THE RISE OF TROY

Have you ever wondered how the seven cities of ancient Troy came to be built on top of one another? Read the following excerpt from the book, *Rubbish! The Archeology of Garbage*, (W. Rathje and C. Murphy) to find out.

"A human being's first inclination is always to dump. From prehistory through the present day, dumping has been the means of disposal favored everywhere, including within cities. Archaeological excavations of hard packed dirt and clay floors—the most common type of ancient living surface—usually recover an amplitude of small finds, suggesting that many bits of garbage that fell on the floor were trampled into the dirt or were brushed into corners and along the edge of walls by the traffic patterns of the occupants . . . . The archaeologist C. W. Blegen, who dug into Bronze Age Troy during the 1950s, found that the floors of its buildings had periodically become so littered with animal bones and small artifacts that 'even the least squeamish household felt that something had to be done.' This was normally accomplished, Blegen discovered, 'not by sweeping out the offensive accumulation, but by bringing in a good supply of fresh clean clay and spreading it out thickly to cover the noxious deposit. In many a house, as demonstrated by the clearly marked stratification, this process was repeated time after time until the level of the floor rose so high that it was necessary to raise the roof and rebuild the doorway.' Eventually, of course, buildings had to be demolished altogether, the old mud-brick walls knocked in to serve as the foundations of new mud-brick buildings. Over time the ancient cities of the Middle East rose high above the surrounding plains on massive mounds, called tells, which contained the ascending remains of centuries, even millennia, of prior occupation. In 1973 Charles Gunnerson, a civil engineer with the U. S. Department of Commerce . . . , calculated that the elevation . . . [of] Troy was about 4.7 feet per century."

1. Complete a table of century and height to record the height above sea level of Troy each century from 1500 B.C. to 1000 B.C. Assume that Troy was approximately 120 feet above sea level in 1500 B.C. Define 1500 B.C. as year 0. (Remember that 1500 B.C. is before 1000 B.C.)

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2. What recursive formula describes the height of Troy?

3. Add a column entitled "change between observations" to your table. What do you observe?

4. What type of model describes Troy's elevation?

5. If you were told that the height of Troy was 167 feet above sea level in 500 B.C., what would you predict its height to be one century later? What would you predict the height to be two centuries later? Explain how you computed your answer.

6. How high would Troy have been at the end of 1995 if the rate of rise had remained constant? Did you use a recursive formula or closed formula to answer this question? Explain why you chose to use the formula you did.

7. If the height of the ground surrounding your school were rising at the same rate as the city of Troy, would people notice the change? Use rates of change to explain your answer.