Greener Cleaner Granite City

A Visual Approach to Educating a Community on Air Quality (and Health)

An Air Quality and Health Presentation

St Elizabeth Catholic School

UNITED CONGREGATIONS OF THE METRO EAST

Boy Scouts of America Troop 1064 Nameoki United Methodist Church Granite City, IL

Public Health

Washington University

MADISON COUNTY GREEN SCHOOLS PROGRAM

Granite City School District 9

Granite City Fire Department

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SAINT LOUIS UNIVERSITY. EST. 1818

Granite City coolcities A Greener, Cleaner Granite City

Six Mile Regional Library District

Granite City Housing Authority

Madison County Partnership for Community Health MCPCH

Holy Family Catholic School

SWIC SOUTHWESTERN ILLINOIS COLLEGE

GRANITE CITY COMMUNITY GARDENS CAN YOU DIG IT GCCGVOLUNTEERS@GMAIL.COM

BLUEGREEN ALLIANCE Good Jobs, a Clean Environment, a Safer World

CLEAN AIR PARTNERSHIP

ILLINOIS UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Second Baptist Church

UNITED STEELWORKERS SOAR

SIERRA CLUB

This project was made possible through a grant awarded by EPA to United Congregations of Metro-East. Partners in writing the grant proposal include: St. Louis University, Granite City Cool Cities, and Granite City Community Gardens. Its success is possible because of the joint efforts of its partners listed in the sky above.

Raising the Flag
At
Six Mile Regional Library

Partners
at
Opening Ceremony

Goal of Project - to provide a service to the community by informing residents about:

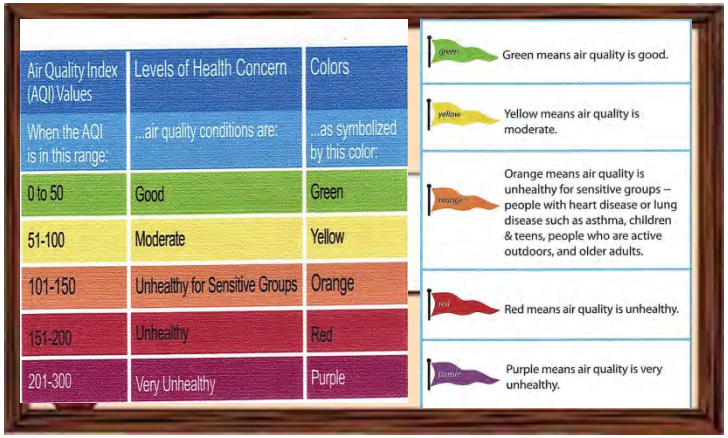
1. **Ozone and Particle Matter**
2. **Sources**
3. **Health risks**
4. **How to keep safe and healthy on days when air quality is unhealthy.**
5. **What to do to improve air quality and health.**

SWIC

Six Mile Regional Library

Educational Display Boards At All Educational Sites

The Ozone Garden at the Fire Station on Rock Road.



Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	...air quality conditions are:	...as symbolized by this color:
0 to 50	Good	Green
51-100	Moderate	Yellow
101-150	Unhealthy for Sensitive Groups	Orange
151-200	Unhealthy	Red
201-300	Very Unhealthy	Purple

Green means air quality is good.

Yellow means air quality is moderate.

Orange means air quality is unhealthy for sensitive groups -- people with heart disease or lung disease such as asthma, children & teens, people who are active outdoors, and older adults.

Red means air quality is unhealthy.

Purple means air quality is very unhealthy.

Housing Authority

What is Ozone?
Who is Most At Risk?
What is an Ozone Garden?
How Can I Help Reduce Pollution
and
Improve the Air Quality of Granite City?
US EPA Air Quality Flag Program
Ozone Monitoring Network

What is Ozone?

Ozone is a colorless gas that can be good or bad depending on where it is. Ozone in the stratosphere is good because it shields the earth from the sun's ultraviolet rays. Ozone at ground level, where we breathe, is bad because it can harm human health.

Ozone forms when two types of pollutants (VOCs and NOx) react in sunlight.

<u>The worst time of the year for ozone pollution is May through October</u>. This is when temperatures are high and the amount of sunlight is greatest.

<u>Ozone levels are highest in the afternoon.</u>

<u>Ozone Pollution comes from sources such as:</u>

Vehicle emissions

Power Plants

Industry

Paints and Solvents

Cleaning Suppli

Automotive Supplies

Art Supplies

Office Supplies

Photographic Supplies

Pesticides

Sources of Particle Pollution

Construction Vehicles

Power Plants

Industry

Wood Burning Stoves

Forest Fires

Cars and Trucks

Heavy Duty Diesel Engines

What is Particulate Matter?

•Particulate matter, or PM, is the term for particles found in the air. Some particles are both large enough to be seen by the naked eye. Other particles are so small that they can only be seen using a microscope.

• Particles that are less than 10 micrometers in diameter are referred to as PM 10 and are considered a health concern because they can be inhaled and can accumulate in the respiratory system.

•Particles less than 2.5 micrometers in diameter are referred to as PM 2.5 and are considered the greatest health risk because their particles are so fine (approximately 1/30th the average width of a human hair) and can lodge deeply into the lungs.

Health Risks Associated With Ozone and Particulate Matter :

- difficulty breathing, wheezing
- irritation of the throat, airway, and lungs
- decreased lung function
- damage to lung
- make the lungs more susceptible to infection
- aggravates lung diseases (asthma)
- aggravates cardiovascular diseases
- Increase asthma attacks
- Increased heart attacks
- increase the risk of early death from heart or lung disease, including strokes

Other effects include:

- increased school and work absences
- increased visits to the doctors and emergency rooms
- increased hospital admissions

Who is Most At Risk?

Children (including teenagers) whose lungs and airways are not fully developed, are more physically active, and spend more time outdoors.

Elderly who are more prone to infection.

People with respiratory diseases: asthma, emphysema, and chronic bronchitis.

Healthy people who are active outdoors.

What is the is Air Quality Index?

The purpose of the AQI is to help you understand what local air quality means to your health. The Air Quality Index is a guide for reporting daily air quality. It uses colors and numbers to show how clean or unclean the air is. EPA uses the Air Quality Index to report ground-level ozone and particle pollution for reporting daily air quality

For each pollutant, EPA has established national standards to protect people's health.

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OutDoor Activity Guide

Green	The air is "good" and a great day to be active outside.
Yellow	The air is "good" for most people, but "moderate" for people in the "sensitive group". People in the sensitive group may want to take it easier on "yellow days", if coughing or experiencing shortness of breath.
Orange	The air is "unhealthy" for people in the "sensitive group." This group of people may want to take it easier and plan their outdoor activities in the morning.
Red	The air is "unhealthy." Everyone may want to take it easier and plan their outdoor activities in the morning.
Purple	The air is "very unhealthy." All people should be active indoors only on purple days.

How Can I Protect Myself?

- Use the Air Quality Index (AQI) to plan your daily activities to keep you safe and healthy.
- Go to www.airnow.gov. to find tools to keep you updated on the Air Quality Index. You can sign up for EnviroFlash emails, get the free AirNow app., or install the free widget on your website.
- Watch for the colored flags hanging throughout Granite City. Then check your AQI and Outdoor Activity Guide to find your local air quality forecast.

How Can Residents
Improve the Air Quality of Granite City?

- **Drive less: carpool, use public transportation (buses), bike or walk.**

•Combine errands to reduce vehicle trips.
•Keep all your engines tuned, <u>and don't let your vehicle engine idle.</u>
•When refueling,: stop when the pump shuts off, avoid spilling fuel, and tighten your gas cap.
•Refuel cars and trucks after dusk, when emissions are less likely to produce ozone.
•Use clean fuels.
•Inflate tires to the recommended pressure.

- Purchase low-emissions vehicles when replacing vehicles.

- Conserve energy in your home.
- Use Energy Star appliances and other environmentally safe products.

- Use paint and cleaning products that are "environmentally safe."
- Meet or exceed any label precautions.
- Do not store opened containers of unused paints and similar products.

- Buy limited quantities of products that you use only occasionally or seasonally, and only buy as much as you will use right away.
- Watch for times and places to safely dispose of partially full containers of old or unneeded chemicals safely.

•Use integrated pest management techniques to reduce need for pesticides.

•Don't burn leaves, garbage, plastic, rubber.

•Reduce use of wood stoves and fireplaces.

•Use HEPA air filters and air cleaners designed to reduce particles.

•Limit your use gasoline-powered lawn and outdoor equipment.

•When replacing lawn and garden equipment, choose clean - green options.

• Plant trees.

•Recycle.

•<u>Support strong air pollution control laws - both statewide and nationally.</u>

The Ozone Garden at the Fire Station on Rock Road in Granite City

What is an Ozone Garden?

An Ozone Garden is a demonstration garden of plants, such as soybeans, snap beans, and milkweed, whose leaves show visible ozone damage.
By seeing what high levels of ground level ozone can do to plants, it is easy to realize the negative impacts that ozone pollution can have on humans.

Milkweed

Snap Beans

The snap beans and soybeans show **Ozone Sensitive** plants and **Ozone Tolerant** plants planted next to each other

Soybeans

Willow

- An Ozone Garden is a visible way to demonstrate the damage ground level ozone pollution can do to plants.
- Ozone is a toxic chemical that can also harm human's airways and lungs.

Foliar Ozone Injury

Ozone bio-indicator plants begin showing symptoms at concentrations of approximately 40 ppb.

Ozone-induced damage in leaves of black cherry, willow, yellow popular, and grape variety Chambourcin; *photos courtesy John Skelly.*

- Visual symptoms include dark red, brown, or black “stippling” on top side of leaf, not crossing the veins.
- Stippling gradually progresses to become prominent dark areas with older leaves showing more advanced symptoms.
- Damage is occurring internally; ozone enters through leaf pores called stomata.

Breaking Ground for the Ozone Garden
Spring 2015

Planting the Ozone Garden
Spring 2015

Granite City Ozone Garden Summer 2016

Kelley Belina holds the new sign with partner's logo.

An Educational Tour of the Ozone Garden!

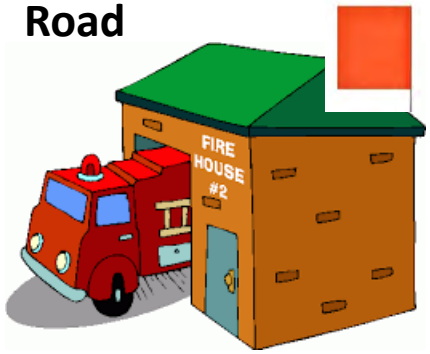
SWIC

Six Mile Regional Library District

The EPA Flag Program

All Schools

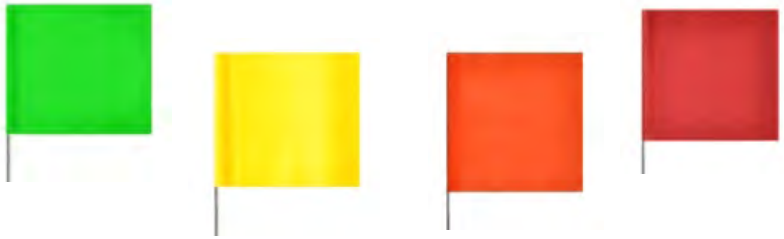
The Ozone Garden at the Fire Station on Rock Road



The Housing Authority

US EPA Air Quality Flag Program

The Flag Program uses **green**, **yellow**, **orange**, and **red** flags. These colors **correspond to the Air Quality Index**.



Good News!
Purple days happen occasionally in the most polluted areas of the country. Fortunately, maroon days are almost unheard of now, due to strong pollution controls that are in place. Therefore those flag colors are not provided to schools for this program. ***Thank You, EPA!***

Each day students & staff check the local air quality forecast and fly the corresponding flag color at their school. This reminds the surrounding community what the air quality is so they can plan their outdoor activities appropriately.

Granite City School Involvement

Granite City private and public schools were contacted through the Madison County Green Schools Program to encourage their involvement.

Participating Schools:

Granite City Public Schools:

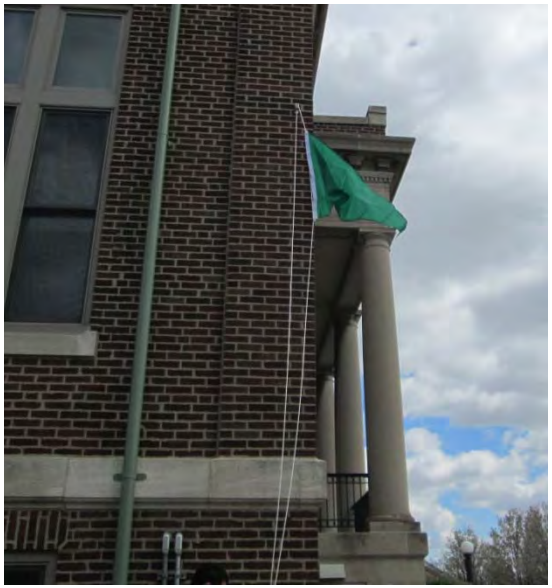
- Maryville Elementary
- Prather Elementary
- Frohardt Elementary
- Wilson Elementary
- Mitchell Elementary
- Grigsby Middle School
- Coolidge Junior High School
- Granite City High School

Private/Parochial Schools:

- Holy Family
- St. Elizabeth

Schools were given an assortment of activities to choose from depending on the school's time, resources, and needs.

Yellow Air Quality Flag Hanging at SWIC



Hanging Green Air Quality Flag at the Six Mile Regional Library!

Classroom Lessons

Madison County Green Schools Coordinator, Kim Petzing, is available to visit classrooms to do a set of up to three air quality-related lessons.

Two sets of lessons are available, and a school can choose to participate in one set, or take part in both. The lessons include the following two main topics:

Pollution & Air Quality:
as background for the US EPA Air Quality Flag program

Ozone & the Effects on People & Plants:
as background for the Ozone Garden and field trip

Each 45-50 minute lesson is:

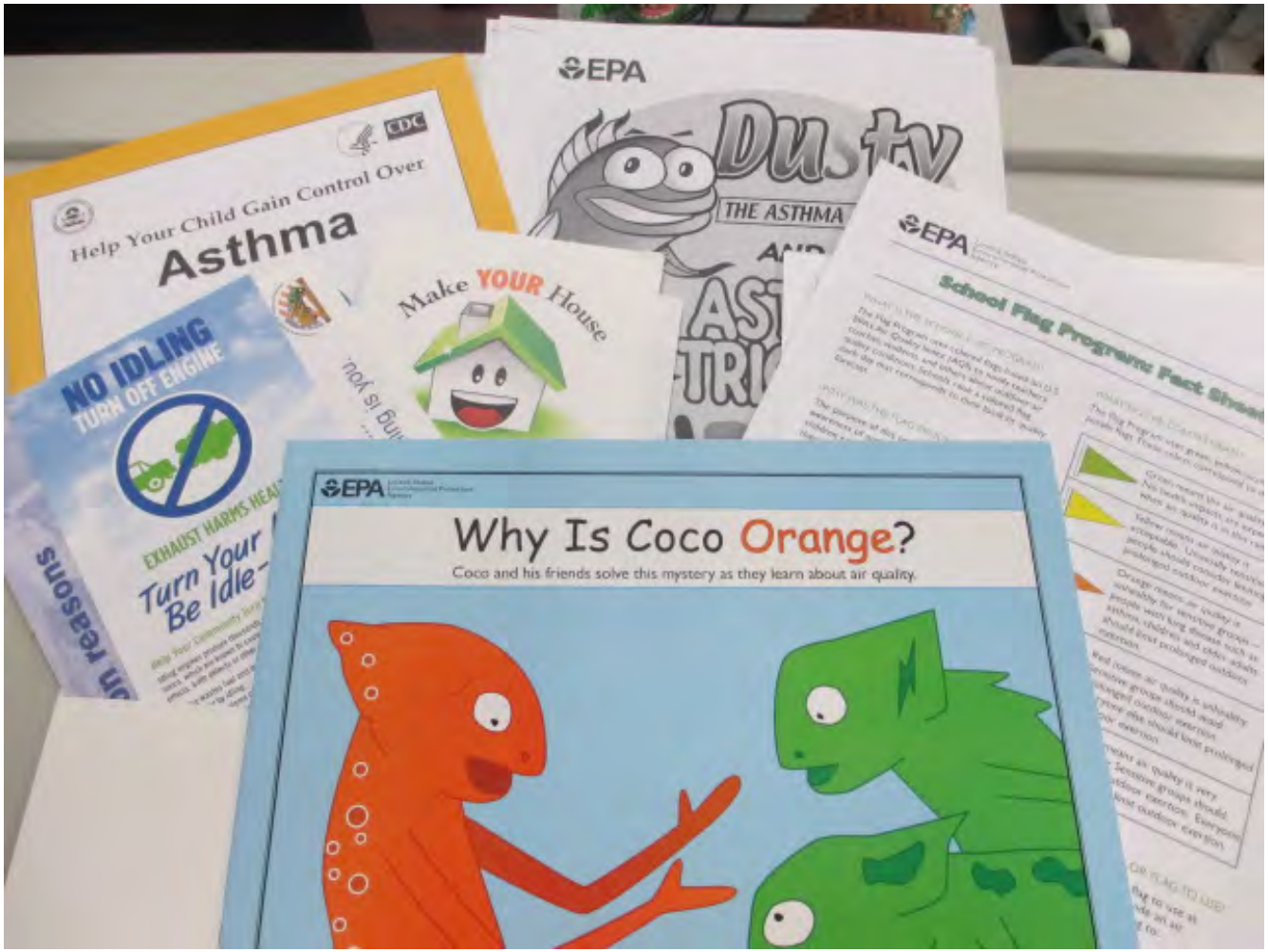
- Adapted appropriately to grade level
- Hands-on and interactive
- Incorporates the following three themes:

  Awareness: What, exactly, is the problem?

  Responsibility: How does it affect me, the local community and the global community?

  Action: What can I do to help?

Supplemental Classroom Materials



Participants were given an assortment of air quality education materials and access to resources suitable for a wide variety of ages.

How Clean Is The Air?

Air Quality Chart

Colors	Air Quality Words	Numbers
Green	Very Clean	0 - 50
Yellow	Clean	51-100
Orange	Not Clean Enough To Be Safe For Some People - including children and people with asthma.	101-150
Red	Dirty	151-200
Purple	Very Dirty	201-300

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Air Quality Index For Students

Air Quality Health And Safety Guide

- **Green Day** = Great time to play outside.
- **Yellow Day** = Safe to play outside.
- **Orange Day** = Okay to play outside, but take it a little easier or spend some time resting.
- **Red day** = No recess in the afternoon when the air is dirty. Play outdoors in the morning when it is cooler.
- **Purple Day** = No recess outside. Find an inside place to play.

Professional Development

Educators will be invited to take part in the **"Climate Science & Stewardship"** Educator Summit on July 20-22, 2016.

(*Part of another EPA grant with Saint Louis University and Missouri Botanical Garden*)

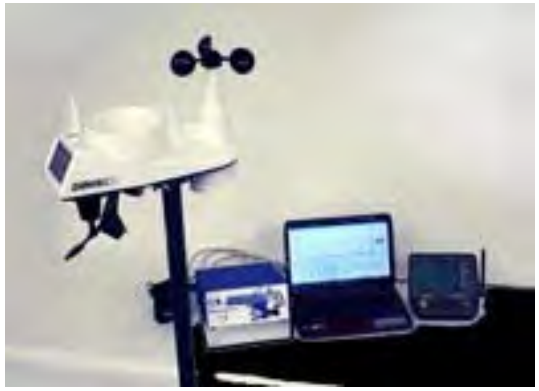
- Fees will be waived
- 3-day workshop

  Day 1: Framing the issue, subject matter experts, the big "why"

  Day 2: Field experiences to local places demonstrating climate science in action

  Day 3: Curriculum connections, reflection, group sharing

The Six Mile Regional Library District has installed Citizen Air Quality Monitoring Networks to monitor our local air quality including ozone, black carbon, and particle matter. The Fire Station on Rock Road will also have an Ozone Monitor at the Ozone Garden. We will be using the monitors this Fall to get our localized data to select the color from EPA's AQI to send all educational sites the appropriate colored flag to hang. This will alert the public of the daily air quality forecast.



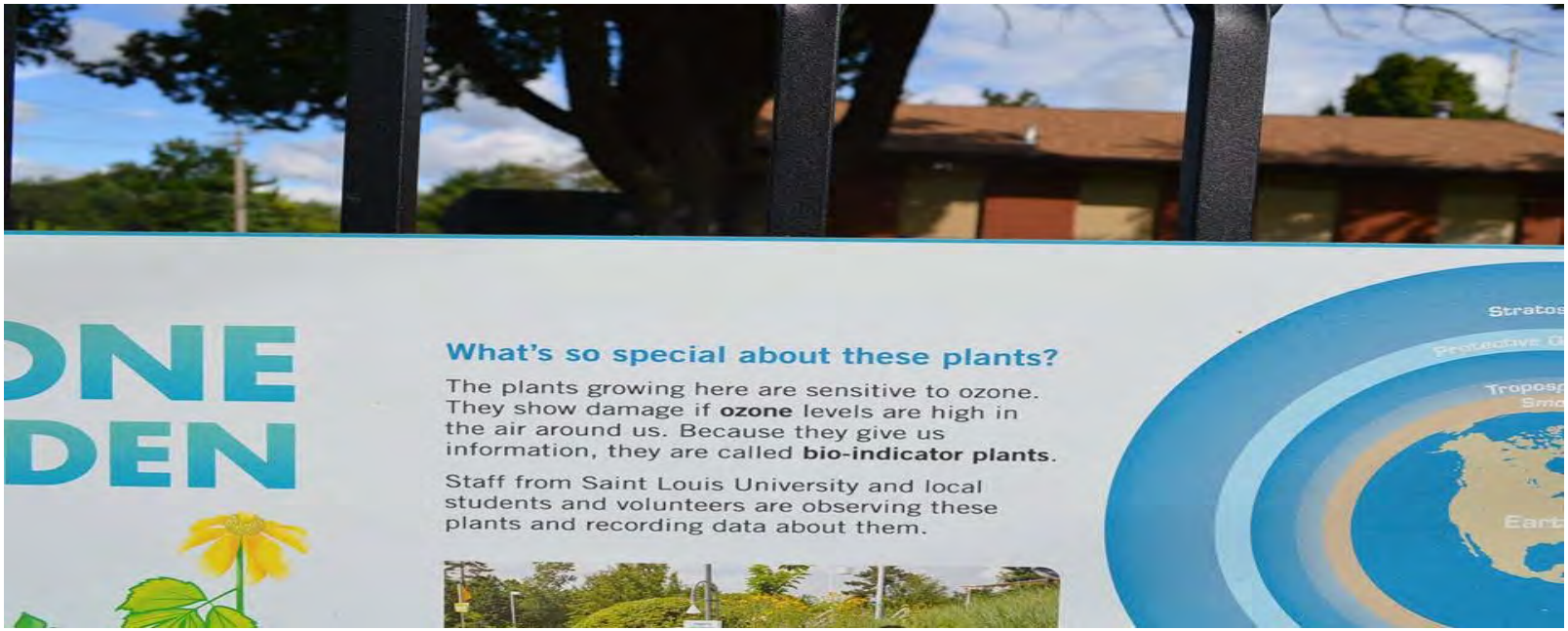
The Ozone Monitoring Network

The MetOne Particulate Monitor

Ozone Garden Work Day
With Retired Steel Workers and SIUE Students!

I ♥
CLEAN
WATER

Common Milkweed


ONE
DEN
What's so special about these plants?
The plants growing here are sensitive to ozone. They show damage if **ozone** levels are high in the air around us. Because they give us information, they are called **bio-indicator plants**.
Staff from Saint Louis University and local students and volunteers are observing these plants and recording data about them.

Why should we be concerned about "bad" ozone?

Aside from health problems, ozone also causes damage to plants, and we depend on many plants for our food. When plants are damaged, they produce much less fruits and vegetables. This is a serious problem because high ozone levels can lead to food shortages in the future.

What do ozone-damaged plants look like?

These photographs show what happens to plants when they are exposed to ozone.

Take a look at the plants in the garden. Do some of the plants show similar damage?

MILKWEED

MODERATE DAMAGE

SEVERE DAMAGE

SNAP BEAN

NO DAMAGE

SEVERE DAMAGE

CONEFLOWER

MODERATE DAMAGE

SEVERE DAMAGE

SOYBEAN

NO DAMAGE

SEVERE DAMAGE

LittleFreeLibrary

Lunch and Break for our Wonderful Workers!

Thank You!