

# An Illustration of Newton's Third Law

Iain MacInnes and Rory McPherson

Langside College, 50 Prospect Hill Road, Glasgow G42 9LB, Scotland

In the figure shown, we see a 1-kg mass, *A*, suspended from a fixed support by a rubber band and a spring balance. An inverted copy of the scale is inked onto the tubular surface of the balance. It is clear that if *A* is pushed from below, the upthrust will be registered by the balance on its inverted scale.

The second body, *B*, perhaps a block of wood, is placed on top of a digital balance, which is tared so that the reading is zero. It is clear that any downward force exerted on *B* will be registered by this balance. The reading, of course, will have to be converted into newtons; for the purpose in hand, 10 N/kg is appropriate.

If the upper system is lowered until *A* and *B* interact, the *upthrust* on *A* by *B* (registered by the spring balance) will always be equal to the *downthrust* on *B* by *A* (registered by the digital balance).

The rubber-band connection enables us to take various readings. The support for the spring balance may be a retort stand or, for a quick demonstration, the apparatus could be held by hand. This experiment can act as a useful precursor to the more subtle demonstration occurring when block *B* is replaced by a beaker of water.

