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Demonstration Predictions Sheet Angular Momentum

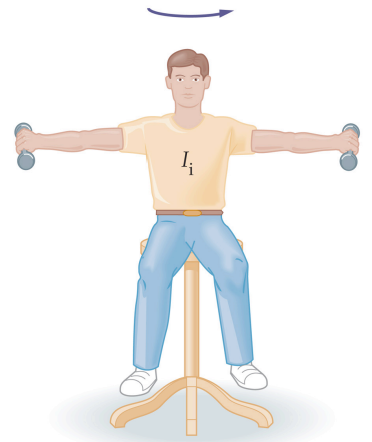
Demonstration 1:

The student on the right is spinning on the stool. (There is negligible friction slowing him down.)

On the right, sketch the student's angular momentum vector.

Also, sketch a free body diagram for the student.

What torques act on the student about an axis passing through the stool's rotation axis?



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If no new outside forces act on him, should the student's angular momentum be conserved? Why or why not?

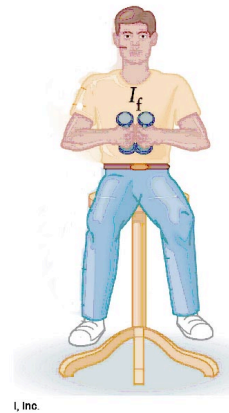
Demonstration 2:

While still spinning, the student pulls his arms in to his chest.

On the right, sketch your prediction for the student's angular velocity afterward.

In words, is student's angular velocity the same as before, larger, or smaller?

Explain your reasoning.



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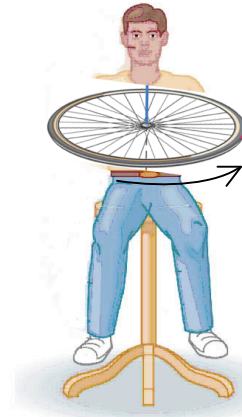
Demonstration 3:

The student is now holding a bicycle wheel while sitting on the stool that is free to rotate. The student is not turning, but the wheel is spinning as shown.

On the right, draw the wheel's angular momentum vector.

Draw the student's angular momentum vector.

If no new outside forces act on the student-wheel system, should its angular momentum be conserved? Why or why not?



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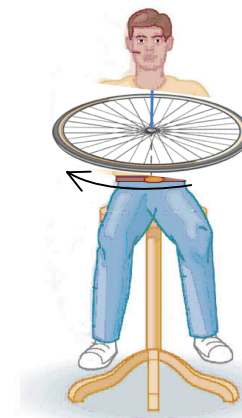
Demonstration 4:

The student turns the wheel over, as shown.

On the right, draw the wheel's new angular momentum vector.

Draw your prediction for the total angular momentum of the system.

Draw your prediction for the student's angular momentum vector.



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