

Physics 122: Normal Forces and Centre of Gravity

Objective: To explore normal force and centre of gravity using the Wii Balance Board.

Materials: Wii Balance Board, ball.

Please do not jump repeatedly on the Balance Board!

Procedure:

1. Connect the Balance Board (double-click CPU Devices -> flip it upside down and remove the battery cover and look for a small red button -> click “add device” on the computer -> press the small red button -> replace the battery cover).
2. Start collecting data. Have someone stand on the balance board; you will see five lines: one for each pressure sensor near the corners and one for your weight in Newtons.
3. Note and describe the motions of the graph as you slowly lean to all four sides. If you lean around faster you will see a sinusoidal pattern emerge – that means you are undergoing simple harmonic motion.
4. Note and describe how the graphs relate information about your centre of gravity.
5. Stand on one foot (or do some yoga!) – What lines change values and what line(s) do not?
6. Reduce the normal force required by the Balance Board to support your weight. How did you do this?
7. Jump off the board – What was your brief acceleration?
8. Drop a ball from different heights – how does the force of impact vary? Is there a pattern? Dribble the ball on the Balance Board – what is the time between dribbles?

Summarize your answers to these questions and any other observations in a short report (into, conclusion, etc.).