

Dr. Zee and the Plastizon

Dr. Zee, the legendary geneticist, was performing an experiment on a spherical shaped microscopic creature called a plastizon, when, due to an unfortunate accident, the plastizon started growing out of control. Hearing Dr. Zee's shouts, his assistant rushed into the room and quickly carried the test tube containing the plastizon outside the building. Dr. Zee's assistant dropped the test tube, and the scientists noticed, to their dismay, that the plastizon was easily visible to the naked eye. Hmm, I wonder how fast the plastizon's volume is increasing? mused Dr. Zee as he raced for a nearby grove of trees with his assistant. Well, panted his talented assistant as they came to a stop, I would estimate that the radius is increasing at a constant rate of 2 inches per minute. Perhaps we could use related... Eureka! I've got it! shouted Dr. Zee. The radius is increasing at a rate of 2 inches per minute. We can use related rates! The frightened scientists quickly smoothed an area in the dust and started writing. Let $V = \frac{4}{3}\pi r^3$. Then $\frac{dV}{dt} = 4\pi r^2 \frac{dr}{dt}$ and if $\frac{dr}{dt} = 2$ we see that $\frac{dV}{dt} = 4\pi r^2(2) = 8\pi r^2$, said Dr. Zee. The radius appears to be about 12 inches now so the volume must be increasing at a rate of $8\pi(12)^2 = 1152\pi \approx 3619$ cubic inches per minute. When $r = 36$ the volume will be increasing at a rate of $8\pi(36)^2 \approx 32572$ cubic inches per minute!

Copyright ©, 2001 by Kenneth L. Wiggins This material may be distributed only subject to the terms and conditions set forth in the Open Publication License, v1.0 or later (the latest version is presently available at <http://www.opencontent.org/openpub>).