Visualization

Bacteria grow by doubling. One bacterium divides to become two, the two divide to become 4, the 4 become 8, 16 and so on. Suppose we had bacteria that doubled in number this way every minute.

Draw a picture that illustrates how a bacteria would double each minute.

Application

Is there a lesson for people in this parable about bacteria? Explain.

Clarify Growth

Suppose we put one of these bacteria into an empty jar at 1:00 and then observe that the jar is full at 2:00. This is a case of steady growth withs a doubling time of one minute.

At what time was the bottle half full? Explain how you know.

Recognition

If you were an average bacterium in that bottle, at what time would you first realize you were running of space? Why

At 5 minutes before 2:00, when the bottle is only 3% full and is 97% open space just yearning for development, do you think it likely that many would realize there's a problem? Explain.

Limitation

Suppose that the bacteria continue their space program, constantly locating new bottles and expanding. Is their any hope that further discoveries will allow the colony to continue its exponential growth? (Hint: By 6:30 the volume of the colony would exceed the volume of the universe)

Alternatives

Suppose that just before 2:00, some of the bacteria realize they're running out of space. They manage to locate three empty bottles on their shelf, tripling the total amount of resource they ever knew about before.

They quickly develop a space program and redistribute their population to the other bottles. At what time will the bacteria run out of space?

Name: _____

Magic Bacteria: A Cautionary Tale

Watch the video **Magic Bacteria: A Cautionary Tale** on Science Mom's YouTube channel.

Then cut and fold the book and answer the questions to show your understanding.