

# Mt. Saint Helens Volcanic Eruption

## Using Basic Math Skills to Analyze a Disaster



When am I ever going to use this? ”  
Using the concepts in this worksheet, you will be able to use basic math skills to analyze the impact of a natural disaster.

On May 18, 1980, Mount Saint Helens erupted. The volcano had not erupted for more than 130 years. However, earthquakes at the mountain in March 1980 let scientists know that magma was moving inside the volcano. Finally, at 8:32 a.m. Pacific Daylight Time on May 18, the mountain exploded.

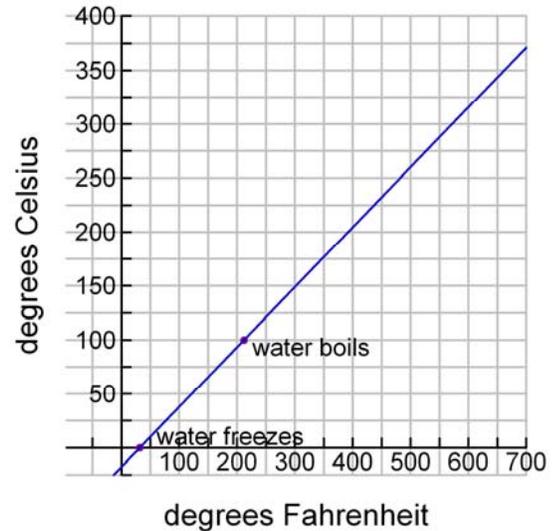


Photo Credit: Austin Post, US Geological Survey

1. The elevation of the summit of the mountain was 9677 feet before the eruption. After the eruption, the summit elevation was 8363 feet.
  - a. By how many feet did the elevation change?
  - b. What percent of the mountain's elevation was lost in the eruption? (Hint: Use a calculator to divide the answer in part (a) by the original elevation. Then convert the solution from a decimal to a percent.)
2. When the mountain erupted, a huge crater was formed. The crater was more than 1 mile across. The elevation of the floor of the crater was 1914 meters. The elevation of the after-blast summit was 2549 meters. What is the distance from the crater floor to the after-blast summit?

3. The speed of the lateral blast of the volcano was at least 483 kilometers per hour. What was the speed of the lateral blast in miles per hour? (Hint: There are 0.62 miles in one kilometer.)

4. The intense heat of the lateral blast reached as high as 660 degrees Fahrenheit. That is hotter than the hottest temperature of your kitchen oven. Use the graph to estimate how many degrees Celsius are equal to 660 degrees Fahrenheit? (Hint: Water freezes at 0 degrees Celsius (32 degrees Fahrenheit) and water boils at 100 degrees Celsius (212 degrees Fahrenheit).)



5. The height of the massive column of steam and ash reached 80,000 feet in less than 15 minutes. Within three days, the ash cloud had spread across the United States. Within 15 days, the ash cloud had circled the earth. Assuming that the ash cloud moved around the earth at a constant speed, what fraction of the distance around the earth did the cloud travel in the first six days?

*The author of this activity remembers well the day of the eruption. It was Sunday and he was outside feeding his sheep on the family farm in Ellensburg, Washington. He observed a large black cloud moving in from the west. Although it was midmorning, the sky turned black and a “rain” of dust fell from the sky. The sky remained black all day long except for a small band of light around the horizon. After the sun set, the entire sky was black. When the family awoke in the morning, a 1/2 inch layer of grey ash covered the ground. Schools were closed for a week while people cleaned up the ash. Even today, a layer of ash may be seen a few inches below the surface of the ground.*

# Mt. Saint Helens Volcanic Eruption

## Using Basic Math Skills to Analyze a Disaster

“When am I ever going to use this?”  
Using the concepts in this worksheet, you will be able to use basic math skills to analyze the impact of a natural disaster.

On May 18, 1980, Mount Saint Helens erupted. The volcano had not erupted for more than 130 years. However, earthquakes at the mountain in March 1980 let scientists know that magma was moving inside the volcano. Finally, at 8:32 a.m. Pacific Daylight Time on May 18, the mountain exploded.



1. The elevation of the summit of the mountain was 9677 feet before the eruption. After the eruption, the summit elevation was 8363 feet.

a. By how many feet did the elevation change?

$$\begin{array}{r} 9677 \\ -8363 \\ \hline 1314 \end{array}$$

*The elevation changed by 1314 feet.*

- b. What percent of the mountain's elevation was lost in the eruption? (Hint: Use a calculator to divide the answer in part (a) by the original elevation. Then convert the solution from a decimal to a percent.)

$$\frac{1314}{9677} \approx 0.1358$$

*The mountain lost 13.58% of its elevation.*

2. When the mountain erupted, a huge crater was formed. The crater was more than 1 mile across. The elevation of the floor of the crater was 1914 meters. The elevation of the after-blast summit was 2549 meters. What is the distance from the crater floor to the after-blast summit?

$$\begin{array}{r} 2549 \\ -1914 \\ \hline 635 \end{array}$$

*The after-blast summit is 635 meters above the crater floor.*

Photo Credit: Austin Post, US Geological Survey

3. The speed of the lateral blast of the volcano was at least 483 kilometers per hour. What was the speed of the lateral blast in miles per hour? (Hint: There are 0.62 miles in one kilometer.)

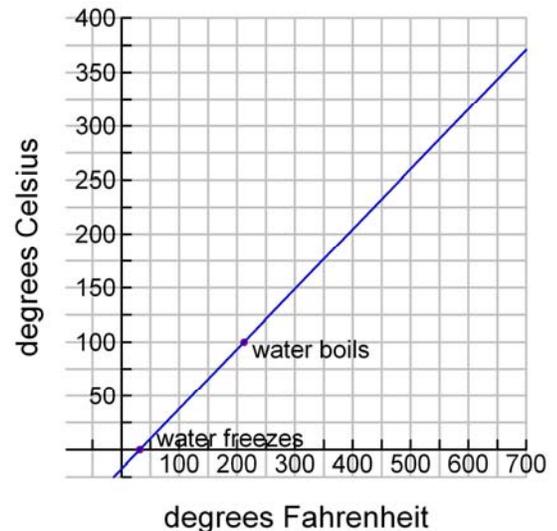
$$483 \frac{\text{kilometers}}{\text{hours}} \times \frac{0.62 \text{ miles}}{1 \text{ kilometer}} = 483 \times 0.62 \text{ miles per hour}$$

$$\begin{array}{r} 483 \\ \times 0.62 \\ \hline 9.66 \\ 289.80 \\ \hline 299.46 \end{array}$$

*483 kilometers per hour is the same as 299.46 miles per hour*

4. The intense heat of the lateral blast reached as high as 660 degrees Fahrenheit. That is hotter than the hottest temperature of your kitchen oven. Use the graph to estimate how many degrees Celsius are equal to 660 degrees Fahrenheit? (Hint: Water freezes at 0 degrees Celsius (32 degrees Fahrenheit) and water boils at 100 degrees Celsius (212 degrees Fahrenheit).)

*From the graph it appears that when degrees Fahrenheit is equal to 660, degrees Celsius is about 350. That is, 660 degrees Fahrenheit is approximately the same as 350 degrees Celsius.*



5. The height of the massive column of steam and ash reached 80,000 feet in less than 15 minutes. Within three days, the ash cloud had spread across the United States. Within 15 days, the ash cloud had circled the earth. Assuming that the ash cloud moved around the earth at a constant speed, what fraction of the distance around the earth did the cloud travel in the first six days?

$$\frac{6}{15} = \frac{\cancel{3} \times 2}{\cancel{3} \times 5} = \frac{2}{5}$$

*The ash cloud traveled  $\frac{2}{5}$  of the distance around the earth in the first six days.*

*The author of this activity remembers well the day of the eruption. It was Sunday and he was outside feeding his sheep on the family farm in Ellensburg, Washington. He observed a large black cloud moving in from the west. Although it was midmorning, the sky turned black and a "rain" of dust fell from the sky. The sky remained black all day long except for a small band of light around the horizon. After the sun set, the entire sky was black. When the family awoke in the morning, a 1/2 inch layer of grey ash covered the ground. Schools were closed for a week while people cleaned up the ash. Even today, a layer of ash may be seen a few inches below the surface of the ground.*