

### The scenario

<b>Subject</b>	<b>Mechanics / Conservation of angular momentum</b>
<b>Length</b>	1:59
<b>Main goals</b>	Get familiar with conservation of angular momentum
<b>Detailed goals</b>	to show that angular momentum is conserved when there is no external torque
<b>Structure and description of experiments:</b>	
<b>1. Introduction</b>	Conservation of angular momentum is one of three most important conservation laws in mechanics, alongside conservation of energy and momentum. It concerns rotation.
<b>2. Main subject</b>	Conservation of angular momentum
<b>Experiments</b>	<p>We do have two balls with different masses. The steel one is heavy, when the plastic one is light. Both of them, when travelling along curved inclined plane, exert torque on the plane, depending on its weight. The same torque is exerted by the plane on the ball. When time taken for the balls to roll down is the same, the torque differs and so the change of angular momentum of the rotating inclined plane (or the ball) is different in both cases.</p> <p>From the other point of view, total angular momentum initially is zero and the same should be after the ball has gone. Angular momentum of the ball is <math>mvr</math>, when <math>m</math> is the mass of the ball, <math>v</math> - its velocity and <math>r</math> - the distance between axis of rotation and the ball when it leaves inclined plane. The only difference in both cases is the mass of the ball - so the steel ball has larger angular momentum, so the turntable should achieve the same amount of angular momentum, but rotating in opposite direction, so the total angular momentum is still zero.</p> <p>We see that the turntable has larger velocity and makes more turns when steel ball is used.</p> <p>Now we use pizza turntable and a huge flask of tinged water. When it is placed on the table, nothing happens. But when we swirl water in the flash and put it on the table once more, it starts to spin. Angular momentum of water is nonzero, but water slows down, by the inner friction (viscosity) between water molecules and between water and walls of the flask. The angular momentum is then transferred to the table, through the walls of the container.</p>
<b>3. Summary, evaluation and remarks</b>	Tinging is best when food colour is used. Potassium permanganate leaves marks that are very difficult to remove.



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	<b>Level:</b> secondary school
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