

# Homemade Hot Air Balloons

## Simple STEM Activities You Can Do at Home

<b>Purpose:</b>	The purpose of this activity is to construct, launch, and improve a homemade hot air balloon while investigating the properties of gases.
<b>Standard:</b>	<p><b>S2P1. Obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects.</b></p> <p><b>S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.</b></p> <p>b. Interpret data from weather maps, including fronts, temperature, pressure, and precipitation to make an informed prediction about tomorrow's weather.</p> <p><b>S6E4. Obtain, evaluate, and communicate information about how the sun, land, and water affect climate and weather.</b></p> <p>d. Construct an explanation of the relationship between air pressure, weather fronts, and air masses and meteorological events.</p>
<b>Materials:</b>	Toaster, lightweight kitchen trash bags, piece of poster board, tape, permanent marker pens.
<b>Procedures:</b>	<ol style="list-style-type: none"> <li>1. Cut the poster board hot dog wise into a long strip 12 inches wide. Roll the poster board paper into a tube that will just fit around the toaster and tape it along the length.</li> <li>2. Design and decorate your hot air balloon using colored marker pens.</li> <li>3. Place the poster paper tube over the toaster. Turn the toaster on and slide the bag over the poster paper tube. <b>Be careful with the hot toaster – avoid contact between the toaster and the plastic bag. Parents should help.</b></li> <li>4. Carefully hold the bag above the paper tube and allow it to fill with hot air.</li> <li>5. When full, let go of the bag, observe, and record your results.</li> <li>6. Repeat several times to see if you can improve your height and/or hang time</li> </ol>
<b>Science Behind It:</b>	<p>Hot air balloons are designed based on the fact that warmer air is less dense than cooler air. Essentially, hot air is lighter than cool air because it has less mass per unit of volume. In this experiment, as the air heats in the trash bag, the air molecules speed up and spread out becoming less dense (lighter) than the surrounding air in the room. Since the air in the bag is now less dense than the air in the room, it begins to lift. As the students will see and feel, the warm air fills the bag and, when released, it slowly rises toward the ceiling. Once the rising air cools, the bag and the slowing particles drop rather quickly back to the ground.</p> <p>With respect to weather, rising warm air in the atmosphere also brings with it water that has evaporated from the surface of the earth. When this water cools and condenses at higher elevations, it often forms rain or snow which then fall back to the earth's surface along with the cooling (and denser air).</p>
<b>Questions to Ask:</b>	<ol style="list-style-type: none"> <li>1. Explain why your balloon was (or wasn't) able to rise to the ceiling?</li> <li>2. What is one thing you could do to improve the flight of your balloon?</li> </ol>