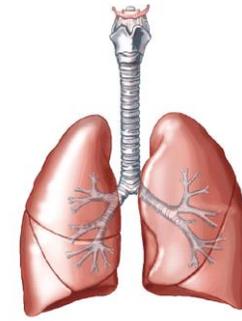


# DIY Air Force Activities:

## Model Lung



### Materials:

- plastic 20 oz bottle
- two 7 inch balloons
- duct tape
- scissors



Have you ever heard the phrase “it’s as simple as breathing?” Breathing is something we do without conscious thought, but the process by which we do it is actually quite amazing! When you take a deep breath a muscle in your chest called the diaphragm contracts and flattens. This increases the volume of your lungs and decreases the pressure inside that space, causing outside air to rush in. When our diaphragm relaxes, the air is pushed out and we exhale. This relationship between pressure and volume is described by something called “Boyles Law,” which states that as pressure decreases, volume will increase, and vice-versa. Follow the instructions below to create a model lung that demonstrates this relationship!

### Directions:

1. Carefully cut off the bottom of the bottle (\*\*ask for adult assistance).
2. Cut the top off of one of the balloons and then stretch the bottom over the lower end of your bottle.
3. Use duct tape to secure the balloon to the bottle.
4. Insert the second balloon so that it hangs inside the top of the bottle and stretch the end of this balloon around the rim.
5. Use duct tape to secure the balloon to the rim and ensure no leaks.

You can now pull on the bottom balloon membrane and make an observation. What happens to the balloon inside? The top balloon should inflate! The bottom balloon is acting as your diaphragm and the internal balloon acts like your lung!

### Air Force Associations:

USAF Pilots wear masks to assist in their breathing at high altitudes. At high altitudes there is less pressure; this drop in pressure makes it difficult for them to breathe in or breathe out when necessary. In addition, our bodies need a certain amount of oxygen molecules in the air we're breathing (approximately 20% by mass concentration). This is the typical concentration found at sea level altitude and pressure but this concentration drastically decreases as altitude increases. Pilots' masks contain valves and regulators to dispense the correct concentration of oxygen at the correct pressure to their mouths.