The Consortium on Children's Asthma Camps

Summer 2013

Expand Your Mind: Experience Inflammation in Your Lungs

Each year, the Consortium on Children's Asthma Camps is proud to provide a free, high quality, kid-friendly educational program to each asthma camp in the United States. This year, we are proud to partner with Aerocrine to provide you with Expand Your Mind: Experience Inflammation in Your Lungs. Aerocrine is a medical technology company focused on improving the treatment of patients with inflamed airways. Measuring airways inflammation helps doctors to diagnose, monitor and optimize therapy for people with inflammatory airway diseases.

This year's educational program is focused on teaching campers about inflammation. It is hard for kids to visualize swelling (or the reduction of inflammation) in their lungs, so we have identified five hands-on, truly awesome experiments to drive the educational message home. Each experiment is outlined below as well as a link to see an example of each experiment. A gift card is enclosed to purchase supplies for each experiment.
Note: the supply list is per group of 8-10 campers.

If you have any questions about this year's education program, please contact **Cynthia Isaacson at Cynthia.Isaacson@LungMN.org or 651-268-7587.** If you have any questions about Aerocrine and measuring exhaled nitric oxide, please visit **www.aerocrine.com/en/About-Aerocrine/ or contact Kyle Mall at Kyle.Mall@Aerocrine.com.**

Thank you,

Jill Heins Nesvold, MS
Executive Director

INFLAMMATION OVERLOAD!

Mentos and Diet Coke Experiment

Example: www.onlinemathlearning.com/mentos-cola-experiment.html

OBJECTIVE

- Exposure to one of your asthma triggers can create inflammation in your airways making it difficult to breathe.
- Taking a controller medication helps fight inflammation in your airways.

SUPPLIES FOR EACH GROUP

2 liter bottle of Diet Coke
1 package Mentos (12)
1 test tube
1 square of cardboard
1 cup of water

DIRECTIONS & EDUCATION

1. Begin a discussion with the campers about what types of triggers cause their asthma to flare.
2. Explain that people with asthma experience different triggers, and some triggers are more severe than others.
3. Open the 2-liter can of Diet Coke.
   a. Explain that you'd like the campers to pretend that the can of Diet Coke represents the lining of their airways.
4. Put 10 Mentos in the test tube—represents the trigger.
   a. Show the campers the Mentos and tell them to pretend that this is one of their triggers.
5. We are going to find out what happens to the lining of our airways when a trigger is introduced.
6. Put the cardboard over the test tube and flip over to align test tube opening with bottle opening
7. Pull the cardboard to allow the mentos (trigger) to drop in and see what happens to the "lining of the airway."
8. The Diet Coke will shoot out of the bottle as it quickly expands.
   a. Explain that the trigger makes the airways inflame and expand.
9. When the lining of our airways gets irritated by a trigger, the trigger causes inflammation.
   a. What do we do to help control inflammation in our airways? (answer: take medications)
   b. Do we take a controller or reliever? (answer: controller will better control inflammation)
   c. If you are on a controller, does a trigger cause inflammation as easily? (answer: not as easily)
10. Now let's pretend the cup of water represents the lining of the airways when taking a controller medicine.
    a. What would happen if we put Mentos (trigger) in water?
11. Drop the last 2 Mentos in a cup of water.
    a. You'll notice the Mentos (trigger) doesn't react as much to the water.
12. So taking your controller medicine every day will keep your inflammation down, making it easier to breathe and less likely for your asthma symptoms to flare up.

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Brought to you by Aerocrine

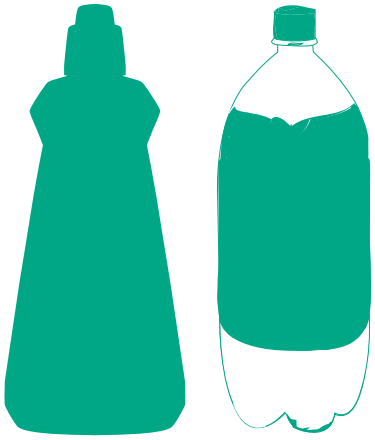
Fantastic Mucus Fountain

Example: www.sciencebob.com/experiments/toothpaste.php

OBJECTIVE

- Exposure to one of your asthma triggers can increase mucus production in your lungs. This blocks your airways making it difficult to breathe.

SUPPLIES FOR EACH GROUP



- Clean 16-ounce plastic soda bottle
- 1/2 cup 20-volume hydrogen peroxide liquid (20-volume is a 6% solution)
- 1 Tablespoon (one packet) of dry yeast
- 3 Tablespoons of warm water
- 1 Tablespoon liquid dish washing soap
- Small cup
- Safety goggles

DIRECTIONS & EDUCATION

1. Begin this experiment by talking with the campers about mucus.
   a. What is mucus?
   b. How many experience mucus with their asthma flare-ups?
   c. How does their mucus come out?
2. Explain that people with asthma experience different triggers, and some triggers cause an increase in mucus production.
3. Add the hydrogen peroxide to the bottle. (Hydrogen peroxide can irritate skin and eyes, so put on those safety goggles and have an adult pour the hydrogen peroxide into the bottle.)
4. Add about 1 tablespoon of liquid dish soap into the bottle, and swish the bottle around a bit to mix it.
5. Show the campers the bottle with the ingredients in it—this represents normal mucus production.
6. In a separate small cup, combine the warm water and the yeast together and mix for about 30 seconds. Explain that this combination in the cup represents one of their triggers.
   a. What are some triggers that can make their asthma symptoms get worse?
7. Now the adventure starts! Pour the yeast water mixture into the bottle (a funnel helps here) and watch the foaminess begin!
   a. Explain how the mucus production fills the airway, and there's no room for air to breathe. The more of a trigger you have, the more mucus you may produce and the thicker the mucus could be.
   b. The mucus has to come out of the airway so you can breathe. The fountain is an extreme representation of you coughing to get the mucus out of your lungs so you can breathe better.

Expanding Ivory Soap

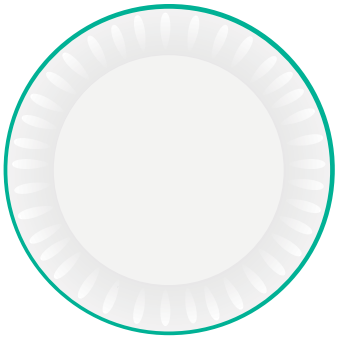
Example: www.youtube.com/watch?v=z1hzatoE1tg

OBJECTIVE

- Exposure to one of your asthma triggers can create inflammation in your airways making it difficult to breathe.
- Taking a controller medication helps fight inflammation in your airways.

SUPPLIES FOR EACH GROUP

- 1 bar Ivory soap
- Paper plate
- Access to a microwave



DIRECTIONS & EDUCATION

1. Begin by having a discussion about inflammation in the lungs.
   a. What is inflammation? What happens when something is inflamed? (something is irritated it reacts and gets bigger)
   b. What causes inflammation in your lungs? (triggers, name some)
   c. What part of the lungs is affected by inflammation? (lining of the airways)
   d. What does the inflammation feel like during an asthma episode? (makes it hard to breathe, causes less room in the airways to get air in and out)
2. Unwrap one bar of fresh Ivory soap and place it on a paper plate.
3. Put in the microwave for 75-90 seconds.
4. Have the campers pretend that the heat is a trigger that causes their airways to swell, just like it does to the bar of soap.
   a. The heat from the microwave is the trigger causing inflammation to the bar of soap just like a trigger does to the lining of the airways during an asthma exacerbation.
5. What can we do to control inflammation in our lungs? (stay away from triggers and take our controller medication)
6. How often do you take a controller medication? (everyday)

Expanding Marshmallows

OBJECTIVE

- Exposure to one of your asthma triggers can create inflammation in your airways making it difficult to breathe.
- Taking a controller medication helps fight inflammation in your airways.

SUPPLIES FOR EACH GROUP

- Large marshmallow for each camper
- Roasting stick
- Campfire

DIRECTIONS & EDUCATION

1. Have every camper find a roasting stick and take a marshmallow.
2. For this experiment to work we cannot burn the marshmallow, so instruct the campers we are going to slowly roast the marshmallows over the heat—not in the flames).
3. The trigger in the experiment is the heat. What is the trigger going to cause your marshmallow to do? (get bigger, expand)
4. While campers are roasting, talk about inflammation in the lungs during an asthma episode.
   a. What causes inflammation? (trigger)
   b. What part of the lungs gets inflamed? (lining of the airways)
   c. What does it feel like when you are experiencing inflammation in your lungs during an asthma episode?
   d. What do we do to control the inflammation? (take medication)
   e. What type of medication do you take for inflammation, controller or reliever? (controller)
   f. How often to you take your controller? (everyday)
5. See who can get their marshmallow to expand the largest before falling off their stick.

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Collapsing Airways Can

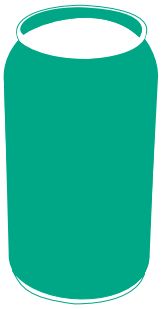
Example: scifun.chem.wisc.edu/homeexpts/COLLAPSE.html

OBJECTIVE

- When the smooth muscle around your airways (can) comes in contact with a trigger (cold water), the muscle around the airways starts to tighten and squeeze your airways making it hard to breathe.
- Take your reliever to relax this muscle, making your airway bigger to help you breathe better.

SUPPLIES FOR EACH GROUP

- Empty aluminum soft drink can
- 2- or 3-liter (2- or 3-quart) saucepan/pan
- Water
- Pair of kitchen tongs



DIRECTIONS & EDUCATION

1. Start a discussion with the campers about the anatomy of the lungs. Explain that there are airways, lining in the airway and smooth muscle around the airways. Explain that three things happen in your lungs when you are having an asthma episode—the airway lining inflames, more mucus is produced and the smooth muscle around the airway tightens.
2. Put 1 tablespoon of water into the empty soft drink can. For this experiment, the can will represent the smooth muscle surrounding the airways.
3. Fill the saucepan with cold water. The cold water will represent a trigger.
   a. What are some triggers?
   b. How do you stay away from your triggers?
4. Heat the can on a stove or over a campfire until the water boils. When the water boils, a cloud of condensed vapor will escape from the opening in the can. Allow the water to boil for about 30 seconds.
5. When the water is ready, tell the campers to watch for what happens when the airway is exposed to a trigger.
6. Using the tongs, grasp the can and quickly invert it and dip it into the water in the pan. The can will collapse almost instantaneously.
   a. The airway will tighten up almost immediately, just like the smooth muscles do during an asthma attack.
   b. When your airway is collapsed that is when, in some kids, you will hear wheezing because the space for the air to come in and out is so small. Like when we whistle. Have the kids whistle. We make a small air and force air out and it makes noise.
   c. Do you wheeze when you are exercising asthma symptoms?
7. How do you get the smooth muscle to relax? (take your inhaler/medication) Do you take your controller or your reliever to relax the muscle? (reliever)