

Topic: Air Quality

Audience: Grades 9-12 and Adults

Whirling, Swirling Air Pollution

There are a huge number of potential contributions to air pollution generated by everyday human activities. These activities may not be immediately apparent as a source of pollution when you observe from the individual viewpoint. However, the cumulative effect can be profound. This activity attempts to simulate the cumulative effect of various air pollution sources upon the “airshed.” Water is used to simulate mixing which occurs in the air. For our purposes today:

RED food coloring represents car and truck pollution.

GREEN food coloring represents lawn & garden, motor boat, and construction engines.

BLUE food coloring represents consumer products and paints.

YELLOW food coloring represents industry and commercial activities.

Small Clear Cups half full of water - represents “airshed”

Students work in pairs.

Narrate a Day in the Life of... (be creative with your story and embellish as needed).

Alarm goes off! Jump into the shower and get ready for your day.

VOC sources:

Soap and shampoo (perfumed) in the shower.

Deodorant, hair spray, perfume, shaving supplies, fingernail polish

CO, NO_x, PM_{2.5}, SO_x sources:

Combustion to heat water.

Add one drop of BLUE food coloring to your “airshed.”

Jump into your car and drive to work.

VOC, CO, NO_x, SO_x, PM_{2.5} source

Cold start in your automobile: High CO emissions.

Add one drop of RED food coloring to your “airshed.”

Arrive at work.

Industrial sources: PM_{2.5}, CO, VOC, NO_x, SO_x

manufacturing, mills, construction, space heating

Commercial sources: PM_{2.5}, CO, VOC, NO_x, SO_x

printing, painting, delivery, small manufacturing, dry cleaning, space heating

Add one drop of YELLOW food coloring to your “airshed.”

Time for your lunch break.

Drive over to pick up a burger: PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of RED food coloring to your “airshed.”

Eat your lunch (flame broiled burger with fries): PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of BLUE food coloring to your “airshed.”

Drive back to work: PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of RED food coloring to your “airshed.”

Back at work.

Same sources mentioned above.

Add one drop of YELLOW food coloring to your “airshed.”

Time to go home!

Drive home in your car: PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of RED food coloring to your “airshed.”

Stop off to pick up the dry cleaning: VOC

Add one drop of BLUE food coloring to your “airshed.”

Everyone’s yard looks great-except yours! Mow the lawn: PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of GREEN food coloring to your “airshed.”

Those fall evenings are getting cool.

Start up your gas fireplace: PM_{2.5}, CO, VOC, NO_x, SO_x

Add one drop of BLUE food coloring to your “airshed.”

Now look at the “air” in the glass. Discuss.

Implementation:

Individuals should evaluate the environmental impacts which result from the choices we make in our everyday activities. When you make a choice that reduces or eliminates the amount of pollution you contribute to the air you also reduce the need for technologies to remove or recycle the pollution.

This is one of my favorite activities! I have embellished it a bit for our purposes here. You could have the students design a sequence which describes their daily activities. Try having your students make one or two lifestyle changes for a semester. Encourage them to think of air pollution in relation to this activity.

We have collected a large storage tub of props to use when narrating this activity. We have a small plastic car, a child size lawn mower, fast food containers, shower and hair products, etc. Just use your imagination.

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