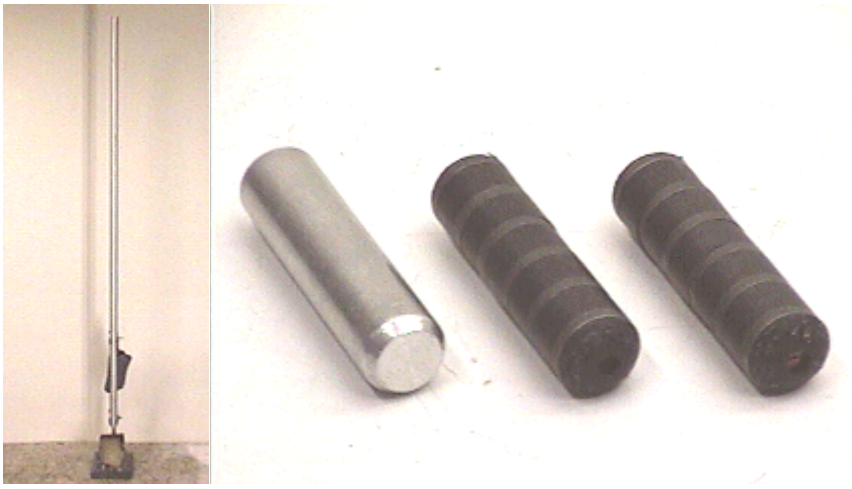
Answer #126

The answer is: (a) the aluminum tube is fastest, (b) the (NS-NS-NS-NS-NS) magnet stack is next, and (c) the (NS-SN-NS-SN-NS) stack is the slowest.



This can be observed in a set of mpeg videos showing each cylinder separately:

aluminum

NS-NS-NS-NS-NS magnet stack

NS-SN-NS-SN-NS magnet stack

When the respective magnet cylinders fall, they create a changing magnetic field in the aluminum tube as they fall. This changing magnetic field induces electrical fields around the tube, causing electric currents that create magnetic fields that oppose the falling motion of the magnets. The magnet stack with adjacent poles alike possesses more external magnetic field, and therefore induces greater magnetic fields due to currents in the aluminum tube. The opposing force due to Lenz's law is therefore greater, and that magnet stack drops most slowly. Click here for magnetic field structure for the two magnet stacks obtained using the iron filing technique.

Archive 7

Question of the Week

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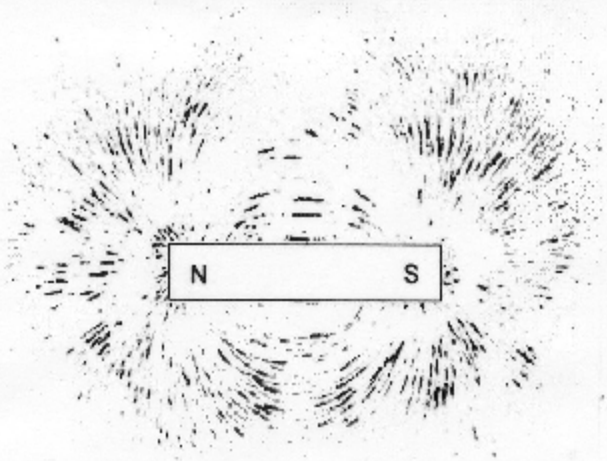
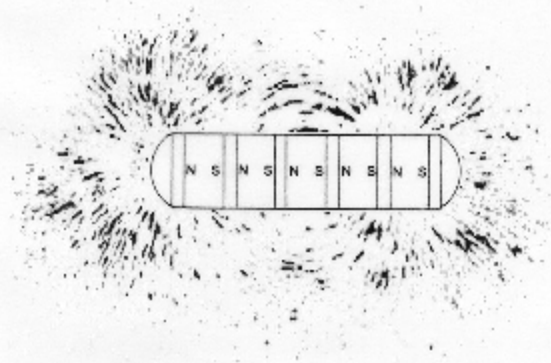
For questions and comments regarding the *Question of the Week* contact

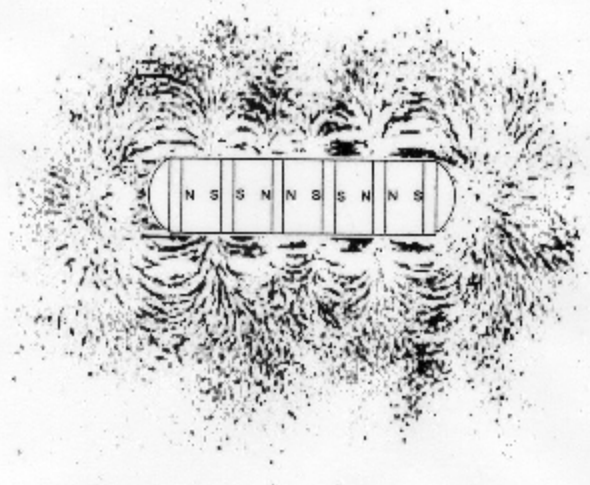
Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.



BAR MAGNET



SMALL MAGNETS IN SERIES
UNLIKE POLES ADJACENT



SMALL MAGNETS IN SERIES
LIKE POLES ADJACENT