**The Science behind Solving the Falling Egg "Problem"**

**Newton’s first law on motion states that** an **object at rest will stay at rest, and an object in motion will stay in motion, unless acted upon by an external unbalanced force. This law means that if the forces acting on a falling egg are equal, it will remain in its current state of motion. If a force greater than those acting on the egg is applied, it will accelerate. "Acceleration" means any change in velocity -- slowing down, speeding up or changing direction. If you hold an egg, the forces you are applying are equal and balanced, canceling out the force of gravity. Therefore, it remains motionless in your hand. If you let go of the egg, gravity becomes an unbalanced force and causes the egg to fall to the ground.**

## Force, Mass and Acceleration

**Newton's second law deals with the relationship between an object's mass, its acceleration and the amount of force it exerts. The heavier an object is, and the faster it is traveling, the more force it exerts. Gravity causes falling objects to accelerate at a rate of 32.2 feet per second squared. By reducing the amount of mass in the egg container, you are reducing the amount of force it exerts as it falls.**

## Equal and Opposite

**Newton's third law states that for every action, there is an equal and opposite reaction. That means when you exert a force on an object, the object exerts a force back on you. For example, if you were standing on a boat and pushed off of the dock, even though you were pushing the dock, the dock pushed back. This is what causes the boat to move away from the dock. This concept is useful in understanding why an egg breaks when it strikes the ground; the ground is returning the force from the egg as it meets the ground. Using shock-absorbing materials can help reduce the amount of force exchanged between the ground and the egg.**

Potential Energy **is being converted into Kinetic Energy. The potential energy of the egg at a higher state reduces as the speed increases. When it hits the ground (without breaking) the kinetic energy is transferred into heat kinetic energy into the earth.**

## Conservation of Energy

**The law of conservation of energy helps understand how to mitigate the effect of an egg that is falling to the ground. Energy can neither be created or destroyed, only transferred. When an object falls to the ground, some of its energy is transferred to the ground, while it retains some energy. This is why a ball may bounce lower and lower each time. Eventually, the kinetic energy dissipates and the ball stops bouncing. By understanding that kinetic energy from a fall can be diminished over time, students can attempt to minimize the force of impact from a falling egg by using materials that allow for a bounce.**

**On your Own:** [Physics Egg-Drop Experiment Ideas](https://sciencing.com/physics-eggdrop-experiment-ideas-12045877.html)
[How to Drop an Egg Without Breaking It by Using Straws and Rubber Bands](https://sciencing.com/how-to-drop-an-egg-without-breaking-it-by-using-straws-and-rubber-bands-12750715.html)
[Successful Egg Drop Contraptions for a Science Project](https://sciencing.com/successful-drop-contraptions-science-project-8423692.html)
[Egg Drop Experiment Solutions Without a Parachute](https://sciencing.com/egg-drop-experiment-solutions-parachute-8253093.html)