Walking the Plank [Experiment]

This activity centers on the questions that led textbook author Paul Hewitt to study physics. The key finding here is that the net force for a body in equilibrium is zero. The forces that support the plank need not be equal to each other, but they will add to an amount equal to the weight being supported.

Answers to Procedure Questions

1. Answers vary with the wide variety of metersticks in circulation. Older metersticks tend to be heavier and easier to get readings from.
2. Forces L and R should be about equal to each other, and W = L + R.
3. Zero (or nearly zero).
4. Answers will vary, but should be about 4 N greater than the value reported in question 1.
6. Zero (or nearly zero).
7. The value should be the same as the value reported in question 4.
9. Zero (or nearly zero).
10. The net force must be zero.
11. Answers will vary, but should be 7 N greater than the value reported in question 1, and equal to the sum of the scale readings found in Step 8.
12. Answers will vary but should be equal to the difference between the value reported in question 11 and the measurement recorded in Step 10.
13. Answers will vary; most students find their measurement matches their prediction.
14. About 25 cm.

Answers to Summing Up Questions

1. Yes—as observed in Steps 4-5, for example.
2. Yes—as observed in Steps 6-7, for example.
3. Yes. The support forces would balance the weight so the net force would be zero.
4. The 200-g mass needs to be 2.5 times farther from the center of the meterstick than the 500-g mass. If the 500-g mass is 20 cm from the center, the 200-g mass would need to be placed at the 100-cm mark (2.5 x 20 cm = 50 cm from the center).
5. The 200-g mass would have to be 75 cm away from the center of the meterstick, so this is not possible.