

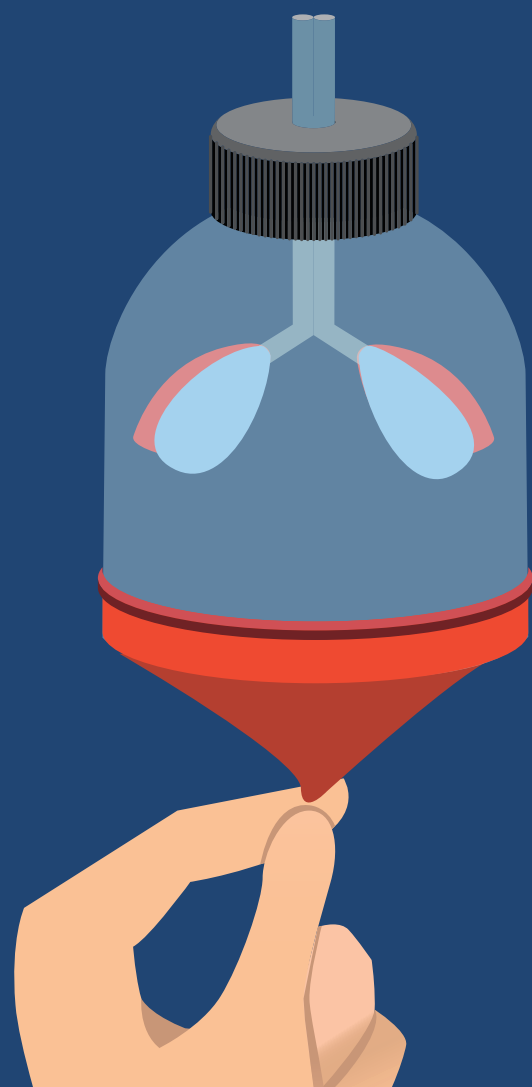


112年教育部補助大學校院
STEM領域及女性研發人才
培育計畫



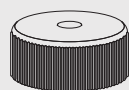
機能性奈米纖維與複合骨材
創新產品開發在醫療領域之
應用暨女性研發人才培育

STEM 胸腔引流 Chest Drainage 科普教具 Education Tool



Required Materials

1 Pierced bottle cap×1



2 Straw×2



3 Lung pattern×1



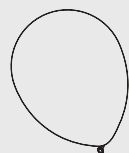
4 Small balloon×2



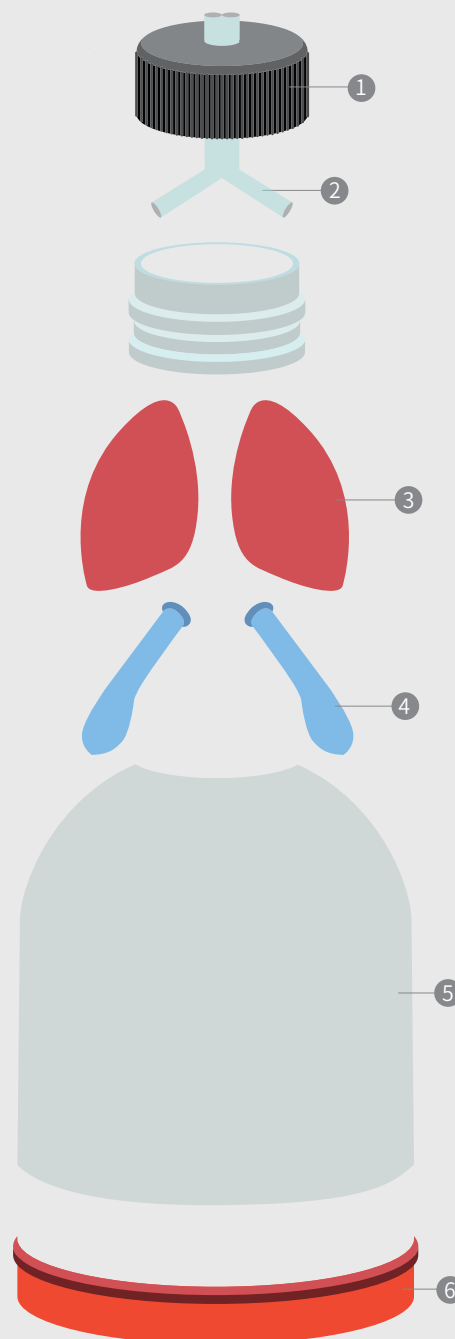
5 Plastic soda bottle×1



6 Large balloon×1



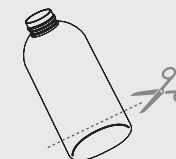
Required Tools



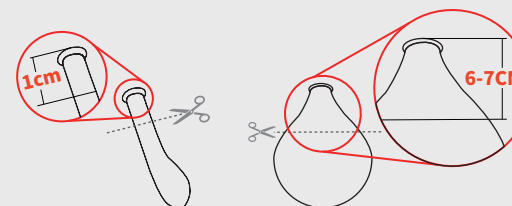
Assembly Instructions

*** Please use scissors or utility knife carefully!***

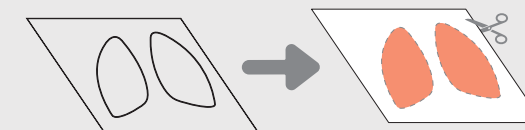
1 Cut along the dotted line at the bottom of the plastic bottle, then carefully use scissors to remove it. (try to make the cut as even as possible)



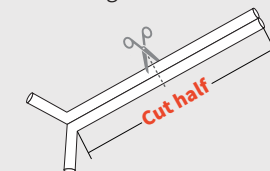
2 Cut **1 cm** from the top of the small balloon⁴ and then cut **6-7 cm** from the top of the large balloon⁶.



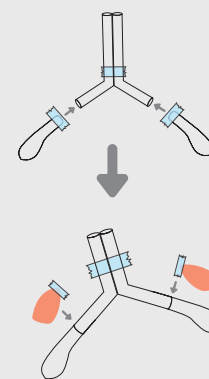
3 Cut along the dashed lines on the lung diagram³.



4 Cut the long end of the straw² in half.

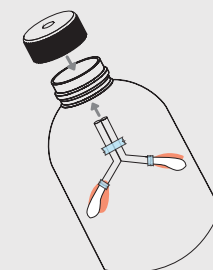


5 Cut off the top part of the small balloon and attach it both sides of the straw, then secure the straw with tape.

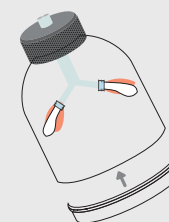


Attach the lung diagram at the junction of the balloon and the straw, and secure it with tape.

6 Next, assemble the cut bottle, bottle cap, and straw.



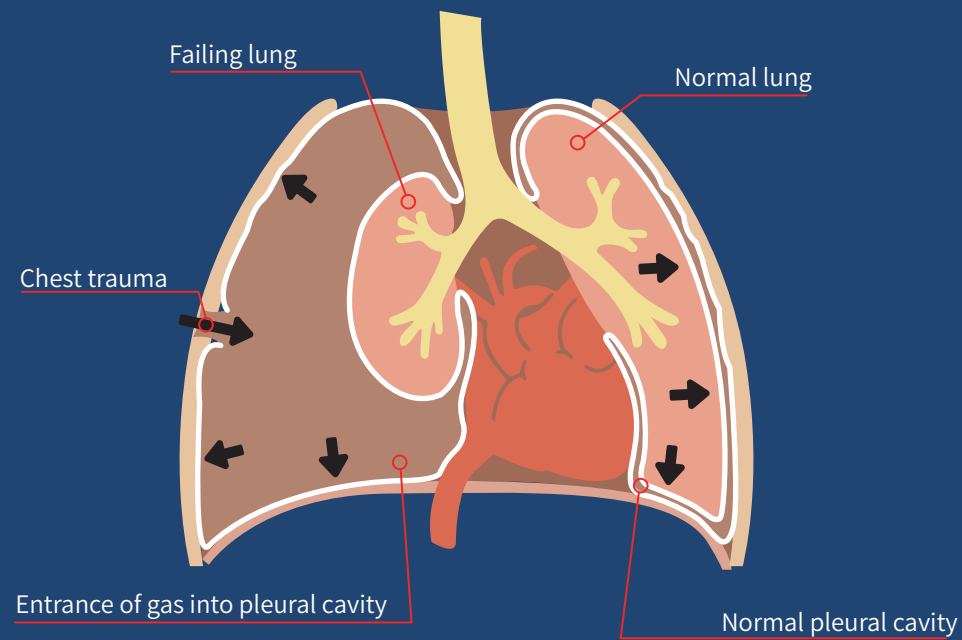
7 Finally, assemble the large balloon to the bottom of the plastic bottle.



8 Finish.



← Pull the bottom balloon downward, allowing air to enter the plastic bottle through the straw, causing the balloon inside to start inflating. Conversely, when you release it, the balloon will return to its original position.



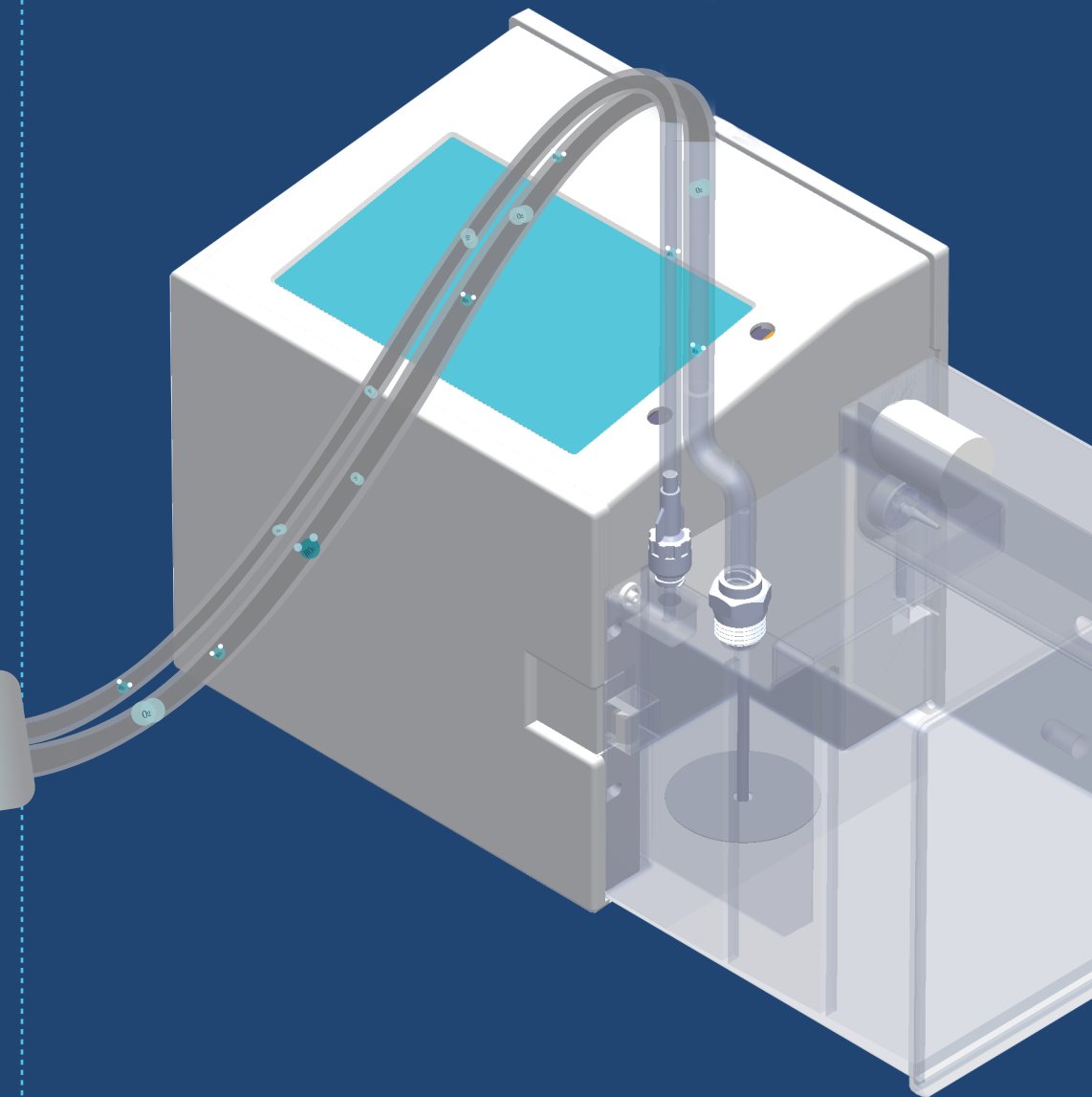
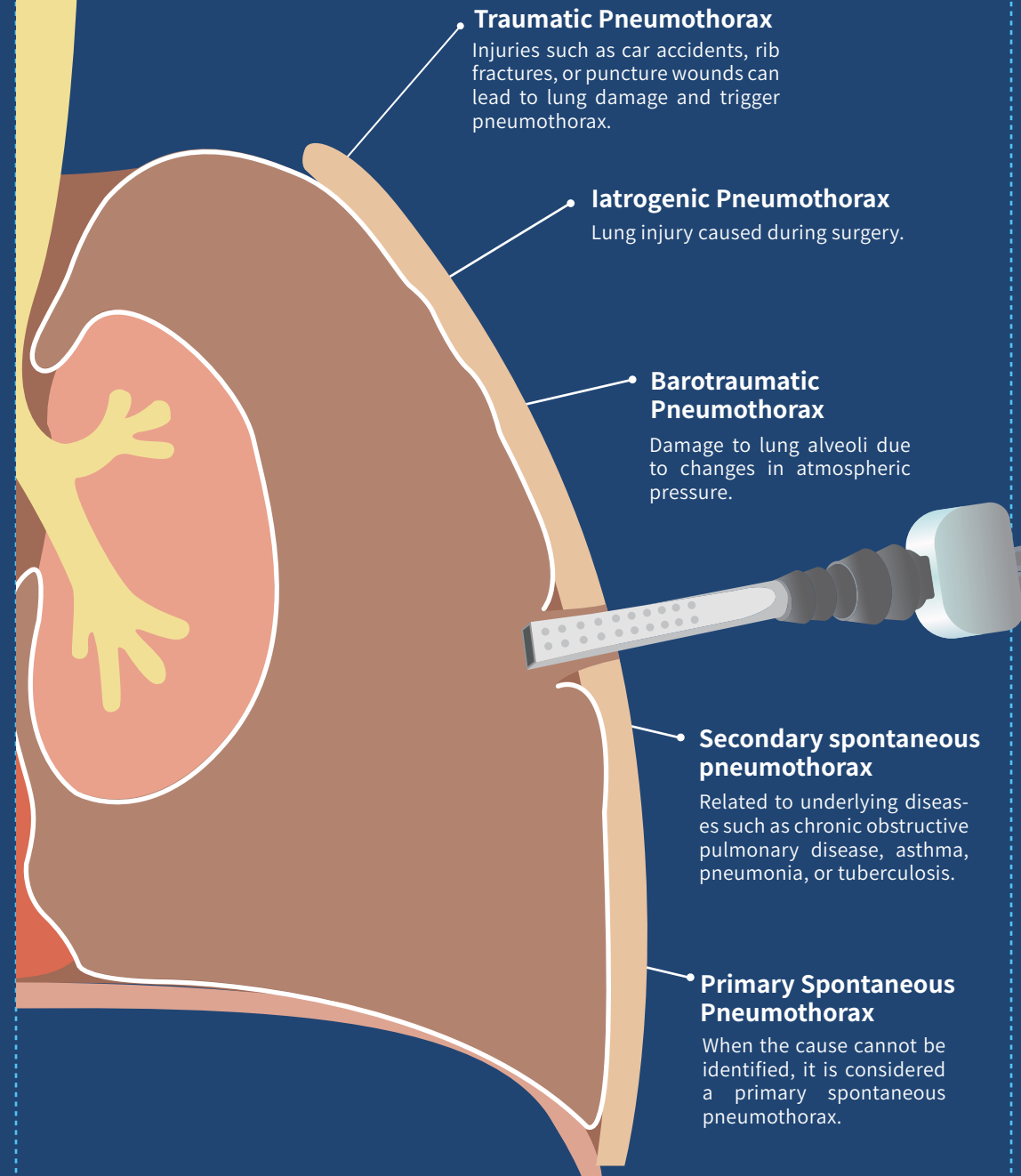
Respiratory System

When we breathe, muscles change the volume of the chest cavity, creating a pressure difference between the lungs and the external atmosphere, allowing inhalation or exhalation.

When the pressure inside the lungs is greater than atmospheric pressure, exhalation occurs, whereas when the pressure inside the lungs is lower than atmospheric pressure, inhalation takes place. The pleural cavity, located between them, typically maintains a certain degree of negative pressure, preventing the primarily membranous and elastic fiber-based lungs from collapsing.

Pneumothorax

Also known as "collapsed lung," a "pneumothorax" is a chest cavity condition where the pleura is damaged, preventing the pleural cavity from maintaining negative pressure, consequently causing the collapse of the lung. Additionally, the pressure in the pleural cavity naturally varies with respiration.



Chest Drain

The purpose of using a chest drain procedure is to remove air and fluids from the pleural cavity, aiding in the restoration of negative pressure within the pleural cavity, allowing the lungs to re-expand. This is achieved using principles of gravity, vacuum suction, sealing, and asepsis to drain air and liquids from the chest cavity.