VaxImpact School Outbreak

A Middle School Case Study of a School Outbreak

THE SCENARIO
On Monday, students gather for a health sciences club meeting. By the next day, five students and two teachers are home sick. Rumors about an outbreak spread through the school.

Your team is part of the school's Student Public Health Task Force. The school board needs your help. You will use a computer model to study how vaccination coverage might change an outbreak, then make a recommendation using evidence.

Your mission

Explore → Make a prediction → Run repeated trials → Graph the results → Discuss what the model misses → Present a school-board response plan.

Driving question

How might vaccination coverage change the size of an outbreak, and what should the school board do with the evidence?

Important: The story is fictional, and the simulation is simplified. The model cannot confirm what caused the illness at the school or replace guidance from public-health professionals.

Name _____ Team _____ Date _____

Part I · Explore the simulator

Open vaxshield.org and find the VaxImpact simulator. Try changing one setting at a time and watch what happens.

Simulator feature	What it shows
Simulation panel	A picture of infection spreading in the model.
Simulation controls	Settings you can change to test different conditions.
Learn More	Explanations of the settings.
Epidemic Timeline	How infections change over time, including total infected.

1. Observe. What happened when you changed vaccination rate?

2. Ask a question. Write one question about vaccination coverage that you can test with the model.

3. Measure. What number will you record to help answer your question?

Helpful words: A variable is something that can change. A trial is one run of an experiment. A fair test changes one variable while keeping the others the same.

Part II · Investigate vaccination rates

Test whether vaccination coverage affects the size of an outbreak. Change only vaccination rate. Keep all other settings fixed.

Setting	Value	Setting	Value
Transmission rate	90%	Recovery time	14 days
Mortality rate	1%	Population density	80%
Vaccine effectiveness	97%	Change only	Vaccination rate

Make a prediction. If vaccination coverage rises from 65% to 95%, I think…

…because…

Run your investigation. Complete three trials at each rate: 65%, 80%, and 95%. Wait for each simulation to finish, then record the same four outcomes every time.

> How to calculate an average: Add the three trial results and divide by 3. For example, (9 + 12 + 15) ÷ 3 = 12.

What will you change? _____ What will you measure? _____

What will stay the same? _____

Part II · Record the evidence

Use the Epidemic Timeline and other simulator results to complete these tables.

65% vaccination

Trial	Peak infections (most sick at once)	Total infected	% vaccinated sick	% unvaccinated sick
1				
2				
3				
Average				

80% vaccination

Trial	Peak infections (most sick at once)	Total infected	% vaccinated sick	% unvaccinated sick
1				
2				
3				
Average				

95% vaccination

Trial	Peak infections (most sick at once)	Total infected	% vaccinated sick	% unvaccinated sick
1				
2				
3				
Average				

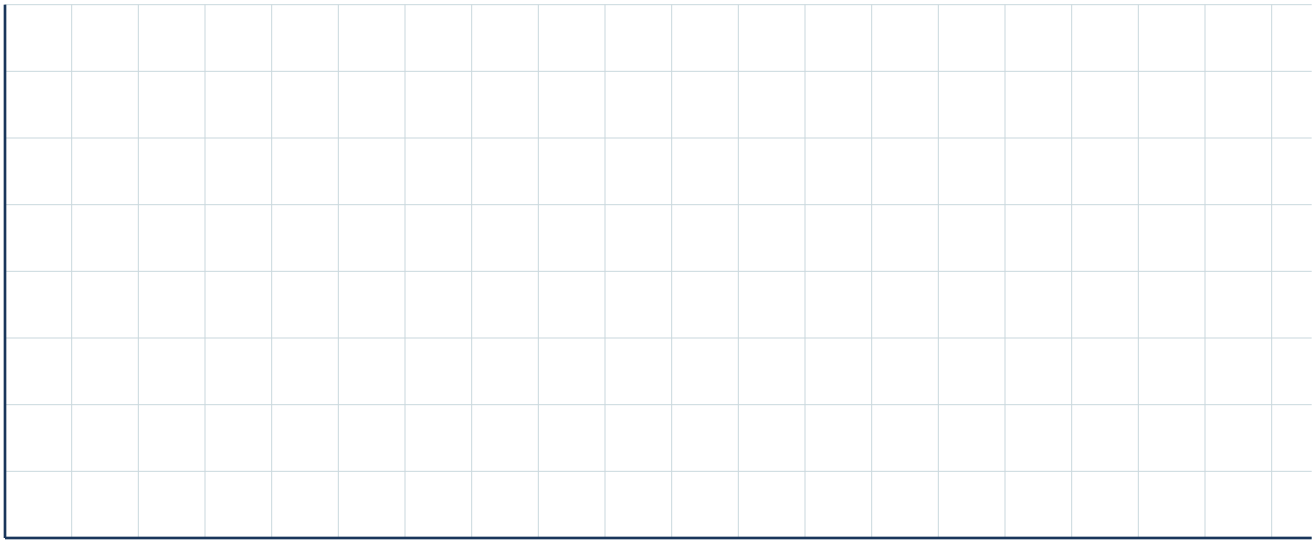
Part III · Graph and discuss the results

Enter the averages from your three experiments.

Average outcome	65%	80%	95%
Total infected			
Peak infections			

Graph average total infected for 65%, 80%, and 95% vaccination. Label the axes and give your graph a title.

Graph title _____



Discuss with your group. No written answers required. What happened to total infections and peak infections as vaccination coverage increased? Which numbers best support your conclusion?

Compare the percentages of vaccinated and unvaccinated people who became infected. What differences do you notice?

What does community protection mean? How might vaccination help protect other people?

What does the simulator leave out? Think about how people actually interact in schools and homes.

Part IV · School board emergency meeting

The superintendent has asked your group to give a five-minute briefing before classes resume. Your recommendations should use the data you collected, but remember that a simulation cannot identify the cause of a real outbreak.

> Your team must address three questions.
> 1. What might explain how an infection spread through the school? What would you still need to find out?
> 2. What should the school do next? Support at least one recommendation with a result from your investigation. Include evidence from a hands-on contact activity if your class completed one.
> 3. How should the school communicate with students and families without spreading fear or rumors?

Role	What you contribute
Public Health Officer	Explain the simulation results and their limits.
Principal	Suggest ways to keep students safe while school continues.
Family Representative	Ask questions and raise family concerns.
Student Body President	Share student concerns and help explain the plan.

Plan your briefing.

Our main finding from the simulator was...

One number that supports our finding is...

We recommend...

Part V · Reflect as a team

After the presentation, discuss the questions below. You do not need to turn in written answers unless your teacher asks.

1. What did your team do well when sharing responsibilities and explaining evidence?

2. What was the hardest part of deciding what the school should do?

3. If you had more time or information, what would you investigate next?

4. Why should school leaders use real health information, not only a computer simulation, when making decisions?

> Takeaway: Computer models help us explore patterns and test ideas. Strong decisions also require trustworthy real-world information, attention to uncertainty, and clear communication.

One question I still have: