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| **Understanding Newton’s Free Fall** |
| **MUSICAL GRAPHIC INTRODUCTION**Globisens [www.globisens.com](http://www.globisens.com) |
| Oh look this is Ido jumping.Ido – why don’t you fly into space when your feet leave the ground? What pulls you back down?It’s gravity of course.But how can you show gravity to your students? How can you measure it? | IDO JUMPS. DOVI AND IDO TALKDOVI TALKS TO CAMERA, HOLDING LABDISC IN ONE HAND AND PING PONG IN THE OTHER |
| Let’s consider one of the most famous scientists of all time. * Newton

And his 2nd law – Free Fall motion and acceleration. All we’ll need is the Labdisc motion sensor and * a ping-pong ball!
 | TALK TO CAMERAEQUATION: $$V\_{f}=V\_{i}+gt$$$$t= \frac{V\_{f}-V\_{i}}{g}$$$$V\_{f}^{2}=V\_{i}^{2}+2gh$$$$h=V\_{i}t+\frac{1}{2}gt^{2}$$SHOW EQUIPMENT |
| Bluetooth wireless communication makes this a cable-free exercise.We will setup the Labdisc via the GlobiLab software. All we need is 3 simple steps.  | TALK TO CAMERA |
| Open the setup screen – select the distance sensor. Set it to measure at 25 samples a second and collect 1,000 samples.  | SETUP LABDISC VIA SOFTWARE  |
| That’s it we are ready to go.I’m going to hold the Labdisc 1 meter above the table – but first we need to open the cover for the distance sensor. I will start recording and then Ido will drop the ball under the distance sensor.  | PERFORM EXPERIMENT |
| Immediately we see the data building with every jump shown in a peak of the graph.The balls movement is represented by this graph of distance as a function of time. Let’s use the markers and crop function to focus on the graph’s sections showing the jumps. We will first place two markers. Then use the crop function. Now we can see the balls jumps.We can use the markers to focus our students’ attention into a single ball jump. The free fall equation tells us that the ball’s position is a second degree function of time, or in other words a parabola. Having selected the start and end point of one bounce. Now I will press the quadratic regression function to get the parabola equation. With this equation we can measure gravity | CLOSE-UP OF SCREEN  |
| In 2 minutes of class time with a simple piece of equipment like a ping pong ball, your students understand gravity.Got it?Got it! | TRHOWS BALL TO IDO |
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