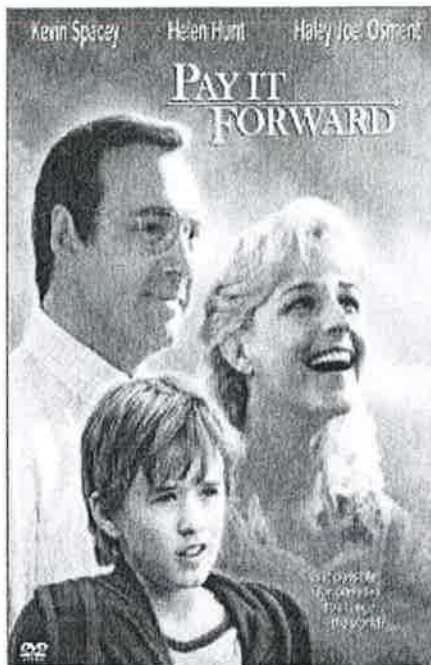


## Think About This Situation: Pay It Forward



In the popular book and movie *Pay It Forward*, Trevor McKinney was given the following social studies assignment: *Think of an idea for world change and put it into practice!*

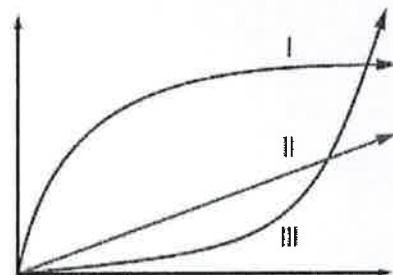
Trevor's idea was to do something really good for three people. When they asked what they could do to pay him back, he tells them to "pay it forward", which means that they are to do something really nice for three other people.

Trevor figured out that those three people would do something good for a total of nine others. Those nine would do something good for 27 others, and so on. He was sure that before long there would be good things happening to billions of people around the world.

### Think About This Situation

Continue Trevor's kind of Pay It Forward thinking.

- a) How many people would receive a Pay It Forward good deed at each of the next several stages of the process?  
**1, 3, 9, 27, 81, 243, 729, 2187, 6561, 19683**
- b) What is your best guess about the number of people who would receive Pay It Forward good deeds at the tenth stage of the process?  
**59049**
- c) Which of the graphs at the right do you think is most likely to represent the pattern by which the number of people receiving Pay It Forward good deeds increases as the process continues over time?



**Graph III**

## Teacher Notes:

1. Give students the Exponential Function Pre-Assessment. When finished, launch the lesson by discussing the *Pay It Forward* problem situation. Either show a short video clip of Trevor McKinney's explanation to his classmates about his social studies project or explain the *Pay It Forward* scenario.
2. Ask students to explain how the good deeds were done verbally.
3. Make a tree diagram of the situation as a visual for students before making a table of the data.
4. Talk about the independent and dependent variables (stage of the Pay It Forward Process, Number of Good Deeds)
5. Discuss with students their guesses of at what stage of the process would 10,000 people be helped? 100,000 people?  
11<sup>th</sup> (177147) 9<sup>th</sup> (19683)
6. Discuss with students why they would or would not choose each of the three graphs.
7. Discuss how this pattern of change is different from the linear patterns that students have just studied and that these growing patterns are exponential in nature.
8. If there is time, graph the data and discuss how the number of good deeds at each stage grows (triples from one stage to the next). Students may not recognize the vertical change from one point to the next and you may need to compare this to a constant linear change by drawing a linear function with the same rate of change for a good visual between the two. Graph both by hand and/or by using a graphing calculator.

\*The key here is rich discussion about a new pattern situation.