

Precalculus Unit 4: 4.6 – Nonlinear Models

Disease Simulation Game – Logistic Modeling

Logistic models describe limited growth, as opposed to unlimited, exponential growth. This is useful for populations with constraining factors (food, space, etc.) and modeling the spread of diseases, among other applications. We are going to simulate the spread of disease with an in class activity called the Disease Simulation Game.

Imagine you are having a party where people interact with each other randomly. None of the guests know who is healthy or infected. Every time a healthy person interacts with an infected person, there is a chance that the disease is spread.

This is how the game works:

Step 1: Creating ID numbers.

Roll your die three times and write down the numbers you rolled to form your three digit ID number on the appropriate space on your worksheet.

Step 2: Recording ID numbers.

We will make a master list of ID numbers on the board, grouped according to first digit. No duplicate ID numbers are allowed.

Step 3: Playing a round of the game.

Now the party begins ☺! When the beginning of the round is signaled, walk up to a person and exchange ID numbers. Mark their ID number on the handout in the column corresponding to the current round. Each person rolls his/her die. If the sum of the two rolls is less than or equal to 5, then you've just had a risky encounter (if one of the two people has the disease, then the other will be infected). If the encounter was risky, circle the other person's ID number on your worksheet. Then move on to the next person and repeat the process. You will most likely have 2 or 3 encounters per round.

Step 4: Determining the initially infected person.

I will roll a die until it matches the first digit of one of the ID numbers listed on the board. Then the die is rolled until the number matches one of the second digits of the ID numbers that matched on the first roll. A third set of rolls of the die will match one person's ID number. That person is the initially infected person.

Step 5: Tracking the spread of disease.

Round 1: Any person that had a risky encounter with the initially infected person in round 1 is now infected with the disease. These numbers will be added to our list on the board.

Rounds 2-5: For each round, anybody that is still healthy checks whether or not he/she had a risky encounter with any person whose ID is circled on the board. We will record the number of newly infected and the total number of infected individuals on the worksheet.

Your ID Number: _____

Round 1	Round 2	Round 3	Round 4	Round 5	Round 6

Round #	# of Newly Infected People	Total # of Infected People
0		
1		
2		
3		
4		
5		
6		

Total # of
infected
people

Round