Name _____ Class _____ Date _____

ENRICHMENT ACTIVITY 1-1

Guessing a Number by Bisection

The group decides on a whole number that is unknown to the person who is "it." That person, knowing only the maximum number possible, guesses a number and the group responds that the guess is too large, too small, or correct.

Example:

The group selects 583 and tells the person who is "it" that the number is less than 1,000.

Guess	Group Response	Finding the Next Guess
		The number n is between 0 and 1,000, or $0 < n < 1{,}000$. Guess the average of 0 and 1,000.
500	Too small	Therefore, $500 < n < 1{,}000$. Find the average of 500 and 1,000.
750	Too large	Therefore, $500 < n < 750$. Find the average of 500 and 750.
625	Too large	Therefore, $500 < n < 625$. Find the average of 500 and 625, rounded.
563	Too small	Therefore, $563 < n < 625$. Find the average of 563 and 625.
594	Too large	Therefore, $563 < n < 594$. Find the average of 563 and 594, rounded.
579	Too small	Therefore, $579 < n < 594$. Find the average of 579 and 594, rounded.
587	Too large	Therefore, $579 < n < 587$. Find the average of 579 and 587.
583	CORRECT!	

a. How many guesses were needed?

b. If the number had been 579, how many guesses would have been needed?

c. If the number had been any number less than 2,000, what do you think would have been the maximum number of guesses?

Play the game with numbers less than 1,000, numbers less than 500, numbers less than 250, numbers less than 125. Do you think that the maximum number of guesses is dependent on the given maximum value of the hidden number? If so, how?

How do you think that this procedure could be applied to searching for a word in a dictionary or a name on a list of thousands of names that are in alphabetical order?