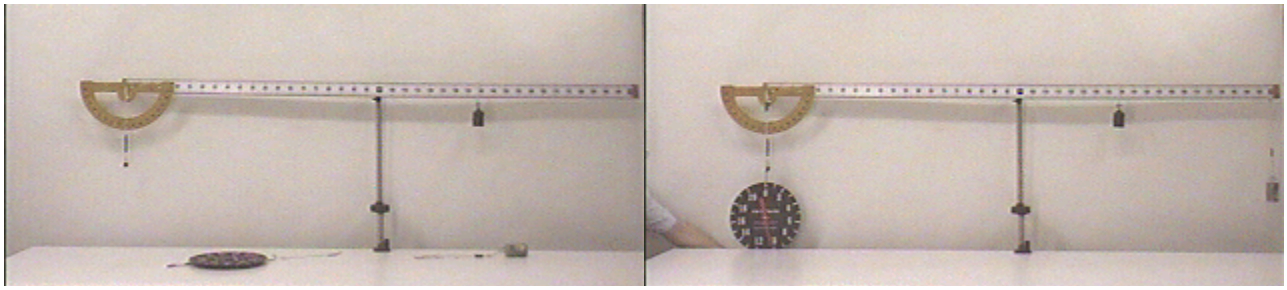
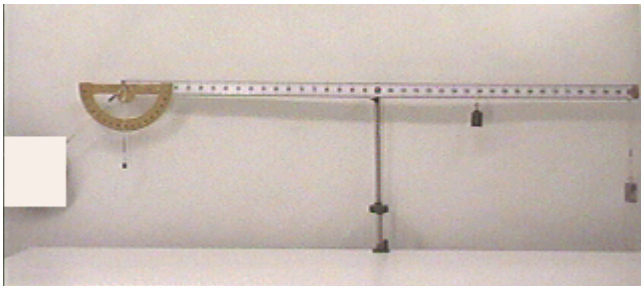
Question #201

The long lever shown in the photograph at the left below is in equilibrium as shown, with the various doodads shown hanging from the scale at the appropriate positions. That is, the torques are in equilibrium about the pivot (center of beam, at support post), so the scale will rotate neither clockwise nor counterclockwise when it is not held in position.

Adding the weight at the far right in the photograph at the right below, the system can only be maintained in equilibrium by pulling down on the left end with a force of about 10.5 Newtons, as seen in the figure (The scale is marked off every 2 Newtons.).



Now the downward force applied at the left, is rotated, so that it is pulling on the scale at an angle of about 45^{o}, as seen in the photograph below. However, the face of the scale has been masked, so that the actual scale reading in this case is unknown. the question this week involves the magnitude of the force in the case below relative to the magnitude of the force when it is applied directly downward, as shown in the photograph at the right above.



When the force, as indicated by the scale in the picture above, is applied at an angle with respect to the vertical, as shown, the magnitude of the force, as measured by the spring scale, will be:

- (a) greater than the force required when it acts vertically downward.
- (b) equal to the force required when it acts vertically downward.
- (c) less than the force required when it acts vertically downward.

Click here for Answer #201 after December 13, 2004.

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.