

RAFT IDEAS

Topics: Health, Biology, Ethics

Materials List

- ✓ A one or two liter plastic soda/water bottle (clean)
- ✓ Cotton
- ✓ Masking tape
- ✓ Various brands of cigarettes (light and strong, with and without filters)
- ✓ Matches

This activity can be used to teach:

- Structure and Function in Living Systems (CA Science Standards: Grade 7, 5.b)
- Respiratory system (CA Science Standards: Grade 5, 2.b)
- Broad applications in Life Sciences (Grades 5 & 7, and HS Biology and Health Classes)

Smoking bottle

See the yuck!



In this demonstration students see first hand evidence of some of the poisonous substances they would expose themselves to if they smoked a cigarette.

Note: A well-ventilated area is highly recommended for this activity.

Assembly

1. Wrap several pieces of cotton around the filter end of a cigarette.
2. Insert the filter end of the cigarette with the cotton into the neck of the bottle
3. Secure the cigarette with tape leaving no gaps.

To Do and Notice (Note: For younger students and/or if it is not possible to use smoking cigarettes at school –bring in samples prepared by an adult outside of class.)

1. Light the cigarette.
2. Gently squeeze the bottle. The bottle will act as a lung drawing air in through the cigarette and filter.
3. Continue squeezing the bottle until the cigarette is *smoked* down.
4. Observe contents of bottle.
5. Remove the cotton and the butt of the cigarette. Observe stains on cotton and filter.

The Science Behind the Activity

Cigarettes contain toxic chemicals and tar (particulate matter). Smoking is especially bad for the respiratory system. When a cigarette is smoked, the lungs are directly exposed to various substances. There are more than 4,000 chemicals found in cigarette smoke, of which **250 are toxic poisons (50 cause cancer)**. Some of the toxins found in tobacco smoke include **Ammonia** (also found in toilet bowl cleaner), **Arsenic** (an ingredient in rat poison), **Polonium 210** (nuclear waste), **Carbon Monoxide** (car exhaust), and **Acetone** (used in finger nail polish remover). These can reduce the lungs ability to function and interfere with body's ability to protect the lungs against disease. Smoking impairs lung function in several ways: Smoking damages cilia, bronchioles, and alveoli; contaminated mucus becomes trapped in the lungs, causing wheezing and shortness of breath. Because of the toxins found in cigarette smoke, smoking accounts for 90% of all lung cancer cases.

Taking it Further

Repeat the demonstration with different brands of cigarettes both light and regular or try a cigar. Observe and compare the residues.

Web Resources

- http://www.nsw.ca/factsheets/harmful_ingredients_cigarette_smoke.pdf
- <http://www.co.chippewa.wi.us/CCDPH/CVTFC/whatisssmoke.htm>
- <http://www.quitsmokingsupport.com/whatsinit.htm>