Experiment M-10
Gravity and Motion

Objectives

- To understand what is gravity.
- To investigate the change in the Panda's acceleration whiles it falls on the pillow.

Modules and Sensors

- PANDA-1 Panda Multi-sensor 🐼

Materials

- A pillow

Introduction

Gravity is the force that makes objects fall down towards the Earth. Every object in the universe that has mass exerts a gravitational pull on every other mass. The size of the pull depends on the masses of the objects. Objects with a very large mass, like the Earth, have a very impressive gravitational pull. The Earth's gravitational force accelerates objects when they fall. It constantly pulls, and the objects constantly speed up.

In this experiment you will measure the acceleration of the Panda while it falls on a pillow. This will demonstrate the Earth's gravitational pull on the Panda.

Procedure

Experiment setup

1.   Put a large pillow on your lap. Instead you can sit on a sofa.

> It is very important to drop the Panda from a very short distance (up to 16 inches) and only on a very soft surface like a pillow or sofa! A teacher should be near you while you are performing this experiment. There is an option that the teacher will perform the experiment and demonstrate to the students. Do not drop the Panda on the floor!

Settings

2.   Press on the **Sound sensor** icon 🔊 on the top left of the screen.

3.   Use the arrows ⌃ ⌄ to select the acceleration sensor.

4.   Press on the **m/s²** icon ▪.

5.   Change the range to '**Z axis**'.

6.   Press on the **m/s²** icon ▪ again.

7.   Make sure that the Panda's screen is facing up (on the table) and press on the **Offset** icon ⚖ to offset the sensor's acceleration to 0 m/s^2.

8.   Press on the **Record** icon ⭕.

9.   Set the duration of 5 seconds using the arrows ⌃ ⌄.

Testing and measurements

10. Click on the **Record** icon 🔴 to start the measurement.

11. Hold the Panda with its screen facing up and drop it (do not through) on the pillow or sofa from a short distance (up to 16 inches).

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12. Your graph should be similar to the following:

We can see that the acceleration was high (in the negative direction, towards the ground) while the Panda was in the air. After the panda landed on the pillow the acceleration got back to zero. When an object doesn't move its acceleration equals to zero.

Summary questions

1.   What would happen to the Panda if there wasn't a gravitational pull on it? How would the graph look like?

2.   Why is gravity so important to us?