6.NS Mile High

Alignments to Content Standards: 6.NS.C.5

Task

Denver, Colorado is called “The Mile High City” because its elevation is 5280 feet above sea level. Someone tells you that the elevation of Death Valley, California is −282 feet.

a. Is Death Valley located above or below sea level? Explain.

b. How many feet higher is Denver than Death Valley?

c. What would your elevation be if you were standing near the ocean?

IM Commentary

The first two parts of this task ask students to interpret the meaning of signed numbers and reason based on that meaning in a context where the meaning of zero is already given by convention. In 7th grade, students will be asked to connect this reasoning to finding the difference of signed numbers, but they are not expected to know how to add and subtract signed numbers in 6th grade.

The third part is meant as a discussion point about what, exactly, "sea level" means, and will require teachers either to supply more information about the meaning of sea level or to encourage students to research this. Since the oceans have tides, sea level is defined to be the average height of the ocean surface (and is technically called mean sea level). As a result, it is possible to be standing at the edge of the water and be at a negative elevation if the tide is low. The first two parts of the task are straight-forward; the third part could provide a good tie-in to a science lesson.
Solution

a. Death Valley is located below sea level. We know this because its elevation is negative. Sea level is the base for measuring elevation. Sea level elevation is defined as 0 ft. All other elevations are measured from sea level. Those places on Earth that are above sea level have positive elevations, and those places on Earth that are below sea level have negative elevations. Thus, Death Valley, with an elevation of -282 feet, is located below sea level.

b. To find out how much higher Denver is than Death Valley, we can reason as follows:

Death Valley is 282 feet below sea level. Denver is 5280 above sea level. So to go from Death Valley to Denver, you would go up 282 feet to get to sea level and then go up another 5280 feet to get to Denver for a total of

\[282 + 5280 = 5562.\]

Thus, Denver, Colorado is 5562 feet higher than Death Valley, California.

c. If you were standing near the ocean, your elevation would be close to zero. Depending on how high or low the tide is and where exactly you are standing, your elevation could be as low as -50 feet (or as high as 50 feet) if you are at the edge of a very low tide (or a very high tide, respectively) at the Bay of Fundy.