

THE DEMONSTRATION CORNER

HOW ABOUT THAT?

by

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Effective classroom demonstrations often require tinkering with temperamental equipment. With the permission of the editor, I would like to share a "thought demonstration" that requires no equipment, but which still makes a surprising point.

A physics teacher's wife took her gold wedding ring to a jeweller for repair. It was her 25th wedding anniversary and the jeweller who originally had sold the ring noted that the wear amounted to 0.25 g. The physics teacher decided to calculate the rate of wear in the interesting units of atoms/second. Estimating the molar mass of 14k gold to be 120 g/mole, we get :

$$0.25 \text{ g}/25 \text{ yr} =$$

$$(0.25 \text{ g}/(120 \text{ g/mole})) \times 6.02 \times 10^{23} \text{ atoms/mole}$$

$$\div (25 \text{ yr} \times 365 \text{ days/yr} \times 24 \text{ hr/day} \times 3600 \text{ s/hr})$$

$$= 1.6 \times 10^{12} \text{ atoms/s}$$

Before beginning the solution, do ask your students what they consider to be "reasonable" answers. You'll be surprised.

End the session by asking why you are not knee-deep in gold atoms as you walk around the class.

(based on an article by J. Shull, Alfred University.)

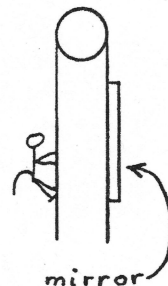
NOTE: If, during the solution, your students can tell you coherently what a "mole" is, treat your local chemistry teacher to a coffee. He/she will have earned it!

Now, a second thought experiment your students will enjoy.

A monkey hangs onto a long, massless rope which passes over a large-diameter, massless, frictionless pulley and is connected to a mirror equal to the monkey's mass directly opposite the monkey. On seeing his image, the monkey is frightened and wishes to escape. Can he?

The monkey might try:

- (i) letting go of the rope
- (ii) climbing up the rope
- (iii) climbing down the rope
- (iv) something else (should be interesting).



Please send in samples of your students' responses to (iv). Contact me at A.B. Lucas Secondary School, 656 Tennent Ave., London, Ontario, N5X 1L8, or e-mail to murrkuch@village.ca. The best answers will appear in a later edition of this *Newsletter*.

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Submissions describing demonstrations will be gladly received by the column editor.
