

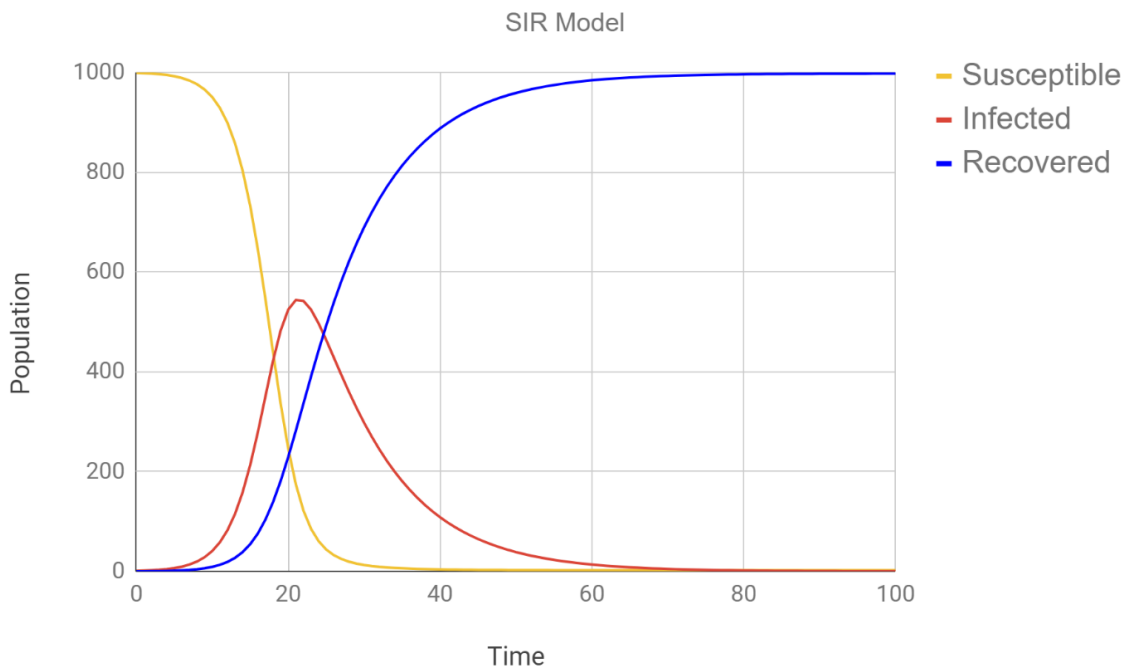
# Lesson 2: Modeling Disease Transmission

## Pre/Post-Lesson Evaluation

Student # \_\_\_\_\_  
or **Post**

**Pre**

1. What do each of the three letters (S, I, and R) stand for in the infectious disease transmission model?  
S-  
I-  
R-
2. What is one reason scientists might need to use mathematical models rather than experiments when studying the spread of human and wildlife diseases?
3. Based on the SIR model graph below, please list the magnitude of the epidemic and the duration of the epidemic. Additionally, how many individuals are immune at Time = 20?



4. What is the definition of transmission rate?
  - a. Percent of organisms that an organism interacts with
  - b. Rate of disease spread from infectious to susceptible individuals
  - c. Rate at which infected individuals recover from infection
  - d. Individuals in a population that are not infected with a parasite but can become infected
5. In relation to the SIR model, how does vaccination reduce disease transmission?
  - a. By reducing the number of total susceptible individuals and increasing the number of recovered individuals
  - b. By increasing the number of infectious individuals and decreasing the number of recovered individuals
  - c. By increasing the recovery rate of individuals
  - d. By decreasing the population size
6. Why do models typically contain simplifying assumptions?

## Lesson 2: Modeling Disease Transmission

### Pre/Post-Lesson Evaluation- Answer Key

1. What do each of the three letters (S, I, and R) stand for in the infectious disease transmission model?

S- Susceptible

I- Infected/Infectious

R- Recovered

2. What is one reason scientists might need to use mathematical models rather than experiments when studying the spread of human and wildlife diseases?

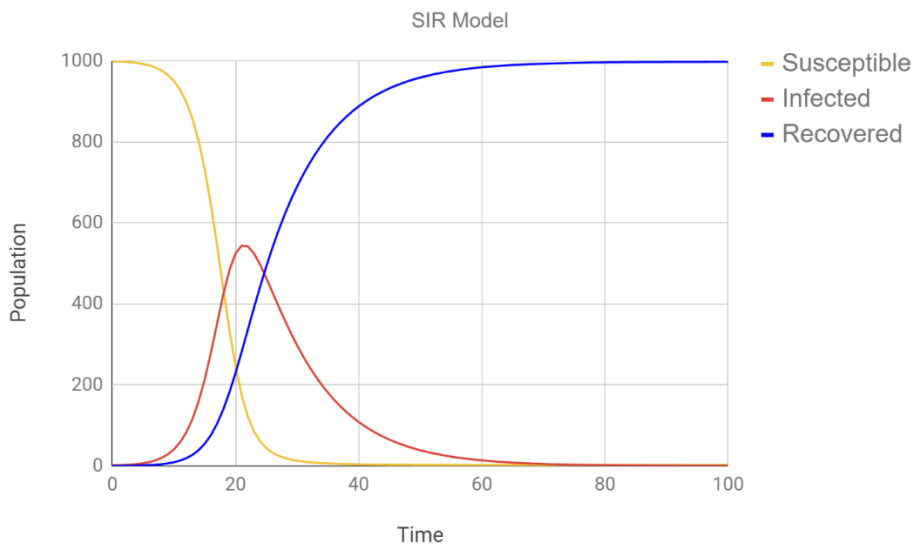
Answers may vary. Common responses include: It is unethical to infect humans with diseases to test disease spread; it is impossible to study disease spread without models because the populations are so large; Models allow scientists to conduct many "experiments" on disease spread very rapidly; Many diseases are dangerous and difficult to work with.

3. Based on the SIR model graph below, please list the magnitude of the epidemic and the duration of the epidemic. Additionally, how many individuals are immune at Time = 20?

Magnitude = between 500 and 600

Duration = Between 50 and 65 units of time

Number of individuals immune at time 20 = approximately 200



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  - a. Percent of organisms that an organism interacts with
  - b. Rate of disease spread from infectious to susceptible individuals
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  - d. Individuals in a population that are not infected with a parasite but can become infected
5. In relation to the SIR model, how does vaccination reduce disease transmission?
  - e. By reducing the number of total susceptible individuals and increasing the number of recovered individuals
  - f. By increasing the number of infectious individuals and decreasing the number of recovered individuals
  - g. By increasing the recovery rate of individuals
  - h. By decreasing the population size

6. Why do models typically contain simplifying assumptions?

To make complicated problems like disease spread easier to understand.