

## Lesson 4: Representing Landforms on Maps

### ☐ Getting Started

In Lesson 3, you learned about a wide variety of landforms and how they were created, how they change over time, and how they influence the lives of the people who live near them. In this lesson, you'll learn about how geographers measure landforms and how they represent those measurements on different kinds of maps.

### Stuff You Need

- *The Geography Book: Activities for Exploring, Mapping, and Enjoying Your World* by Caroline Arnold
- crayons, markers, or colored pencils
- fine-tipped permanent marker
- flour\* (Activity 3 - optional)
- large potato
- modeling clay\* (Activity 3 - optional)
- newspaper\* (Activity 3 - optional)
- paint\* (Activity 3 - optional)
- paper clips
- ruler
- salt\* (Activity 3 - optional)
- sawdust\* (Activity 3 - optional)
- scissors
- sheet of newspaper
- tape measure
- wallpaper paste\* (Activity 3 - optional)

### Ideas to Think About

- How can the physical environment be represented visually, and how might different kinds of visual representations be useful?
- How can mapmakers accurately represent landforms like mountains or represent differences in elevation on a map?

### Things to Know

- Surveyors have specialized tools and procedures for measuring the height of features of the Earth's surface.
- Relief maps, color-coded maps, and contour maps can all show changes in elevation (the height of features like valleys, hills, and mountains).

### Activities

#### ☐ Activity 1: Measuring Mountains

In Lesson 3, you either created a graph or a model of some of the world's tallest mountains. How do geographers know how tall these mountains are? Scientists use specialized tools and techniques to accurately measure the height of landforms. In

this activity, you'll have the chance to estimate the height of something in your own area that is too tall to measure using a ruler or a tape measure.

Read pp. 54-55 in *The Geography Book* and then follow the instructions for measuring the height of a nearby object. You might choose a tall tree, the roof of your house, a building, or the tallest structure on a nearby playground. Ask an adult to help you with this activity - you will need to find a safe place to stand while you make your measurements, and you may need someone to help you hold the tape measure. Use the "Measuring Mountains" activity page to record your results.

### ☐ **Activity 2: Contour and Color-Coded Maps**

Once mapmakers know the height of landforms in a region, they can create maps that show the contour of the land from the highest mountains to the deepest valleys. Mapmakers can create three-dimensional relief maps to show elevation (see page 29 in *The Geography Book* for a description of relief maps), but they can also use contour lines or color-coding to show the elevation of land on a flat map. In this activity, you'll explore both of those kinds of maps.

Read pp. 31-32 in *The Geography Book* and then follow the instructions for marking the contours of a potato. Be sure to first ask an adult to cut the potato in half.

Next, use the "Contour & Color-Coded Maps" activity page to create a color-coded map of your potato's contours. After you have finished your map, be sure to discard your potato and clean up your work area.

### ☐ **Activity 3: Relief Maps (Optional)**

You may have already created relief maps, but if you have not and if you have some extra time this week, you can create a relief map using the instructions on pp. 29-30 of *The Geography Book*. The instructions call for sawdust and wallpaper paste, which you may not have on hand. Instead, you can use modeling clay or homemade play dough to make a relief map of a real or imagined place. (Refer to the "Relief Map Recipes" sheet for instructions on making the dough.)

If you want to make a paintable relief map, you can use paper mâché paste and strips of newspaper to create a relief map and then let it dry thoroughly before painting. (Refer to the "Relief Map Recipes" sheet for instructions on making the paste.) The paper mâché option will be messy, so before you begin, check with a parent to find a waterproof surface to use for the base of your map.

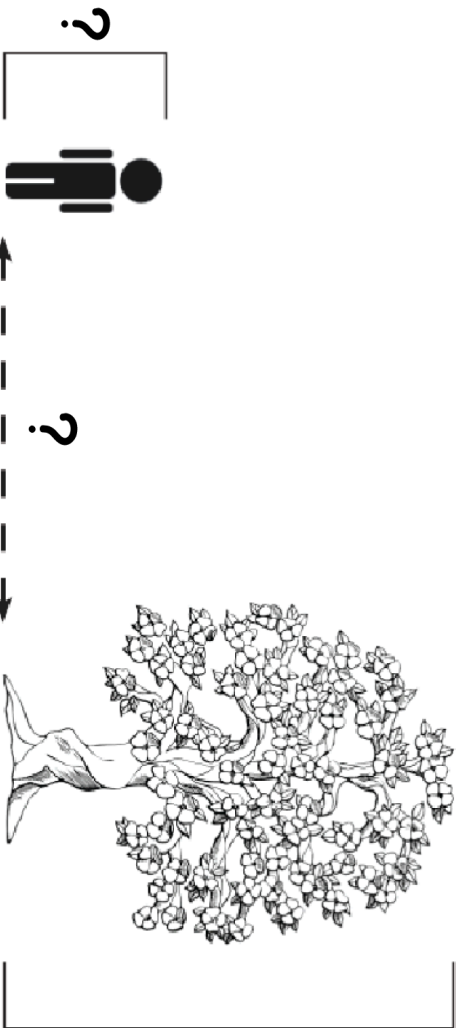
## Wrapping Up

Today you figured out how to estimate the height of a very tall object and how to represent elevation on different kinds of maps. Take some time to look through maps online or in an atlas and notice how cartographers choose to show elevations accurately.

# MEASURING MOUNTAINS

**Directions:** Use the formula provided to measure a tall object and complete your measuring chart.

**Your height + distance between you and the object = the approximate height of the object**



Convert the height in inches to the height in feet: \_\_\_\_\_

If you like, measure two more tall objects and record your results below:



1 foot = 12 inches

## Measuring Chart

What are you measuring? \_\_\_\_\_

Your height in inches: \_\_\_\_\_

Distance between you and the object in inches: \_\_\_\_\_

Approximate height of the object in inches: \_\_\_\_\_

|                                                      |                                                      |
|------------------------------------------------------|------------------------------------------------------|
| What are you measuring? _____                        | What are you measuring? _____                        |
| Your height in inches: _____                         | Your height in inches: _____                         |
| Distance between you and the object in inches: _____ | Distance between you and the object in inches: _____ |
| Approximate height of the object in inches: _____    | Approximate height of the object in inches: _____    |

# Contour and Color-Coded Maps

**KEY**

|                          |             |
|--------------------------|-------------|
| <input type="checkbox"/> | 0.0 – 0.25  |
| <input type="checkbox"/> | 0.25 – 0.50 |
| <input type="checkbox"/> | 0.50 – 0.75 |
| <input type="checkbox"/> | 0.75 – 1.0  |
| <input type="checkbox"/> | 1.0 – 1.25  |
| <input type="checkbox"/> | 1.25 – 1.50 |
| <input type="checkbox"/> | 1.50 – 1.75 |
| <input type="checkbox"/> | 1.75 – 2.00 |

**Directions:**

1. Trace your potato on the page.
2. Transfer the contour lines of your potato to your drawing. Your map should resemble the top view shown on p. 32 of *The Geography Book*.
3. Choose a color scheme to color each level of elevation indicated by the contour lines. If you decide to use a single color, select several shades of that color that get lighter at higher elevations.
4. Color in your contour map and key to show the contours and changes in height of your potato.

# Relief Map Recipes



**Directions:** Use these recipe cards to create a salt dough or papier-mâché paste that you can use to create a relief map of a real or imagined place. Be sure to ask a parent to help you find all of the necessary materials and to help you locate an appropriate place to work.

## Homemade Salt Play Dough

- 2 cups flour
- 1 cup salt
- About 1 cup of water

Mix flour and salt thoroughly. Add water, starting with about  $\frac{3}{4}$  cup and mix. Continue to add water until the mixture is the right consistency for modeling. If you find that the dough is too sticky, mix up more flour and salt (2 parts flour for each part salt) and add that dry mixture to the dough until the dough feels like it is ready for modeling. You can add food coloring to the mixture if you like. Store any unused dough in the refrigerator to use within the next couple of days.

## Homemade Papier-Mâché Paste

- 1 cup flour
- 2 cups water
- 2 Tbsp salt

Place flour in a bowl. In a large measuring cup, mix water and salt. Add to flour and stir to remove any lumps. You want a mixture that is the consistency of glue. To use, tear up newspaper into strips and coat them with the paste mixture. Wipe off any excess paste and use the strips for any papier-mâché project.

## Lesson 4: Representing Landforms on Maps

### Getting Started

#### ? Ideas to Think About

- How can the physical environment be represented visually, and how might different kinds of visual representations be useful?
- How can mapmakers accurately represent landforms like mountains or represent differences in elevation on a map?



#### Things to Know

- Surveyors have specialized tools and procedures for measuring the height of features of the Earth's surface.
- Relief maps, color-coded maps, and contour maps can all show changes in elevation (the height of features like valleys, hills, and mountains).

#### ⦿ Skills

- Identify and use models and maps as ways of representing landforms. (SS)

### Introducing the Lesson

In the previous lesson, your student learned about a number of different landforms. In this lesson, she'll have the chance to learn more about how surveyors measure the height of things that are too tall to be measured easily and how mapmakers represent different elevations on maps in different ways.

### Activities

#### Activity 1: Measuring Mountains

Your child will need to find tall objects to measure; things like trees, the roof of a house or shed, or tall playground equipment like a slide or a climbing structure would all work well. Be sure to help your child find a safe place to stand for this activity, and be available to assist her with her measurements.

#### Activity 2: Contour and Color-Coded Maps

Your child will mark a potato, allowing her to see how a contour map works. You should cut the potato in half for her for this activity. Your child will then use a color-coding system of her own invention to create a color-coded map of the potato.

#### Activity 3: Relief Maps (Optional)

If your child has the time and interest, you can invite her to follow the instructions on pp. 29-30 of *The Geography Book* to make a relief map of a real or imagined place. The book calls for sawdust and wallpaper paste, but your child can create a map with more readily available materials like modeling clay, homemade play dough, or papier-mâché materials. An activity sheet provides recipes for both the dough and papier-mâché paste.

**Wrapping Up****Questions to Discuss**

- How do cartographers show elevation on a map? (Relief maps show the height of the land.)
- Which kind of map do you think is the easiest to use and understand? Why? (Answers will vary.)
- Which kind of map was the most interesting to make? (Answers will vary.)

**Things to Review**

- Review your child's activity pages, being sure to check the mathematical calculations for Activity 1.
- You might ask your child why she chose the colors that she used for the color-coded map in Activity 2.