

## Happy and Sad Balls #HSBL-01

### Warning:

- **Not a toy; use only in a laboratory or educational setting.**
- **Choking hazard.**
- **Contains latex.**
- **California Proposition**



**65 Warning: This product can expose you to chemicals including benzene and lead, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

### Introduction

These balls are a great experiment to use when learning about collisions and hysteresis. **Hysteresis** is a measure of the delay in the return to original state after a change is introduced to a substance. With that property in mind, the initially-puzzling mystery behind this experiment may begin to make sense.

To the eyes and hands, these two balls appear to be identical. They differ, however, on the material level. The **happy ball** is made from **polychloroprene, or neoprene**, while the **sad ball** is made from **polynorborene, or Norsorex**. These materials contrast each other in terms of elasticity. The material in your happy ball has elastic

properties and low hysteresis, meaning the ball will quickly return to its original shape when it is bounced. The material in your sad ball, on the other hand, is commonly used as an impact-absorption material because of its inelastic properties and high hysteresis. This means that, when bounced, it will be slower to return to its original shape and more of its kinetic energy will be dissipated as heat.

### How to Use

1. Take each ball into your hand and shuffle them around so that you don't know which one is which. Let any spectators inspect them and try to guess which ball is happy and which one is sad.
2. Drop each ball at the same time from the same height.
3. Observe them as they bounce. Discuss why one bounces while the other does not.

