Hooke's Law is a physics principle that basically says a stretched spring will work to return to equilibrium. A trampolinist's potential energy is maximized at the moment she is propelled upward, related to the spring constant and Hooke's Law.

Compared to other athletes, elite weightlifters tend to have relatively short arms and legs. Short limbs provide better leverage, and the athletes need not lift the weights as high, therefore requiring less expenditure of energy.

When an archer pulls the arrow back, the bow and string store potential energy, which becomes kinetic energy when the archer releases. Feathers on the arrow create "fletching" – a drag that prevents turbulence from nudging the arrow off course.

A cyclist in the slipstream behind another cyclist can be up to 40 percent more energy-efficient than when riding solo at the same speed. Surprisingly, there's also a small gain for the lead cyclist: the tailing cyclist fills the pocket of low-pressure air that would otherwise "drag" the lead cyclist.

Putting topspin on a ball causes the ball to experience an aerodynamic force known as the Magnus effect, which "pushes" the ball downward. The spinning also creates different airspeeds above and below the ball, causing an extra downward force, according to Bernoulli's principle.

To reach the maximum height, pole vaulters and high jumpers arch their bodies over the bar so their centre of mass actually passes as much as 20 cm *underneath* the bar, requiring less energy. This was the great innovation of the "Fosbury Flop."

Why do top sprinters have such muscular arms? Big arms help counterbalance the momentum of hard-pumping legs to keep the runner steady. Bent elbows make the arms shorter pendulums, which swing faster.

Rowers need a perfect balance of size and strength. A taller rower is heavier, which makes his boat sit lower in the water, increasing drag. But a tall, strong rower compensates for this with a longer, more powerful stroke.

When a gymnast spins, she is exploiting the physics concept of angular momentum. As she retracts her arms and legs, her moment of inertia decreases, but her angular velocity increases to compensate, preserving her angular momentum.