



Elevation Above and Below



Death Valley National Park

Dynamic Death Valley Pre-Trip

Two 1 hour periods

Essential Question: What does sea level mean, and how does it relate to elevation?

Standard(s):

Next Generation Science Standards: 4-ESS2-2 Analyze and interpret data from maps to describe patterns of the Earth's features.

Common Core Standards: 4.RI.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Objectives:

Students will be able to:

- describe elevation.
- explore topographic maps to form a clear understanding of elevation.
- use sea level as a reference point while describing elevation.
- analyze and interpret data to make sense of phenomena using logical reasoning.

Overview:

For this activity students will explore the way topographic maps are used to describe elevation such as “sea level,” “below sea level,” and “above sea level.” Students will compare and contrast side view diagrams of mountains and valleys to topographic maps. Students will use their own hands to create a topographic map of their own.

Teacher Background Information:

Death Valley's Badwater Basin is the lowest point in North America at 282 feet below sea level. This is often a difficult concept for students to grasp. There are common misconceptions as to why Death Valley is so low. One common misconception is that there was once an ocean in Death Valley, but it dried up. Another misconception is that Death Valley was created by a river's erosion. The reason Death Valley's Badwater Basin is so low is that the stretching of the earth's crust has dropped this location to such depths.

In order to have exposed land below sea level, the climate must be extremely dry. In wet places, low points fill with water and overflow to the sea. A dry climate evaporates water, leaving behind salt flats.

Materials:

- 1 washable ball point pen or marker per student
- 1 projector
- 1 document camera (such as Elmo)
- Topographic map worksheet per student

Procedure:

Anticipatory Set

Ask students if they have ever looked at a map. Ask them to describe the map to a partner. After 5 minutes of partner discussion, ask the students to begin engaging in classroom discussion based on what they see on a map.

Video

[“What is topography?”](#) by Monkey See

<https://www.youtube.com/watch?v=K-UXrpAjyI0>

PowerPoint Presentation

Using the Topographic Maps PowerPoint presentation, introduce the concept of elevation and topographic maps. Compare and contrast the side view and topographic map view with the students.

- What does Badwater look like from the side view?
- What does Badwater look like from the top view?
- What does the Panamint Mountain Range look like from the side view?
- What does it look like from the top view? (You may need to point out the line spacing as a clue).

Next, using the presentation, explain to the students how the terms “above sea level” and “below sea level” are used. During this section, address the misconception that “below sea level” must mean that the place is below the surface of the ocean or that a sea once was in that location.

Photos are provided in the presentation to reinforce that the locations in Death Valley are not underwater. Instructor should make it clear to the students that “below sea level,” does not necessarily mean that there was ever any water there, but that it is a phrase used to describe elevation. Some slides have teacher notes to assist with the presentation.

Topographic Map Hands Lab Activity

For student success teacher should work alongside the students using a document camera and projecting their hand on the screen.

- 1) Review topographic map lines in the PowerPoint. Take note of peaks and valleys.
- 2) Form fist with less dominant hand.
- 3) Point out the knuckles. Are they taller than the rest of your hand?
- 4) Trace the highest part on top three knuckles first. Make sure it is three separate circles representing the peaks.
- 5) Continue making contour lines around the knuckles.
- 6) Keep tracing until there are lines to the middle of your hand.
- 7) Take note of the where the irregular shapes, the higher points (or mountains) are located.
- 8) Students analyze their own hand.
- 9) Ask them to place their finger on the peak.
- 10) Ask them to put their finger in the lowest point.
- 11) Ask how they knew it was the lowest point.



This activity is adapted from [“Topographic Map Activity”](#)

<http://www.scouterlife.com/blog//2012/05/topographic-map-activity.html>

Extensions:

To reinforce the concept of “below sea level”:

During the hand activity, identify one of those lines as sea level. This could be a dashed line instead of a solid line so that students remember which one is “sea level” on their hand. Ask the students to point to a place on their hand that is above sea level. Ask the students to point to a place that is below sea level.

Enrichment Questions:

- Looking at a topographic map, how might we tell that one mountain is taller than another?
- Imagine you are planning a trip using your hand map. You are going to travel from your thumb to your little finger. You want to take the easiest way. Which way would you plan to go? Why?

Vocabulary:

Elevation: Height or given level, especially sea level.

Sea Level: the level of the sea's surface, used in calculating the height of landforms such as hills, mountains, and salt flats.

Topographic Map: map showing natural and human-made features of the land and marked by contour lines showing elevation.

Assessment:

Use the Topographic Maps Worksheet to assess learning. For this assessment, students will need to pick out the highest and lowest points, and write their elevations. Students should use the words “below sea level” and “above sea level” when describing elevation.

References:

[National Geographic- Elevation](https://www.nationalgeographic.org/encyclopedia/elevation/)

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This lesson plan was developed through the Teacher-Ranger-Teacher program.