

# MAKING MOUNTAIN MODELS

## 3D Models from Topographic Maps Using EVA Foam

### Curriculum topics

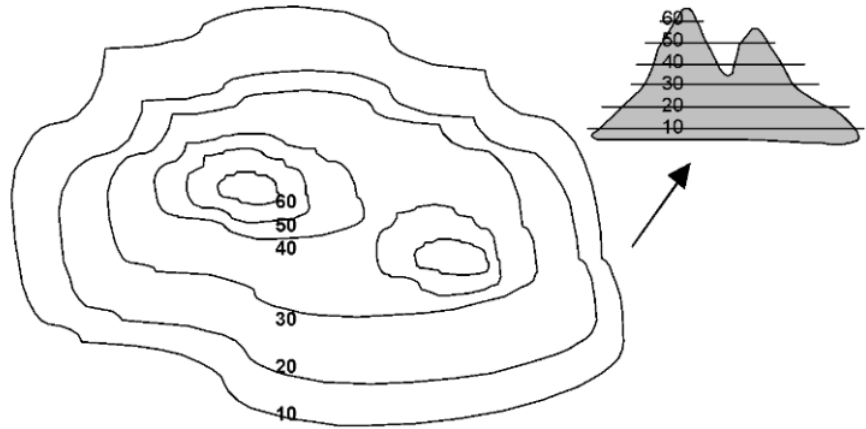
- Earth and Human Activity
- Earth Systems
- Geography
- Map Reading
- Modeling
- Spatial Thinking

### Subjects

- Earth & Space Science

**Grade range:** 2 - 8

**Who we are:** Resource Area for Teaching (RAFT) helps transform the learning experience by inspiring joy through hands-on learning.



Topographic maps are detailed, accurate 2D representations of the Earth's surface that shows natural and manmade features. They have imaginary lines drawn in that connect points on land that have the same elevation above or below sea level (see above). Students practice topographic map-reading skills, pattern identification, and model building as they draw a topographic map of a fictitious mountain and then build the mountain represented by the map's contour lines (see example below).



**Share Your feedback!**

<http://bit.ly/RAFTkitsurvey>

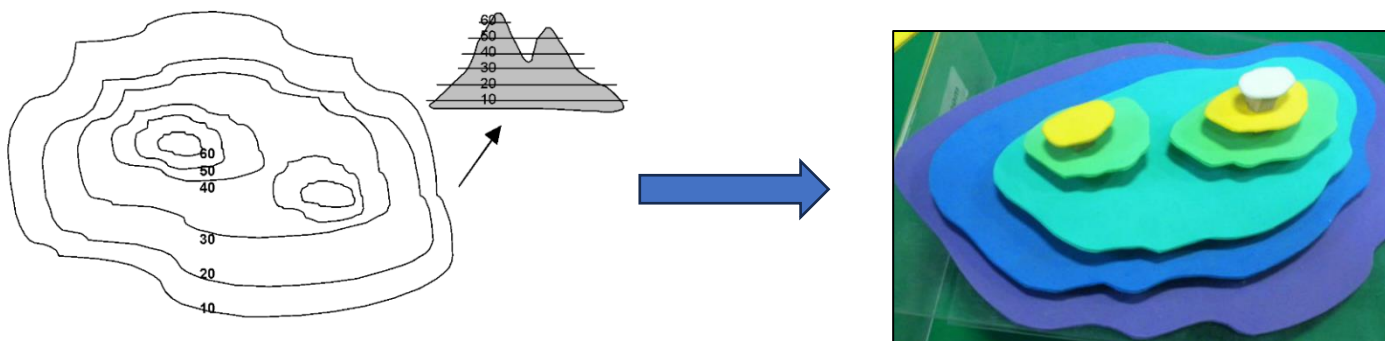
# Materials

Materials in the kit may vary but generally, this kit contains the following:

- EVA foam sheets, multiple colors (8)
- Paper, blank (2)
- **Not included:** Pencil, marker, scissors, glue
- **Optional:** Topo map images/shapes obtained online

## To Do and Notice

- 1** On a sheet of paper, draw a closed, rounded shape about 4" x 6" in size. Repeatedly draw similar shapes, each inside the previous shape with some spacing between the lines until there are 4 to 7 lines.
- 2** Copy or trace the drawing on another paper and keep it for later. Cut out the outermost shape from the drawing. In the example picture below (left), that means cutting along the line labeled with a 10.
- 3** Using the paper cut-out from step 2 as a template, trace that shape onto a foam sheet near one of the corners (this helps save some foam as you go). Cut out the newly traced shape from the foam sheet.
- 4** Cut away the first shape from the paper template, providing access to the next outermost shape on the template (see line labeled 20 in picture below, left).
- 5** Trace this second shape onto the foam sheet and then cut it out as before. Repeat this process until all 4-7 shapes have been cut out.
- 6** Use the copied/traced drawing from step 3 as a guide to stack the successive shapes on each other to build the 3D mountain model. **Optional:** Cut small squares or circles from leftover foam and put in between stacked layers as spacers (for more pronounced differences in elevation, shown below, right).
- 7** **Optional:** Create a 3D model of a real topographic map, such as the map of Hawaii on the next page, following the same process using cardboard, EVA foam, or other material.
- 8** Compare the stacked 3D model to the drawing. What differences, similarities, or patterns do you notice? What does this tell you about the mountain? What are the limitations and benefits of such a model?
- 9** **Share** your experience with RAFT! Submit photos/video via email at [education@raft.net](mailto:education@raft.net) or on social media ([Facebook](#), [Twitter](#), [Instagram](#)).



## Core Content Skills:

### Science & Engineering (NGSS)

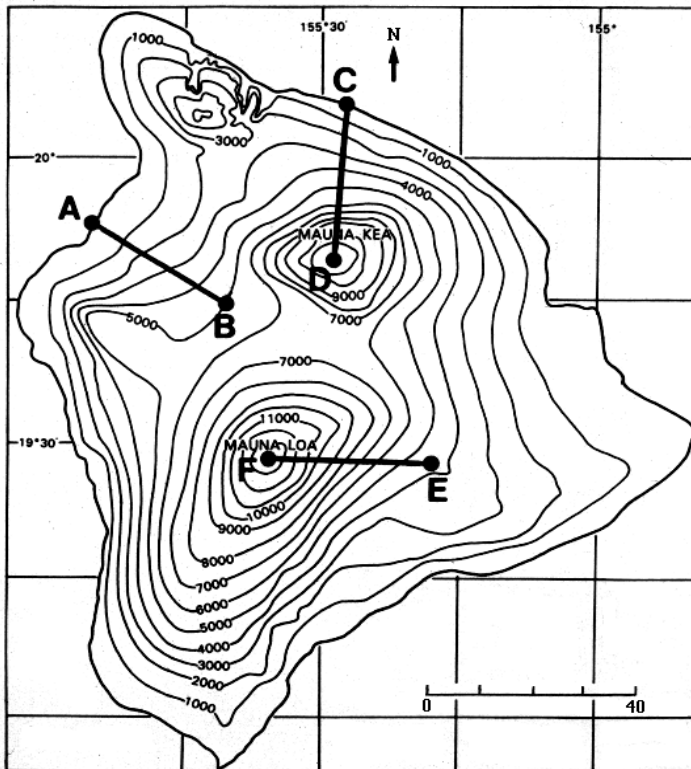
Developing and Using Models, Using Mathematics and Computational Thinking, Analyzing and Interpreting Data, Patterns, Earth Materials and Systems, Roles of Water in Earth's Surface Processes, Plate Tectonics and Large-Scale System Interactions

### Social Emotional Learning

- Self-awareness
- Self-management
- Responsible decision-making

# The Science Behind the Activity

Topographic maps provide a method to show a 3D landscape on a 2D map by showing **contour lines** that mark the surface of the landscape at regular elevation intervals. Topographic maps have many different uses such as aiding hikers in navigating terrain and helping scientists chart occurrences and types of plant and animal species by elevation and location. The field of map-making, cartography, is a sub-field of geography, important to both Earth Science and Social Science.



Topographic Map of Hawaii from: [https://personal.ems.psu.edu/~nese/f1\\_9.gif](https://personal.ems.psu.edu/~nese/f1_9.gif)

## Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

## Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know of any material concerns (missing, broken, or poorly fitting parts) as well as any suggestions for improvement.

Visit <https://raft.net> to view related activities!

3D Topo Views  
Pop Goes the Mountain

## Resources

- Topo Map Images - <https://bit.ly/3y6gsZL>
- How to Read a Topo Map - <https://bit.ly/3ycwSQi>