

Physics Challenges for Teachers and Students

► Out in the Field

Two charged particles ($M, +Q$) and ($m, -q$) are placed in a uniform electric field E . After the particles are released, they stay at a constant distance from each other. What is this distance (L)?

► In Hot Water

Two identical light metal containers are filled with equal amounts of water and placed in a room with constant air temperature. A heavy ball is submerged into the center of one of the containers on a thin nonconducting string. The mass of the ball equals to the mass of the water, and the density of the ball is much greater than that of water. Both containers are heated to the boiling point of water and are then allowed to cool. The container with the ball in it takes k times longer to cool down to the room temperature than the container without the ball. Find the specific heat of the material of the ball c_b in terms of k and the specific heat of water c_w .

► The World on a Spring

A spring has a force constant k and mass m . The spring hangs vertically, and a block of an unknown mass is attached to its bottom end. It is known that the mass of the block is much

greater than that of the spring. The hanging block stretches the spring to twice its relaxed length. How long (t) would it take for a low-amplitude transverse pulse to travel the length of the the spring stretched by the hanging block?

Below are the names of the readers who were first to submit the correct solutions to the October *Challenges*.

- Dylan Consla, student (Limestone, ME)
- Rusty Davis (Watertown, CT)
- Art Hovey (Woodbridge, CT)
- Robbie F. Kouri (San Antonio, TX)
- Carl E. Mungan (Annapolis, MD)
- Inge H. A. Pettersen (Kongshavn, Norway)

The solutions, as well as the more complete list of their contributors, can be found on our website: <http://www.aapt.org/tpt>. We look forward to your future contributions.

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