Chemistry:

Balloon Isometrics **Primary Audience: 3rd-5th Grade**

Description: Examine the properties at work in the stretching of a balloon.

Keywords: Entropy, Heat

Concepts:

- Rubber is a flexible material and is perfect for balloons.

Materials:

- 1 rubber balloon (the wider the better)

Instructions:

Grasp the balloon on each end. Practice stretching the balloon once to test the stretching limit (you don't want to break the balloon). While holding the balloon against your forehead, rapidly stretch the balloon. What happens? Did you feel the temperature of the balloon change? While holding the stretched balloon against your forehead, quickly allow the balloon to return to its normal size, without snapping your skin. What happens? Why does the temperature change?

Possible Interactive Questions:

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What's Going On?

Entropy is the measure of the total disorder of an object. The more disordered the molecules of an object are, the more entropy it has. For example, ice has less entropy than liquid water, which has less entropy than steam. Therefore, heating objects creates more entropy (disorder). Stretched balloons have molecules that are lined up in order. When you stretch the balloon, it gives up some heat already inside it. Since your skin is touching the balloon, the heat transfers into your skin and you feel the balloon warm up. When you allow the balloon to go back to its original size, it feels cooler. The balloon takes some heat from your skin so that its molecules can become more disordered.

Entropy is all around us. The universe is always becoming more disordered in the sense that it is spreading out more and more. This was one of the predictions made by Einstein's general theory of relativity. It also predicted that the parts of the universe

were slowing down. This lead to the formation of the Big Bang Theory for the universe's beginning.

Further Exploration:

1.

Relevant Ohio Science Content Standards: