MAPPING THE SHAPE OF EVEREST

GUIDING QUESTION

How can a flat map show the shape of a mountain?

Students build a model of a mountain and map its topography, then apply their learning to a topographic map of Mount Everest.

75 MIN

Materials

- items for modeling a mountain, such as wastepaper basket, large cups, or posterboard stapled into a cone shape
- large fabric sheet
- yarn
- transparent tape
- scissors
- stepstool or chair
- digital camera *(optional)*

Handout

- Everest Scavenger Hunt

Film Clip

- "George Mallory's Route to Everest"

DIRECTIONS

1. Compare items that are 2-D and 3-D.

Explore with students the difference between something that is two-dimensional, or 2-D, and three-dimensional, or 3-D. Hold up a piece of paper and measure its length and width, then compare to a box's length, width, and height. Ask students how they might show something three-dimensional such as a person, computer, or car, in two dimensions. Ideas might include photographs or drawings.

2. Discuss the meaning of topography.

Explain that on the Earth's surface we measure distances in three dimensions too, with miles or meters from one place to another, and also distance above sea level, or elevation. Watch the film clip "George Mallory's Route to Everest." Have students describe the shape of the land Mallory, Irvine, and others on his team travelled to Everest. Ask: *Which areas have higher elevations than others?* Brainstorm ways that mapmakers might show the different shapes on the land, or topography. You can explain that topography comes from the Greek words *topos* meaning "place," and *graphos*, meaning "to write." Ask: *How might taking a picture from above help with showing topography of an area?*

3. Build a 3-D model of a mountain.

Set up next to a whiteboard or chalkboard. Place an upside-down wastepaper basket or another narrow, sturdy item on one edge of a desktop or on the floor. Place a smaller basket or item nearby. Drape a sheet over the baskets, letting the sheet flare out at the base. Explain that the class has recently discovered this mountain, and then have the students brainstorm a name for it.

4. Demonstrate contour lines on the model.

Have two students carefully place yarn at the base of the mountain and extend it around the entire mountain. Note: If the yarn does not cling, use tape to hold it in place. Emphasize that the yarn must remain at this same level of elevation all the way around. Propose that this is a contour line at 2000 m and label it with a sticky note or tape. Move up 10 cm and repeat the process with another piece of yarn. Be sure the students keep the yarn at the same elevation all the way around. Propose that this yarn encircles the mountain at 2100 m, and mark it. Continue moving up 10 cm and circling the mountain with yarn, parallel to the other lines and to the floor.

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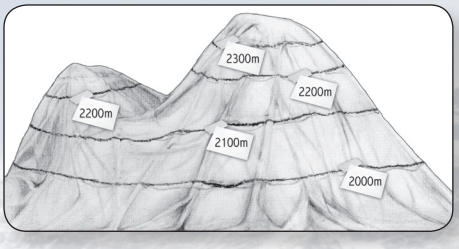
THE WILDEST DREAM
CONQUEST OF EVEREST

MAPPING THE SHAPE OF EVEREST



VOCABULARY

- cardinal directions
- contour line
- elevation
- topography
- topographic map

Label each line, adding 100 m to the line below it. Use as many pieces of yarn as needed up to the peaks. You may need to do two sets of circles near the top, one for each peak.

5. Create a 2-D map of the mountain's shape.

Taking safety precautions, stand on a stepstool or chair, looking down at the mountain. If possible, take a picture with the digital camera from directly above, then download and project the image on a screen. Alternately, draw a large rectangle on the board. Explain that this will become the flat topographic map. Draw the aerial view of the bottom yarn. This is a contour line representing the shape of the mountain at 2000 m. If it were possible to saw off the top of the mountain at this elevation, this would be the shape of the mountain's sides at 2000 m. Repeat the process with the second piece of yarn, and label it 2100. There should be two long shapes, one inside the other. Continue to sketch each contour line, creating the 2-D representation.

6. Discuss the 2-D map of the mountain.

Allow students to view the model in small groups and compare with the 2-D map. Have students find areas where the contour lines are close together. Then point out lines that are far apart. Ask: *When the contour lines are close together, are those areas more steep or less steep?* Explain that when lines on a contour map are far apart the area is less steep, and when close together the area is more steep.

7. Have students apply their learning to a map of Everest.

Together as a class or in small groups, have students explore the very detailed contour map of Mount Everest and the Himalaya online. Have students search for geographic features on the map, using **Handout 1: Everest Scavenger Hunt.** Help students move up and down the map and zoom in and out. This will be necessary so that the students can see detailed contour lines and read information on the map.

SUGGESTED RESOURCES

National Geographic Everest Map:
http://maps.nationalgeographic.com/maps/print-collection/himalaya-topography-map.html

Everest Scavenger Hunt Answers: 1. Students will likely name one of the glaciers; 2. Answers will vary, e.g., at the peak of Mount Everest; 3. 8,850 m and 29,035 ft.; 4. Close together. Climbing would be slow along this steep slope; 5. Far apart. Climbing might be faster since it's not as steep; 6. Answers will vary.

Name _____ Date _____

EVEREST SCAVENGER HUNT

HANDOUT 1

Use the Mount Everest and the Himalaya online map to explore the area's topography and answer the questions below. http://maps.nationalgeographic.com/maps/print-collection/himalaya-topography-map.html

1. Name a feature where contours are far apart.

Climbing in this area would be: ❍ more steep ❍ more flat

_____

2. Name a feature where contours are close together.

Climbing in this area would be: ❍ more steep ❍ more flat

_____

Check the box next to each feature as you find it. Then answer the questions:

3. ❍ **The summit of Everest**

What is the elevation of Mount Everest, in meters and feet? _____

4. ❍ **The Northeast Ridge of Everest**

The contour lines are: ❍ close together ❍ far apart

Describe what you think climbing might be like along the ridge.

_____

_____

5. ❍ **Dong Rongpu Glacier**

The contour lines are: ❍ close together ❍ far apart

Describe what you think climbing might be like along this glacier.

_____

_____

6. ❍ **International border between China and Nepal**

Why do you think the border might have been drawn here?

_____

_____

_____

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