STOP THE DROP

Use paper clips to prevent keys from hitting the floor.

THE SETUP
A ring of keys is clearly heavier than three paper clips. But the three clips can counterbalance the keys and stop their fall.
You will need:
• keys on a key ring
• a piece of string about one yard long
• 3 paper clips
• a pen or pencil
1. Tie the keys to one end of a piece of string and the paper clips to the other end. Hold a pencil horizontally in front of you with one hand. Grasp the paper clips in the other hand.
2. Drape the string over the pencil so the keys are hanging down. Make the string between the pencil and the clips horizontal. Two-thirds of the string should be between the clips and the pencil.
3. Now, let go of the paper clips. Naturally, the keys drop. But amazingly, they don’t reach the ground. The paper clips spin around the pencil and wind up the string. Six wraps are enough to break the fall of the keys.

INSIDER INFORMATION
The second you release the paper clips, gravity acts on the keys and the clips, and both start to fall. Because the keys are heavier, they are falling with a greater force than the clips, winning the tug-of-war with the string. As a result, the length of string between the clips and the pencil gets shorter and shorter. The combined force of the falling clips and the shortening string causes the clips to rotate around the pencil. The shorter the string gets, the faster the clips rotate. After a series of wraps, the keys stop falling. This is because of the friction between the string and the pencil. Friction is a force between two surfaces that resists motion. Six wraps usually provide enough friction to stop the fall of several keys.