

# On Top of the World

NAME \_\_\_\_\_

Mount Everest is the highest mountain on Earth. Straddling the border between China and Nepal, its summit reaches 29,035 feet above sea level.



The first climbers to ascend Everest were Sir Edmund Hilary and Tenzing Norgay. They reached the summit on May 29, 1953. Can you imagine the view that they got from the top of the world? In this activity, you will consider the distance a person can see to the horizon when standing at the top of Mount Everest.

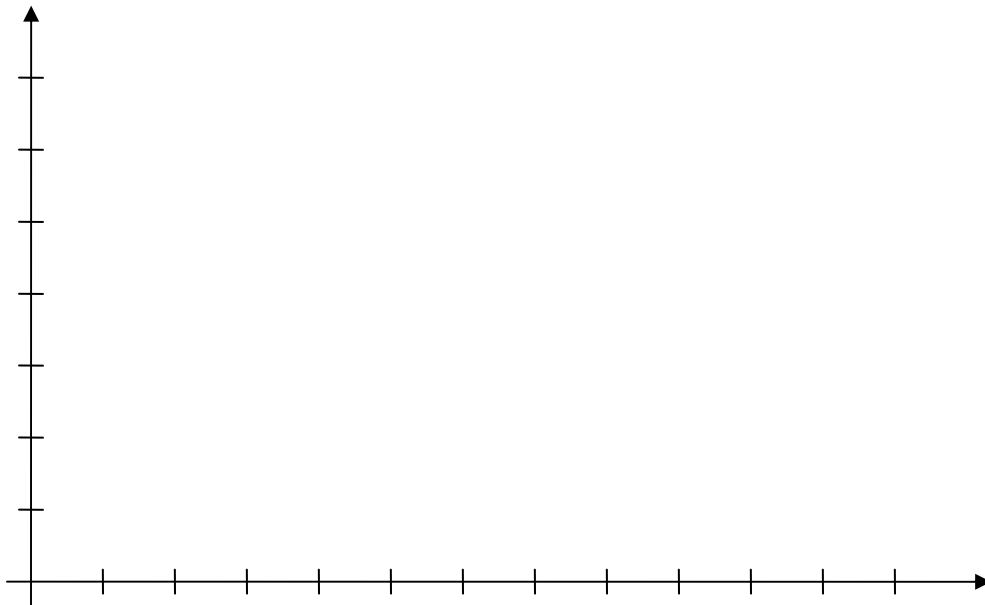
1. If you were standing at the top of Mount Everest, how far do you think you would be able to see to the horizon? Give your estimate in miles.
  
  
  
  
  
  
  
  
  
  
2. What strategies could be used to determine the exact distance that you could see to the horizon from the top of Mount Everest? Discuss this question with some of your classmates, and then list at least two possible strategies.

## Algebraic Approach

The table below shows the distance to the horizon (in miles) from various heights above sea level (in feet).

HEIGHT ABOVE SEA LEVEL (FEET)	DISTANCE TO THE HORIZON (MILES)
0	0
100	12.2
500	27.4
1,000	38.7
5,000	86.6
10,000	122.5
20,000	173.3

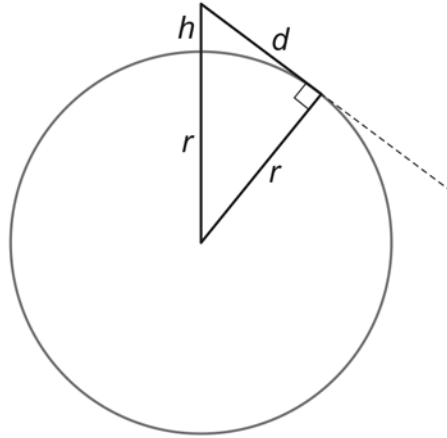
3. Plot this data on a scatterplot.



4. Enter the data into a graphing calculator. Conduct some regression calculations to generate a function that will predict the distance to the horizon if the height above sea level is known. (For some types of regression, you may need to delete the point  $(0,0)$  from the list.) What equation best fits the data? What type of function is it?
5. Using your function, determine the distance to the horizon from the summit of Mount Everest.

## Geometric Approach

The figure below shows that a person standing  $h$  feet above sea level can see  $d$  miles to the horizon. The distance  $r$  is the radius of the Earth. Although the Earth is not perfectly spherical, many scientists consider the value  $r = 3963$  miles to be a reasonable approximation.



- How do you know that a right triangle is formed? That is, how can you be certain that the angle between the two shortest sides is a right angle?
- Write an algebraic equation that incorporates  $r$ ,  $h$ , and  $d$ .
- Solve your equation for  $d$ .
- Using your equation, determine the distance to the horizon from the summit of Mount Everest.