



Activity: What Does Asthma Look Like?

Overview: In this activity, participants will create a pair of bronchial tube models; one that represents a healthy airway and one that represents what an airway looks like during an asthma attack. These models can be used to demonstrate the various physiological changes that occur to a bronchial tube during an asthma attack. They can be prepared ahead of time for demonstration purposes, or conducted as an educational craft activity with small audiences in the home or classroom environment.



Learning Objectives: By the end of this activity, participants will be able to

- Explain the physiological effects of an asthma attack on the bronchial tubes and describe the symptoms that occur as a result.
- Identify the key differences between a healthy bronchial tube and a bronchial tube during an asthma attack.
- Add objective on understanding how asthma treatments can reverse symptoms

Audience: 6th grade to adult; in particular nurses and other public health professionals for use with their patients/clients.

Activity Preparation: Collect materials for assembling bronchial tube models.

Time to make: 30 minutes

Materials:



Item	Represents...	Estimated Cost
Toilet paper tubes (2 for each pair of models) OR paper towel cardboard tube cut into 4" lengths (2 for each pair of models)	The cartilaginous walls of the bronchial tube	
2 different colored craft felt pieces (light and dark pink)	The inner lining of the bronchial tube	40 cents per 9x12 sheet, may also be purchased by the yard
Hot glue gun and hot glue sticks	Mucus	Gun: \$4, Sticks: \$3
Thick width rubber bands and Regular width rubber bands (preferably of a different color such as red or pink)	Smooth muscles surrounding the bronchial tube	\$2.50 per bag
Scissors, preferably fabric scissors		
Ruler		

Assembly Instructions:

1. Cut cardboard tubes into 4-inch pieces (if needed).
2. *Making the healthy bronchial tube:*
 - a. Cut the felt into 4x4.75 inch pieces. Roll the darker piece into a tube shape, then roll the lighter piece around it. Ensure it fits snugly inside the tube piece and has an inside diameter wide enough so it looks like a healthy tube; it should be possible to look through the tube to the other side. Secure, if needed, to inside of tube with hot glue.
 - b. Tie 3-4 thick rubber bands around the outside of the tube, giving appearance of relaxed smooth muscles around bronchial tube. **Recommended:** As in the example below, wide and flat rubber bands can be used to represent the relaxed muscles.



Making the unhealthy bronchial tube:

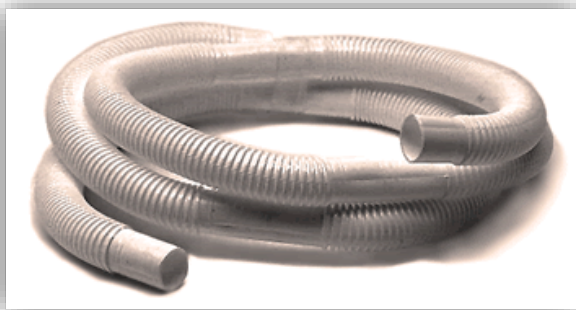
- c. Cut felt into 4x8.5 inch pieces. Roll the darker piece into a tube shape, then roll the lighter piece around it. Ensure it fits snugly inside the tube piece and has very little space look through tube to the other side. This should give the inside of the tube a “swollen” appearance. Secure, if needed, to inside of the tube with hot glue.
- d. Tightly wrap 3-4 thick and regular width rubber bands around the outside of the tube to give illusion of constricted muscles around bronchial tube. Compress the tube to flatten slightly (this can also be done during demonstration to illustrate constriction of bronchial tube). **Recommended:** As in the example below, large and thin rubber bands can be used to emphasize the tightening of the muscles. If only you only have one type of rubber band, wrapping several on top of each other can give the appearance of tight muscles.

- e. Add squirts of hot glue just inside the openings of the tube to give the appearance of mucus inside the tube. Allow to dry for approximately 3 minutes, making sure that glue does not run or drip too much while cooling



Additional instructions:

Depending on your need for more a more durable material and your available resources, you may choose to replace the cardboard tube with a sturdier material, such as a bilge hose (can be found at your local hardware store and an \$8 hose will produce nine pairs of tubes). To do so, follow the same instructions above, cutting the bilge tube into 4-inch pieces, and the felt into 4X4 inch squares for the healthy bronchial tubes, and 4X7 inch rectangles for the unhealthy bronchial tubes. To represent the constriction in the unhealthy bronchial tube model, more effort will be required to compress it than for the cardboard model.



Evaluation: This activity reinforces what we share in our training *Environmental Asthma Triggers: A Training for Public Health Professionals*. Following the workshop and development of the bronchial tubes, participants should be able to practice describing what happens to the airways when exposed to environmental exposures that trigger asthma symptoms.

Discussion questions for classroom or small group setting:

- 1) Why is it important to be able to see clearly through the healthy bronchial tube model?
To show that air is able to move easily through the bronchial tube.
- 2) What do the rubber bands, felt, and hot glue each represent in the bronchial tube model?
Rubber bands represent smooth muscle around the bronchial tubes. Felt represent the inside walls of the bronchial tube, and hot glue represents mucus.
- 3) What are the key differences between the healthy bronchial tube model and the unhealthy bronchial tube model?
There is an open space in the healthy model, representing air being able to get through more easily than the smaller opening in the unhealthy model. The rubber bands are wrapped more tightly around the unhealthy model than in the healthy model. There is hot glue or "mucus" obstructing the openings of the unhealthy model, and no hot glue in the healthy model.
- 4) Using the bronchial tube models as reference, what are three effects upon the airways (bronchial tubes) during an asthma attack?
 - a) *There is a build-up of mucus (hypersecretion);*
 - b) *The walls of the airway become inflamed and thicken (swelling);*
 - c) *Muscles tighten around the airways (bronchospasm).*
- 5) What are some possible symptoms produced by these physiological responses?
Coughing, wheezing, and shortness of breath are some possible symptoms.
- 6) What are some environmental asthma triggers that can bring on an asthma attack?
Common environmental asthma triggers include tobacco/secondhand smoke, cockroaches, mold, pollen, ragweed, air pollution from traffic and wildfires, viral illness, and dust mites. Every asthma patient is different, so there could be additional triggers not included in this list.
- 7) What can be done to alleviate symptoms of asthma before the attack occurs or when a patient is having an attack?
Steps can be taken to remove or reduce exposure to environmental asthma triggers. Many patients take medicine to help with symptoms, including inhalers that work to prevent attacks or to open the airways and improve breathing after an attack occurs. It is best to seek medical advice from a healthcare professional about asthma treatment.

Talking points for one-on-one discussion with asthma patients and families:

What happens when an asthma attack strikes?

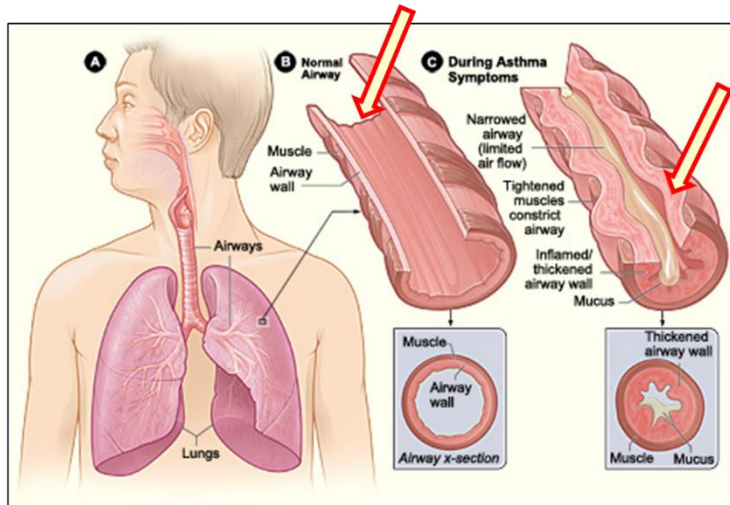


Image source: National Heart Lung and Biology Institute

This diagram shows the differences between normal airways, formally known as bronchial tubes, and airways affected by asthma. The diagram can be used in conjunction with the bronchial tube models.

Image A shows a person's lungs and the airways (bronchial tubes). Image B shows a normal bronchial tube. Air can move in and out of the bronchial tube easily.

Image C shows a bronchial tube during the onset of asthma symptoms. Exposure to an environmental trigger can cause these changes. The walls are thickened and inflamed, and a buildup of mucus occurs. When the muscles tighten around the bronchial tube, it constricts the airway further, making it difficult for air to pass through.

Alignment with NC Standard Course of Study

This activity is suitable for formal and informal classroom settings, and it aligns with the following Healthful Living standards and objectives for middle and high school students:

- 6.PCH.1 – Understand wellness, disease prevention, and recognition of symptoms.
 - 6.PCH.1.2 – Differentiate between communicable and chronic disease.
 - 6.PCH.1.3 – Recall symptoms associated with common communicable and chronic disease.
 - 6.PCH.1.7 – Summarize the triggers and symptoms for asthma and strategies for controlling asthma.
- 9.PCH.1 – Analyze wellness, disease prevention, and recognition of symptoms.
 - 9.PCH.1.1 – Recognize that individuals have some control over risks for communicable and chronic diseases.
 - 9.PCH.1.4 – Design strategies for reducing risks for chronic diseases.