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Dental Floss, Calculus, and Jail

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rior of the cell can be clearly seen during the demonstration. Once the cell has been filled, the cell has to be turned upside down quite quickly, but not so violently that all or almost all of the liquid is lost. The top of the cell can be covered with a finger that is then moved away from the cell. When the cell is upside down, the cell should be held steady and not shaken from side to side, which also causes leakage. In Figs. 2 and 3, I have shown that the cell is held pinched by one corner with a thumb and finger so that it is stable but the interior of the cell is not obscured from view. I recommend that the instructor practice this a few times before giving the demonstration in front of a class.

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Fermi Questions

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Dental Floss, Calculus 😊, and Jail

Dental floss is used to help prevent the formation of dental plaque before it calcifies to form *calculus* (or tartar). A typical single pack contains about 50 m (55 yd) of thread.

Question 1: (i) Assume someone consistently flosses once a day. How long will a pack of floss last?

(ii) Estimate how many floss containers are sold annually in the USA.

(iii) If all the strands in the answer to (ii) were joined in a single strand, how long would it be?

Question 2: In June 1994, an inmate in a West Virginia high-security (!) facility used several containers of floss to escape. Two days prior to his escape, he had used multiple strands to form a "rope" as thick as a telephone cord and used it to scale a 5.5-m (18-ft) cinder block wall and hung from it while cutting through the fence with an 8-cm hacksaw blade. The whole episode took about 20 minutes, and he was not recaptured for 41 days. Jail authorities voted to install razor wire above recreational areas after his escape. They also stopped selling dental floss to inmates.

Estimate how many packs of floss he used.



Fermi Questions are brief questions with answers and back-of-the-envelope estimation techniques. To submit ideas, please email John Adam (jadam@odu.edu).