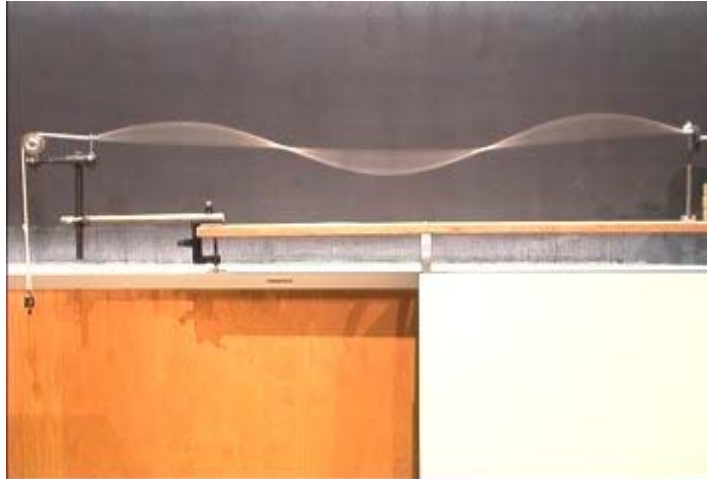# Answer #263

The answer is (b): 111 grams, as seen in an mpeg video by clicking your mouse on the photograph below.

Note that you wish to decrease the loop length of the standing wave produced by the rope wave generator by a factor of 2/3 (from L/2 to L/3 in this problem) while keeping the frequency the same. You can do this by decreasing the tension in the rope by a factor of $(2/3)^2$ or (4/9), from 250 grams to 111 grams. This decreases the wave speed by a factor of 2/3, because the speed of the wave is proportional to the square root of the tension. Decreasing the wave speed by a factor of 2/3 while keeping the frequency the same decreases the wavelength by a factor of 2/3, allowing three loops to fit into the length of the rope rather than the original two loops.

For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.