedia/bathymetry/>

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Topo map images from the web

