



DEPARTMENT OF ENVIRONMENTAL QUALITY

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Lesson Plan: Air Quality Presentation for Youth (Grades 9-12)

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Fugitive Dust Outreach & Education Program
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- Title:** If You Can't Breathe, Nothing Else Matters
- Subject:** Air quality
- Subcategory:** Major local air pollutants and their causes, effects, and solutions
- Description:** Students learn about the major air pollutants in Pima County: particulate matter, ground-level ozone, and carbon monoxide. Students also learn about the health effects and solutions to air pollution. Students are divided into five groups. At the end of the exercise, each group will present their findings to the class as a whole. Each group receives a packet with questions, and resources to answer these questions. Groups receive individual mini-lessons during the research time that will enhance their class presentations.
- Intended Audience:** Youth grades 9-12.
- Duration:** 45-60 minutes.
- Goals:** Students will gain a greater awareness of air pollution issues. Individuals will be inspired to take action in their personal lives to reduce air pollution, and/or reduce their exposure to air pollution in general.
- Objectives:** Groups of students will research air quality topics to discover facts about air pollutants, health effects, or solutions to air pollution. Students will share the group information with the rest of the class for a more broad distribution of information and greater understanding of air quality as a whole.

Educational

Resources: Research packets on particulate pollution, carbon monoxide, ground-level ozone, air quality and health, and solutions to air pollution.

Props and demonstrations

Particulate Pollution:

Air pollutant identification poster
Particulate Matter activity board with size comparison chart, location filter samples
Unused and used filters from monitoring sites
Electron microscope images of Particulate Matter 2.5

Carbon Monoxide:

Air pollutant identification poster
Temperature inversion demonstration:
Clear bowl
Dry ice
Water
Tongs

Ground Level Ozone:

Air pollutant identification poster
Blank 11"x17" cardstock
Markers

Air Quality and Health:

Health effects identification poster
Healthy/unhealthy pigs lungs comparison kit

Solutions to Air Pollution:

Solutions identification poster
Airville board
Pictures or examples of actions that pollute less

Reference

Materials: PDEQ Fugitive Dust Program outreach and education staff
Literature: *Airborne Dust and Your Health*
Air Quality and Your Health
Criteria pollutants chart
Ozone
26 Ways to Healthy Air
7 Ways You Can Be Air Smart
Car Care for Clean Air

Activity

Plan:

Introduction

- With the aid of PowerPoint (or not) open discussion on the environment and air.
Break class into five (or four if not enough students) groups for group research

projects. Hand each group a packet with appropriate demonstration supplies and/or props. Instruct them to research the resources in the packet to answer questions provided. Have them be ready to present this information to the class.

Facilitate Group Activity

- Visit the Particulate Matter group. Discuss issues of concern, give a mini-lesson on the PM filters (what they are, where they are from, why they are discolored to varying degrees), PM activity board (for PM size-comparison chart, filter samples, location of monitoring sites), and PM electron microscope image. Encourage group to use these props during their class presentation. Assist with presentation if more points need to be made or clarified.
- Visit the Carbon Monoxide group. Discuss issues of concern. Give a mini-lesson on temperature inversions. Perform the dry ice experiment to illustrate how pollutants can be trapped in cold air under a layer of warm air in the Tucson valley. Encourage group to use this demonstration during their class presentation. Assist with presentation if more points need to be made or clarified.
- Visit the Ground Level Ozone (Smog) group. Discuss issues of concern, ensuring they understand how ozone is created at ground level. Have at least one person in the group draw a picture of a vehicle, pointing out the parts of the vehicle that emit precursor pollutants to ozone. Have them draw a sun as another precursor ingredient. Encourage the group to use this drawing during their class presentation. Assist with presentation if more points need to be made or clarified.
- Visit the Air Quality and Health group. Discuss issues of concern. Perform a demonstration using the healthy and unhealthy lung kit to illustrate the difference between breathing clean air versus dirty air. Encourage group to use this demonstration during their class presentation. Assist with presentation if more points need to be made or clarified.
- Visit the Solutions to Pollution group. Discuss issues of concern. Review Airville board and actions people take or activities people engage in that affect air quality. Have them point out several actions that will reduce the levels of each pollutant. Review pictures or examples of solutions to air pollution. Encourage them to use these prop during their class presentation, and if time, have class members approach Airville to play. Assist with presentation if more points need to be made or clarified.

Facilitate group discussion

- Throughout and after the class presentations, answer questions students ask about air quality issues.

Method of

Learning: Small group discussion, large group discussion, demonstration, lecture.

Assessment: Written evaluation by teacher assessing presenter, visual aids, and measure learning of students.