Name _____ Date _____ Period_____

You are sitting on a spinning piano stool with your arms folded.

(*a*)When you extend your arms out to the side, what happens to your kinetic energy? What is the cause of this change?

The rotational kinetic energy of the you-stool system is given by $K = \frac{1}{2} I \omega^2 = \frac{L^2}{2I}$ Because the net torque acting on the you-stool system is zero, its angular momentum ***L*** is conserved.

Your kinetic energy decreases. Increasing your moment of inertia *I* while conserving your angular momentum *L* decreases you kinetic energy $K = \frac{L^2}{2I}$

(*b*) Explain what happens to your moment of inertia, angular speed and angular momentum as you extend your arms.

Extending your arms out to the side increases your moment of inertia and decreases your angular speed. The angular momentum of the system is unchanged.