Introduction
One of the many tools used to study Earth’s landscape is a topographic map, which represents Earth’s three-dimensional surface in two dimensions. Topographic maps use contour lines to show elevation, or height above sea level, on a two-dimensional surface. A contour line joins points on a map that have the same elevation. Contour lines never intersect. The difference in elevation between one contour line and the next contour line is the contour interval.

In this investigation, you will interpret the contour lines on part of a topographic map and use them to create a three-dimensional model, or landform.

Problem
How can you use a topographic map to create a landform?

Pre-Lab Discussion
Read the entire investigation. Then work with a partner to answer the following questions.

1. Applying Concepts How does a topographic map show the elevation of the land?

2. Forming Operational Definitions In your own words, define the term contour interval.

3. Inferring Why can contour lines never intersect?
4. **Interpreting Diagrams/Photographs** What kind of topography is indicated by contour lines that are very close together? By contour lines that are very far apart?

5. **Using Models** What is the advantage of creating a landform from a topographic map?

**Materials** *(per group)*
- transparent shoebox with lid
- nonpermanent, fine-lined marking pen
- enlarged photocopy of part of a topographic map
- cellophane or masking tape
- modeling clay
- metric ruler

**Procedure**
1. Place the topographic map provided by your teacher inside the lid of the plastic box so that the map can be seen through the top of the lid. Secure the map to the lid by using small pieces of tape near the map's corners.

2. Place the lid on your desktop or table. Use the nonpermanent marking pen to trace the topographic map onto the box lid. When you have finished tracing every contour line, remove the map from the inside of the lid and put the lid aside.
3. Use the marking pen and the metric ruler to make a centimeter scale along one of the vertical sides of the box, as shown in Figure 1.

4. Find the lowest elevation on the topographic map provided by your teacher. Write this elevation next to the bottom edge of the box.

5. Determine the contour interval of your topographic map. Each centimeter mark on the side of the box will represent the same vertical distance as the contour interval. Next to each centimeter mark, write the actual elevation in meters.

6. Use the modeling clay to make the first layer of the landform on your topographic map.

7. When you have finished the first layer of the landform, check it for accuracy. Do this by placing the lid on top of the box. Looking down through the lid, compare the landform with the corresponding contour lines on the map, as shown in Figure 2. Remove, add, or reshape the modeling clay, if necessary.

8. Repeat Steps 6 and 7 for each layer of the landform until all of the contour lines of the map have a corresponding layer on the landform.

9. After you have finished your model, use the following questions to record your observations.
Observations
1. What is the contour interval of the topographic map you used to make the landform?

2. Describe the shape of the landform you constructed.

3. How many meters above sea level is the base of your landform? How many meters above sea level is the top of your landform?

Analysis and Conclusions
1. Using Models What does your landform indicate about the region modeled?

2. Drawing Conclusions What might you conclude about the overall Earth processes that shaped the region that you modeled? Explain your answer.
3. **Interpreting Diagrams/Photographs**  Look at the topographic maps in Figure 3 on the next page. How does the topography of the Southwest map differ from the topographic features depicted in the other maps?


4. **Comparing and Contrasting**  Compare and contrast the topographic maps of the Southeast and the Southwest shown in Figure 3. Compare the processes that formed each landscape.


5. **Inferring**  Why do you think the landscape varies so much throughout the United States?


**Go Further**
Repeat the investigation using one of the two other maps shown in Figure 3 on the next page. Or obtain a topographic map of a small region in your state and make a three-dimensional landform of the region. Be sure to choose a region that does not cover too large an area and does not have too great a change in elevation so that your landform will still be reasonably accurate. Before you attempt this activity, show your map to your teacher. When your teacher approves your map, carry out the investigation. When you have completed the model, record your observations.
Figure 3  Some Hypothetical Topographic Maps from Different Parts of the United States