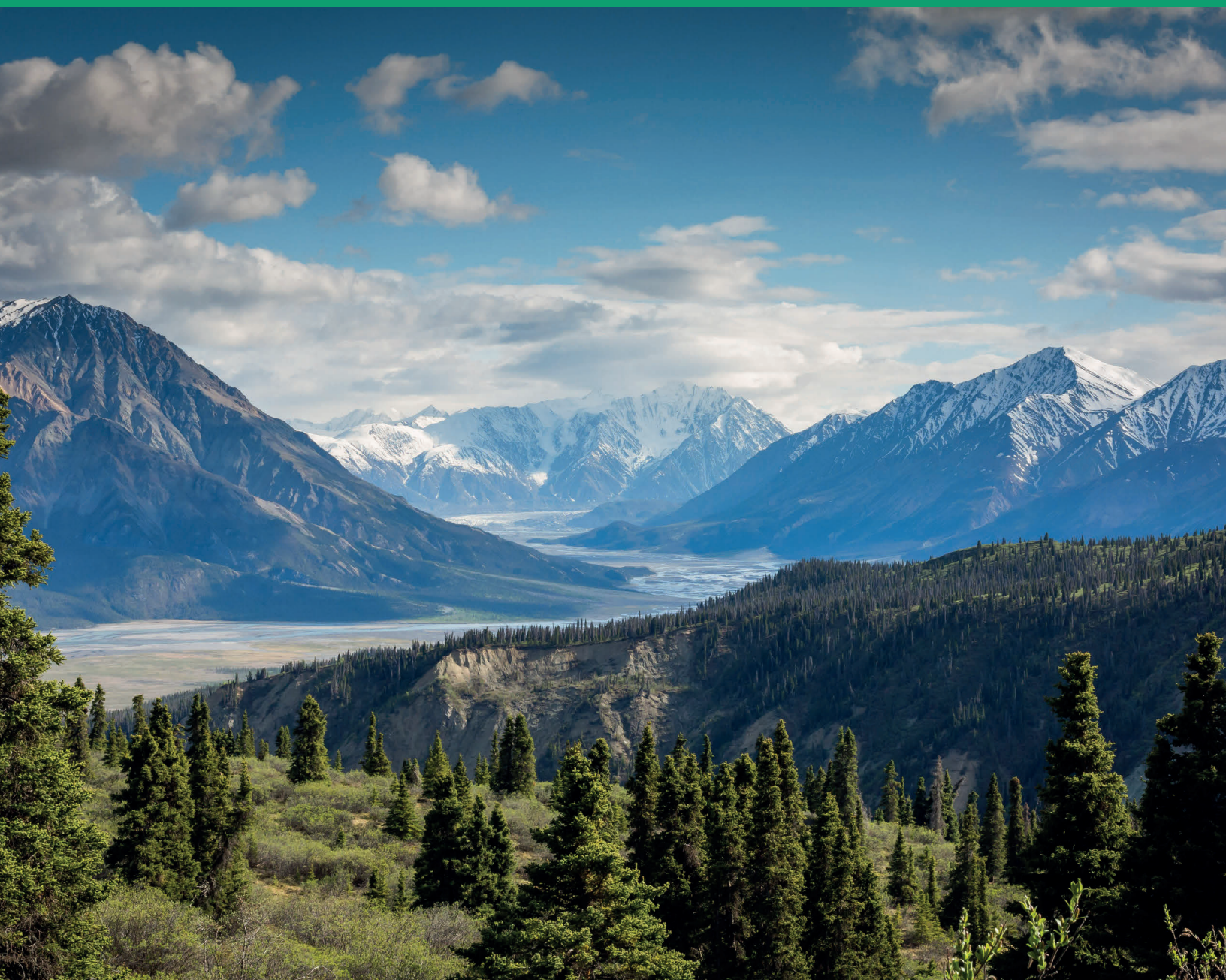


MAKING A MOUNTAIN MAP

What is Topography and How is it Shown on a Flat Map?

Andrea Ludwig, Associate Professor

Jennifer DeBruyn, Associate Professor, Department of Biosystems Engineering and Soil Science



Making a Mountain Map

What is Topography and How Is It Shown on a Flat Map?

Skill Level

- Intermediate (6th-8th grades)
- Advanced (9th-12th grades)

Learner Outcomes

The learner will be able to:

- *Identify topographic map features*
- *Create contour lines that represent elevation change*

Tag(s)

4-H Science

Success Indicator

Students are successful if they can:

- *Understand that a map is a 2-D representation of a 3-D landscape.*
- *Define contour lines.*

Time Needed – 60 minutes

Materials Needed

- Topographic map
- Play dough
- Clear plastic container, roughly 8 inches long, 8 inches wide, and at least 2 inches high (a higher container will allow for taller landforms)
- Measuring cup or mason jar with 100 milliliter gradations
- Pitcher of water
- Clear transparencies
- Permanent sharpies or erasable markers
- Ruler
- Optional: food coloring

Author(s)

Andrea Ludwig, Associate Professor
Jennifer DeBruyn, Associate Professor
Department of Biosystems Engineering and Soil Science

Introduction to Content

Topography is the relief or change in elevation across the land. Topographic maps are 2-dimensional models of the 3-dimensional landscape with relief. Topographic maps show elevation information using contour lines and points of interest (like roads, streams, lakes and buildings). Landforms can be identified on a topographic map, such as ridges, valleys, rivers, floodplains, buttes, islands, plains, peaks, peninsulas, mesas, plateaus, etc. All maps include a scale, which is used to measure relative distance on the map that indicates actual distance in the 3-dimensional landscape.

Contour lines join points on a map with equal elevation. Every contour line eventually connects at the ends (or runs off the map). Contour lines generally do not cross because there is only one elevation value for any given location. An exception to this would be an overhanging ledge. The contour interval is the change in elevation between contour lines. The closer the contour lines are to each other, the steeper the slope of the landscape. The farther apart the contour lines, the flatter the landscape.

Introduction to Methodology

This activity can use local examples of landforms and points of interest that would be familiar to students. In this lesson, students will be introduced to the concept of topography and different geographic terms. Students will then compare and contrast their mountain maps with one another to identify key terms and concepts.

Setting the Stage

Ask your students:

- What is topography?
- What does a topographic map show us?
- What is a contour line?
- What kinds of information do topographic maps provide us?

Experience

1. Break students into pairs or small groups.
2. Give the students 10 minutes to make their own landscapes with play dough in the bottom of the container. The dough shouldn't cover the entire bottom. Relatively simple landscapes with nice rolling features are recommended (for ease of mapping). Intricate and small features will not be able to be mapped. Make sure the students create ridges/mountains (high points) and valleys (low areas). Do not exceed the top of the container with the play dough structures. For young groups, consider making your play dough landscape first and then asking the students to replicate it.
3. Place transparency over the top of the container. Mark the four corners of the container on the transparency with light-colored guidelines. These will help line up the transparency each time it is replaced on the container.
4. Demonstrate this step, then ask the students to repeat. Place transparency over the top of container, lining up the four corners of the container with the small guidelines made in the previous step. Look directly down into container and notice the relief of the model below. Trace the bottom of the play dough landscape (this may be the bottom of the container). Label this line as 0 feet. This represents the lowest elevation of the topographic map. Identify this line as a contour line, which is a line that joins points of equal elevation.

Strategies to Increase Student Engagement

- Make it local! Before the learning session, ask your students to go to Google Earth and look around their county, city or community. Ask them to write a paragraph about what they observe from the aerial photography. Compare and contrast what they can see versus what they can't see.

Teacher Notes

5. Demonstrate this step, and then ask the students to repeat. Fill the measuring cup with 100 milliliters of water. Pour the water into the container, evenly distributing it across the landscape. The water line will represent a new elevation, the second contour. Draw the second contour line, tracing around where the water and play dough meet. Label this contour as 30 feet (or other length unit). If your container is relatively large, then increase the water additions to 200 milliliters or other adequate volume. Ideally, six to eight contours will create an interesting map. Therefore, it should take 6-8 volumes of water to fill the container.

6. Repeat Step 5 until the landscape is completely submerged. Each addition of 100 milliliters will represent another 30 feet of elevation change. Be sure the added water volumes are consistent so that the contour line intervals will be consistent. The final contour will represent the peak of the topography. All contours should be either closed (meet up end to end to create a circle or amoeba shape) or go off of the map space (stop when it hits the boundary of the container).

Share

Once every group has completed their map, ask them to share their 3-D landscape in a box and the 2-D topographic map and point out the geographic landforms they mapped.

Process

Ask students to identify 1) the highest elevation and the lowest elevation on the map, and 2) steep areas with high slope (close contour lines) and flat areas with low slope (spaced out contour lines).

Generalize

Common Tennessee Landforms:

Plateau	Valley	Channel	River
Swamp	Bluff	Mountain	Hill
Ridge	Saddle	Plain	Basin
Floodplain	Lake		

Apply

Show the students a topographic map of the local area. Topographic maps are available for purchase or free download from the United States Geologic Survey (<http://tinyurl.com/TN4Husgsmaps>). Break into small groups of 3-5 depending on how many maps you have. Ask your students to:

- Locate their school/camp/home on the map.
- Name the nearest creek, stream or river.
- Point out at least five geographic landforms (see “Geography Terms” resource).
- Identify the scale of the map (What does one inch on the map represent?).

Supplemental Information

Educational Standards Met

CLE 3204.3.7 Investigate how maps can be used to interpret changes in the earth system

CLE 93204.3.16 Interpret topographic maps

TIPPS *Life Skills*

Working with group members to complete a task. (Hands Working)

Using reasoning and new concepts from the lesson to accomplish a task. (Head Thinking)

GEOGRAPHY TERMS





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