**Lesson Plan: Topographic Maps**

**Grade:** 4th **Curricular Areas:** Science/Math Practices/Social Studies **Time:** 80 min.

**Key Concepts:**

Topographers use contour lines to show elevation of landforms.

**Learning Outcomes:**

Students will know how to read and understand a topographic map.

**Evidence of Learning:**

Students will create a three-dimensional topographic map of Angel Island including contour lines and their values.

Students will compare the elevation of Able Hill and Baker Hill.

**Standards:**

*Next Generation Science Standards:* 4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: Maps can include

topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

*Common Core State Standards Connections/Mathematics:*

MP.4 Model with mathematics. (4-ESS2-1)

*California State Standards:* HSS 4.1 Students demonstrate an understanding of the physical and human geographic features that define places and regions in California.

**Materials:**

Computer and Projector

Google Slide Presentation - Topographic Maps

32 copies of Able Hill and Baker Hill Topographic Map Handout

32 Sharpie Markers

32 glue sticks

32 pairs of scissors

32 Topographic Maps of Angel Island

130 plastic take out food containers

9 tape dispensers

**Teaching Strategies & Sequence:**

**INTO:**

*State Goals –* “Today, we are going to learn how map makers create maps to show elevation, or the height, of landforms. We’ll also practice how to read a topographic map. Then, we are each going to build a three dimensional topographic map of Angel Island.”

Google Slide Presentation - Topographic Maps

*Prior Learning/Connect with lives of students –* Slide #2, 3, 4, 5 - Whole group reviews what we already know about maps. We discuss the importance of why being able to figure out the elevation of various places is important. “If you’re tired, would you rather hike here, or here?”

**THROUGH**

1. Introduce Key Terms - Slides #6, 7, 8 - Topographic Map, Elevation, Contour Lines, Contour Interval
2. Review examples of topographic maps and discuss the meaning of key terms in relation to the maps.

Slide #9 - Point out that not all contour lines have a value written next to them. How can we tell the value of the unmarked lines? Find the difference between two darker marked lines, then divide by the number of intervals between the lighter unmarked lines. Discuss. What is the elevation of point A, B, C, and D?

Slide #10 - This map shows the relationship between a drawing of an actual mountain and a topographical map of the same mountain. Discuss. What do contour lines that are farther apart on the map show us about the mountain? What do contour lines that are closer together on the map show us about mountain? Point out that the farther apart the contour lines are, the more gradual the slope of the land. The closer the contour lines, the sharper the slope of the land.

Slide #11, 12, 13 - View 3 examples of topographic maps

1. Slide #14 - Now you try it! Pass out 1 paper copy of the Able Hill and Baker Hill topographic map to each student. Students glue or tape page into their science notebook and enter “Topographic Maps” in their Table of Contents.
2. Allow time for student partnerships to answer questions on handout. Keep slide #14 displayed during this time. Circulate and check for understanding.
3. Slide #15 - Whole group share out of handout. Discuss.
4. Tell students that we are going to each create a 3 dimensional topographic map of Angel Island.
5. Slide #16 - Ask if students have been to Angel Island. Choose a student to read a brief history of Angel Island. Discuss.
6. Demonstrate how to make the 3D map under the document camera.
   1. Cut out map.
   2. Tape the map to the inside of 1 plastic lid. Turn the lid over so the edges of the container are touching the table like an upside down bowl. Students should be able to see the map.
   3. Organize the 8 lids. Place the lid with the map on it on the table. Stack the next lid on top after you rotate it one time. Stack the next lid in the same position as the first. Continue stacking and rotating the direction. It is important to do this, so there will be some distance between lids, otherwise they’ll stack flat.
   4. Set the organized stack aside, except for the first one with the map.
   5. Use a sharpie marker and label the elevation at sea level - 0ft. on the first lid. Write the 0ft. in the upper left corner. Then, trace the contour line at sea level. This is the outermost line around the island.
   6. Stack the next lid on top - Be sure it does not lay flat against the first lid. Then, write the elevation in the left corner, slightly below 0ft. - Write 100ft. Trace the 100ft. contour line around the island.
   7. Remove the 100ft. and set aside.
   8. Continue stacking the next lid on top and continue writing the elevation on the left side a little bit below the previous elevation. Continue tracing the contour lines for each elevation until 700ft. One unit of elevation for each lid. Use the bottom lid with the map as your guide for each elevation.
   9. You may need to stack and restack as you work to be sure your lines and elevation marks are where they should be
   10. On the last lid, elevation 700, write ANGEL ISLAND at the top. Draw a compass rose and a key. Write name and number.
7. Distribute materials. One student from each table group gathers and distributes pre-organized materials for each student.
8. Students construct 3D topographic maps of Angel Island, teacher circulates and assists individuals as needed. Check for understanding with identified students.
9. Display Slide #17 while students are constructing their 3D map. - Directions.

**BEYOND:**

*Close –* Students write a reflection in their science notebook. Display slide #17 - What did you learn during this lesson? Think about: Topographic maps, elevation, contour lines and intervals, Angel Island, compass rose, map key, units of measurement, etc. What else do you wonder about these topics?

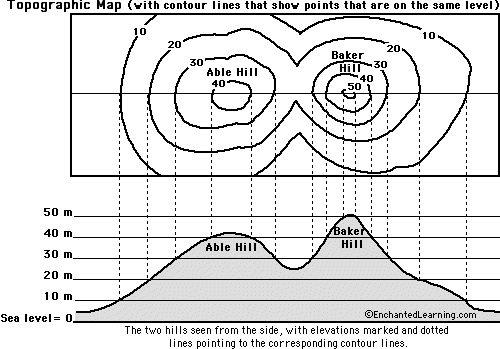
*Assess –* Observation/participation level of each student in discussion and activities, science notebooks, models of Angel Island.

**Ways to Differentiate Instruction:**

Struggling students may include fewer contour lines and use fewer lids.

Advanced students may include more details on their map.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Number: \_\_\_\_\_\_\_\_\_\_\_\_\_



What unit of measurement is used? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the contour interval? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Able Hill is more than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m, and is less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m.

The approximate height above sea level of Able Hill is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m.

Baker Hill is more than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m, and is less than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m.

The approximate height above sea level of Baker Hill is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m.

Which hill is taller and how do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What does a greater distance between contour lines tell us about the slope of the land?

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What does a lesser distance between contour lines tell us about the slope of the land?

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