

Group A - 2 person groups (10 min)

At Spectre labs, the scientist Dr. Bo Gey was working on a bacteria that showed promise in being useful in medicine for speeding up the healing process. Unfortunately, any human who comes into contact with the bacteria has their brain functions hijacked by the invasive micro organism.

Dr. Gey accidentally spilled a sample, and let loose 1000 bacterial cells in the lab. After one hour, the lab contained 5000 cells. If the amount of cells in the lab reaches 2,000,000 then Dr. Gey's containment will fail.

Assuming that the growth is exponential, how long (from the time of the original spill) before there will be a Bo Gey Zombie?

Group B - 2 person groups (10 min)

In Spectre labs, a chemist, Stan Dard, was working on a chemical that would work as a medicine for pain relief. He stumbled across an element that caused feeling of extreme achievement in a person. Unfortunately, this element is unstable and is decaying. When it was created, he had 50 000 mg. After one hour there were 30 000 mg remaining. Hopes of being able to use this dissipate at 100 mg.

Assuming that the decay is exponential, how long (from the time of the original creation) before Stan Dard feels the crushing disappointment of failure?