

WHAT HAPPENS WHEN A RUBBER BALL BOUNCES?

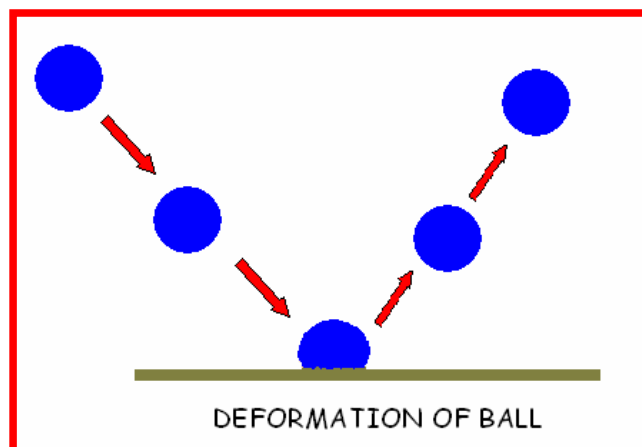


Rubber is very elastic. An elastic material is one that can be stretched to several times its own length without breaking and then return to its original size and shape. Rubber is made of long flexible chains of carbon atoms, connected to hydrogen atoms. When a piece of rubber stretches, the molecular chains uncoil and when the rubber is released, the chains retract, curling back into place.

In the case of a rubber ball these long flexible chains are coiled up into a tangled mass which remains very elastic.

When you squeeze a rubber ball it compresses and returns to its original shape due to its elasticity. The same thing happens to the ball when it hits the ground.

When a rubber ball falls toward the ground, the ball accelerates causing its velocity and kinetic energy to increase. At the point of impact with the ground, the entire ball's potential energy has been converted to kinetic energy. When the ball strikes the ground, the ground exerts an upward force on the ball which force compresses the bottom of the ball. Energy is stored as elastic potential energy. The ball stops in a very short time.



After the ball has stopped, the elastic energy is released and the ball exerts a force on the ground. According to Newton's third law, the ground then exerts an equal but opposite force on the ball in the upward direction, causing it to start moving upwards. The elastic energy is then converted into gravitational potential energy as it moves upwards.

Some of the kinetic energy is changed into sound and heat caused by friction. These energy changes are the reason why the ball doesn't return to the same height.