

Name: _____

Teacher: _____

M204: Exponential and Logarithmic Functions and Equations

Pre-Badge Task

New Badge Alert!

This task will provide a preview of what we will be learning during the M204 - Exponential and Logarithmic Functions and Equations. You already know so much math, so use this task to share any understanding that you have before we start our learning. You will have a chance to do the same task at the end of the badge to see how your thinking has evolved.



The Task

QUESTION 1: Nobody likes a pest! The National Invasive Species Information Center reports that more than 6,500 invasive species are in the United States.

- Research an invasive species in your state or region.
- Share a few interesting findings about this invasive species.
- What could happen to your state or area because of this species? Why is this important?



QUESTION 2 The spotted lanternfly was first detected in the United States in 2014 in Berks County, Pennsylvania. This insect is an invasive species native to Asia. It has since rapidly spread across the United States. The spotted lanternfly has very few natural enemies and is able to feed on many plants. In 2014, the recorded spotted lanternfly population was 370. Since then, data has been collected for 8 years across 25 states.

- What do you **notice and wonder** about the data in the table? What information in the text above supports what you noticed in the table?
- What do the **x** and **y** variables in the table mean?
- Use **Technology** to find an exponential function that best fits the data in the table.
- How do you see growth happening across the table, graph, and equation? Explain any patterns or connections you see.
- Use technology to explore other possible best fit graphs and equations. Which do you feel is the best model for this data? Why?



x_1	 y_1
0	370
1	7677
2	9270
3	9231
4	100691
5	210864
6	154267
7	166020

QUESTION 3 An invasive species is harmful when its population grows enough to hurt the local environment.

- A. What number of spotted lanternflies do you think would be dangerous? Explain why you picked that number.
- B. Using the model from the previous question, how many years would it take for the population to reach this dangerous number?



QUESTION 4 Using your best fit model, what would the spotted lanternfly population be in 2021 if it kept growing without stopping?

- A. How does this number compare to the real population in 2021?
- B. Why might the numbers from the table from Question 2 and your model be different?



QUESTION 5 Research ways people have tried to control the spotted lanternfly population.

- A. What methods were used to stop or slow down the spread of the spotted lanternfly?
- B. Look at the table from Question 2. When can you see these control methods being used or not used?



Sources

<https://neobiota.pensoft.net/article/101471/>

<https://www.fws.gov/story/stopping-spotted-lanternfly-its-tracks>

<https://www.aphis.usda.gov/plant-pests-diseases/slf>

<https://www.sciencedirect.com/science/article/abs/pii/S0025556421000985#:~:text=%E2%80%A2.be%20found%20in%20the%20literature.>

<https://neobiota.pensoft.net/article/101471/>