### 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)

### 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.co.chippewa.wi.us/CCDPH/CVTFC/whatissmoke.htm](http://www.co.chippewa.wi.us/CCDPH/CVTFC/whatissmoke.htm)
- [http://www.quitsmokingsupport.com/whatsinit.htm](http://www.quitsmokingsupport.com/whatsinit.htm)