Pandemic: The Countdown is On

Rules of the Game
- In the game, your task is to save the world by curing a series of diseases, by collecting cards of the same colour, and using the specific role that you have been given.
- In order to cure a disease, you must collect 5 cards of the specific disease type.
- Players will take turns, attempting to quarantine different states, cure the disease, and use their unique action abilities as well.
- Players will draw cards in the epidemic stage to see what happens next - this is randomly done!
- Refer to the rule booklet for more information!

Your Role

- After completing a full play through of the game (you may play multiple times if you wish!) you will assume the role of the CDC, the Center for Disease Control and Prevention.
- As the center's mathematician and statistician, you have been asked to explore the outbreak.

Your Task

1. If there was a poison outbreak in the world where the infected population doubled each day:
   a. How long would it take for unaffected humans to be extinct?
   b. What are the key properties of this relationship?
   c. Create another expression if there were 2 infected people that didn't spread disease on top of the initial pattern.

2. Create a detailed report if there was an outbreak in each continent, the initial number of infected humans per continent will be provided to each individual student. The report should consist of:
   a. A daily comparison of infected vs unaffected humans using graphs
      i. In each continent
      ii. In the world
      iii. When will there be a saturated infected world population?

Follow the formatting of a report and make sure that it flows and the purpose of the report is evident. Include all your calculations and a copy of the spreadsheet that you used to go along with your report.

Check-Bric

Knowledge & Understanding	
I was able to create an exponential expression to illustrate the relationship and demonstrated how it works for part 1	☐☐☐☐
I have explained whether it is a function or not and why for part 1	☐☐
I have found the expression for the second scenario of part 1 and stated the parameters	☐☐☐☐
Application	
I created a correct spreadsheet using a program of my choice to support my report (part 1 and 2)	☐☐☐☐☐
I have stated the key properties of the relationship for part 1 (domain, range, intercepts, increasing and decreasing intervals, and asymptotes) (1 mark for each)	☐☐☐☐☐
Communication	
Report is well organized and easy to follow	☐☐☐☐☐
All of my graphs follow proper convention (titles, scales, labels, etc.)	☐☐☐☐☐
Thinking & Inquiry	
I have chosen the right type of graphs to illustrate the information for part 2	☐☐
I was able to demonstrate what would happen if there was a poison outbreak in each continent and world (part 2)	☐☐☐☐☐☐
I have stated the considerations I took to predict a saturated world infection (part 2)	☐☐☐☐
I have completed a playthrough of the game.	☐
Total	**/43**

Self-Evaluation: Please assign yourself a score by circling the level you feel you have achieved.

Learning Skills and Work Habits	**N**eeds Improvement/**S**atisfactory/**G**ood/**E**xcellent
Responsibility • I have completed all of my tasks on time	N S G E
Independent Work • I have come prepared to work on my report when given time.	N S G E
Initiative • I have sought guidance/clarification when necessary.	N S G E
Organization • I have submitted all components of the report.	N S G E
Collaboration • I have worked well with my fellow game mates and provided feedback for others' progress.	N S G E
Self-Regulation • I have used class time effectively to complete my report.	N S G E

Teacher Considerations: Expectations

B. Exponential Functions MCR3U

1. evaluate powers with rational exponents, simplify expressions containing exponents, and describe properties of exponential functions represented in a variety of ways;
    - o 1.1 graph, with and without technology, an exponential relation, given its equation in the form y = a^x (a > 0, a ≠ 1), define this relation as the function f(x) = a^x , and explain why it is a function
    - o 1.4 determine, through investigation, and describe key properties relating to domain and range, intercepts, increasing/decreasing intervals, and asymptotes (e.g., the domain is the set of real numbers; the range is the set of positive real numbers; the function either increases or decreases throughout its domain) for exponential functions represented in a variety of ways [e.g., tables of values, mapping diagrams, graphs, equations of the form

2. make connections between the numeric, graphical, and algebraic representations of exponential functions;
    - o 2.2 determine, through investigation using technology, the roles of the parameters a, k, d, and c in functions of the form y = af(k(x – d)) + c, and describe these roles in terms of transformations on the graph of f(x) = a^x (a > 0, a ≠ 1)

3. identify and represent exponential functions, and solve problems involving exponential functions, including problems arising from real-world applications.
    - o 3.1 collect data that can be modelled as an exponential function, through investigation with and without technology, from primary sources, using a variety of tools (e.g., concrete materials such as number cubes, coins; measurement tools such as electronic probes), or from secondary sources (e.g., websites such as Statistics Canada, E-STAT), and graph the data