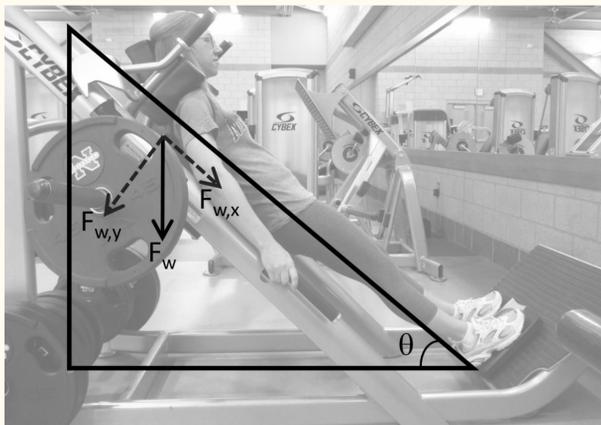


Field Day at the Rec: Working out with Physics of the Human Body

Students in allied health fields often are required to take an introductory survey of physics. These courses cover all major areas and focus on applications of physics in the function and care of the human body. As a final field trip, students in the course complete activities at the University's recreation center. These activities—e.g., torques for the plate-loaded inclined bench press or the hack squat as an inclined plane—highlight particular topics covered in the course and show how these principles are involved in the various exercises and equipment at the recreation center.

Hack Squat



The hack squat is a great inclined plane. Students measure the force required to push up a load and compare that force with the load.

By plotting the $F_{w,x}$ and F_w , the student can calculate the angle of the incline. For this image, the angle is 47° .

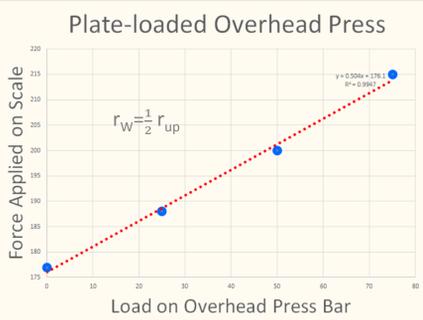
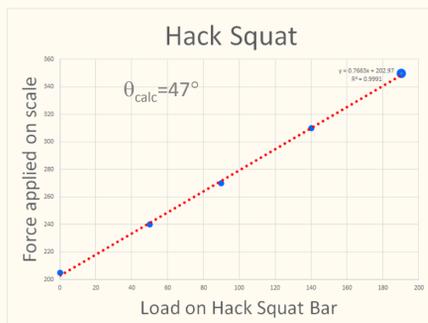
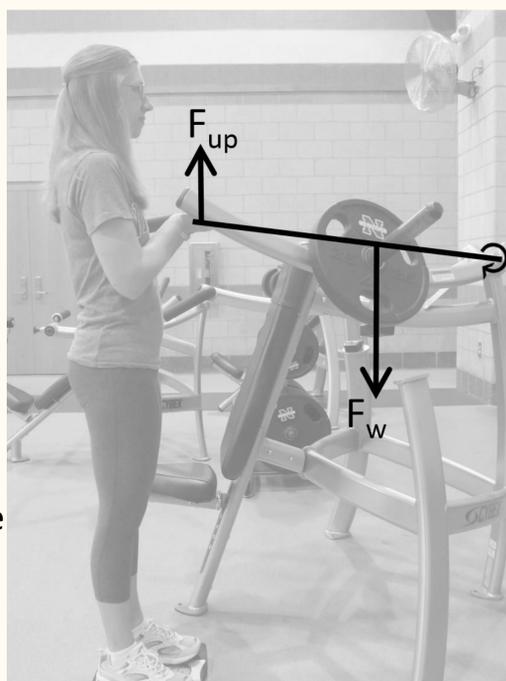
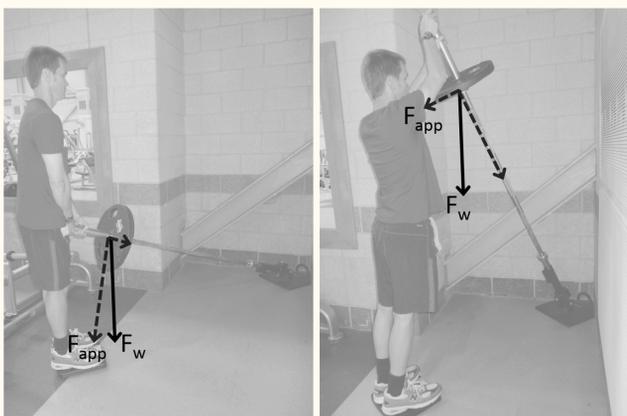


Plate-loaded Press



Use the plate-loaded overhead press to demonstrate torques. Students measure the force required to lift a load. Then, they calculate the relative length of the moment arms for F_{up} and F_w .

Angled Barbell



The angled barbell nicely demonstrates force vectors. Students might take measurements, but the effect of increasing the angle is quite drastic.

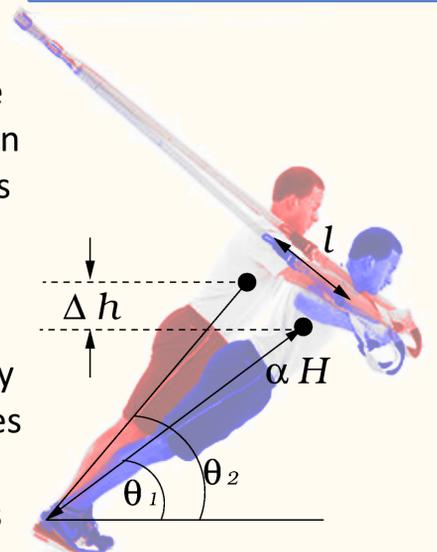
Oblique Raises



The oblique raise offers a good demonstration of two principles. First, if the student extends the medicine ball above their head, the required force, F_{abs} , is a lot bigger. Also, because F_{abs} is applied at a small angle θ , only a small component of it applies torque.

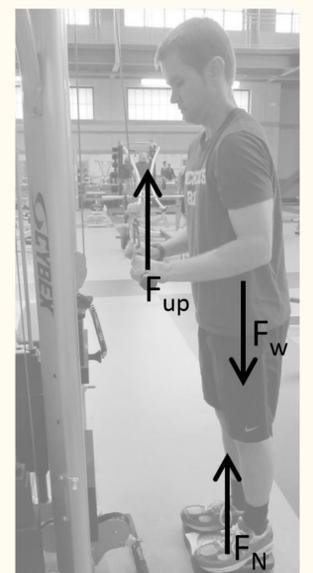
Suspension training is a new approach to strength training that uses a system of ropes to allow an individual to exercise through the lifting of their own body weight. The figure shows the difference in height the student must raise his body mass as part of the exercise. However, there is an instability associated with these exercises that requires more work and greater muscle activity than is simply required to raise one's body mass.

Suspension Training



Pulley-Pushdown

The pulley-pushdown is a cable machine. Place a bathroom scale on the ground and measure how the normal force changes when the student exerts a force on the bar.



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