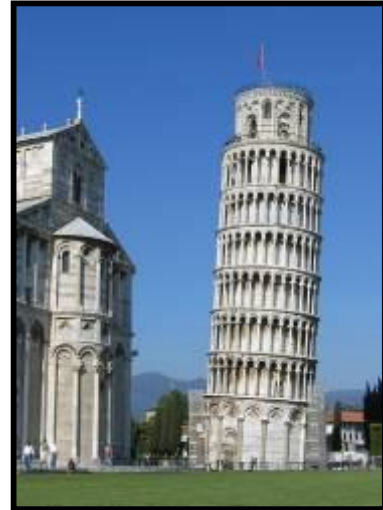


## Impossible To Do?

The photo on the right shows the Leaning Tower of Pisa located in Pisa, Italy. Of course this bell tower was not built this way. Five years after building started in 1173, and without all the floors built, it started to lean. Other floors were added and the Tower was completed in 1372. Will it fall over?

Imagine you are standing at the very top of the tower in the middle near the flag. You have a long piece of rope with a weight attached to one end. You lower the weight so that it is just above the ground. If the weight remains within the shape of the tower, the tower will not fall over. Its center of gravity stays within the tower. But if the weight ever hangs outside the shape of the tower, its center of gravity is no longer within the tower. So gravity will pull it down! Here is an activity about center of gravity.



### You Will Need

piece of paper or a dollar

### What to Do

Stand against a wall. Make sure the back of your feet/shoes are **against** the wall. Drop a piece of paper on the floor about 1 foot in front of you. Now, without bending your knees, and without losing your balance, lean forward and pick it up.

### What Happened?

The author has been teaching this activity for over 40 years. No child has ever been able to lean forward and pick up the paper without falling forward.

### Why It Happens

When you stand straight, your center of gravity is over your feet so you remain in balance. But when you lean forward, your center of gravity changes. Lean too much and the force of gravity will pull you down. But there is another reason!



### Think About This

If you try this activity without your feet against a wall, you probably can lean forward without bending your knees, and pick up the paper. Why? You probably can do it because your backside is not touching a wall. Would you believe that the wall actually is pushing on you? This can be explained by reading about Sir Isaac Newton's Third Law of Motion.