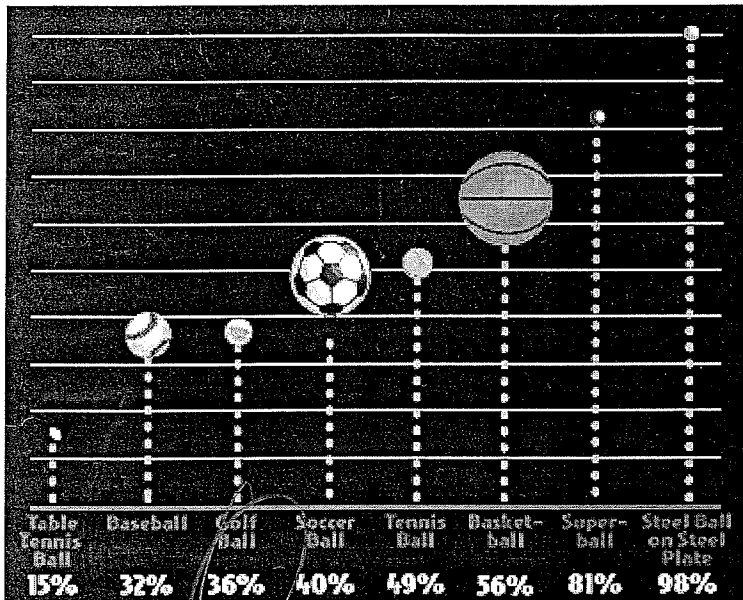


Day 3-4

**ELASTICITY AND THE "COEFFICIENT OF RESTITUTION":
WHY BOUNCY BALLS GO FARTHER**

The speed of the ball as it approaches the hitter also affects its flight after being hit. The greater the speed of the ball before impact, the greater its rebound speed will be. This is due to the elasticity, or bounciness, of the ball. Though it seems quite hard, the modern baseball is very elastic, which means that when it is deformed by an impact, it tends to bounce back, returning the kinetic energy of the impact into motion in the other direction. The measure of this bounce is called the "coefficient of restitution," which is a measure of how much of the energy of the collision is returned into the motion of the ball, rather than being dissipated as heat.



THIS CHART SHOWS THE BOUNCINESS OF DIFFERENT BALLS. NOTICE THAT THE BASEBALL IS NOT AS BOUNCY AS MOST OF THOSE FROM OTHER SPORTS. TO LEARN MORE, VISIT OUR "BOUNCING BALLS" ACTIVITY PAGE...

This shows that coeff is important consideration in sports, etc. Ask students, which is the bounciest?

Handwritten notes on the left side of the page, including 'So COR = v2/v1' and other scribbles.

Some refs say $\frac{v_2}{v_1} = \sqrt{\frac{h_2}{h_1}}$

The above chart shows the percentage of energy returned to the ball after one bounce.

$K \propto h \propto v^2$

No ball is perfectly elastic: The elasticity of a particular ball depends on its construction. After 1920, baseballs were made much livelier to encourage power hitting. The next season, the number of major league home runs more than doubled, and the nature of the game was drastically altered. Over time, changes in materials have changed the nature of the game. But the forces of nature remain the same.

END

Navigation bar with buttons: BACK, Sport! SCIENCE, Baseball, NEXT

*Ping Pong = .94
Basketball = .81
.85*

USGA rules - max COR = .83

© 1998, The Exploratorium

*Tennis ball = .72
Baseball = .55
(MLB rules = 55% = v2/v1)*

*Golf ball = .83
Billiard ball = .80*