Spread the Word: Modeling Logistic Growth – Class Handout

Suppose one person in our classroom has heard an exciting rumor. Starting with the one person who knows the secret on Day 1, we can track the progress of the rumor as it spreads throughout the room over the next few "days." We shall limit the model with some conditions on the way the rumor spreads.

The rumor is 100% "contagious"; anyone who hears it is in the know and can pass the secret to others.

Students are immune to repeat "infection"; anyone with the information can't learn it anew.

Contact is limited; each person who knows the rumor can tell only one person each day.

1. First, we will assign a number to each class member. Record your number here: _____.

2. Let n represent the number of students in the room and k be the total number of students who have already heard the rumor at the beginning of each day. For our class, n = _____. Briefly describe how we will generate k random integers to see who has heard the rumor at each stage.

3. Use the chart below to track the progress of the rumor as we generate numbers for each day and watch the rumor spread. Continue until everyone has heard the news.

Day	New random numbers	Number in the know	Daily change
1		1	
2			
3			

4. Make a scatter plot of the data with the daily number of students in the know on the y-axis and the number of days since the rumor began on the x-axis. Describe the shape of the graph and relate it to the rate at which the rumor spread during the activity. How does the shape reflect the daily differences from the chart?

5. Why did the graph level off as the days increased? (Hint: Look up "carrying capacity.")

6. Use logistic regression to plot a curve to fit the data. How well does your model fit the observations?

7. Locate an inflection point on the graph. How does it relate to the pattern you observed in class and the numbers in the chart?

8. Summarize your observations about logistic growth.