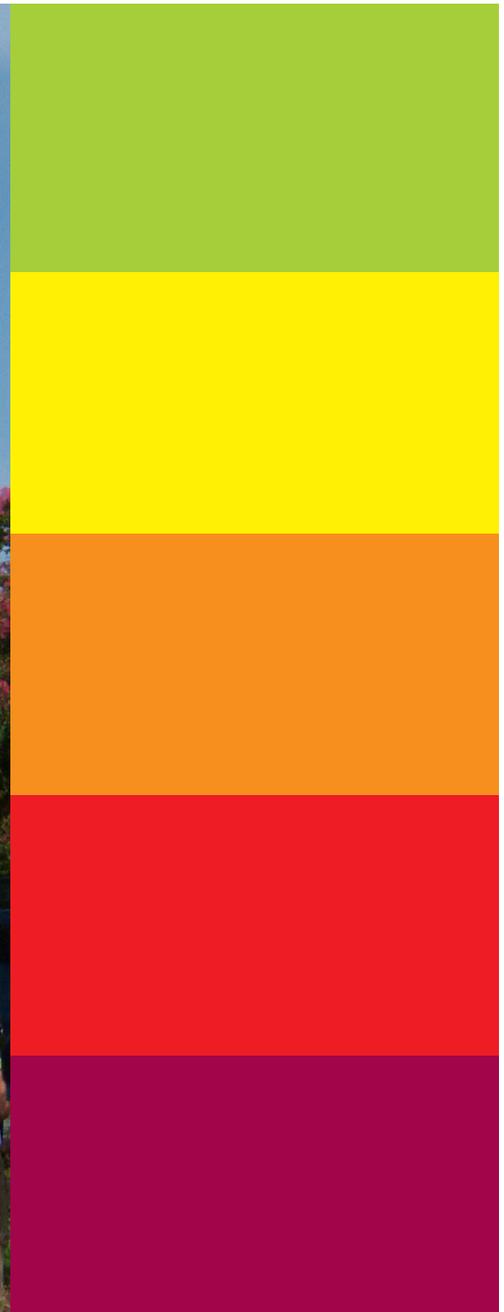




Air Quality Flag Program Coordinator Handbook



Air Quality Flag Program Coordinator Handbook

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina

Thank you for being an Air Quality Flag Program Coordinator. We hope that you find this handbook helpful, and are open to any suggestions you may have to improve it. Questions about the Air Quality Flag Program should be directed to your state air quality agency or to Donna Rogers, at rogers.donna@epa.gov.

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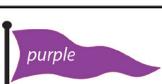
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Overview of the Air Quality Flag Program

The Air Quality Flag Program uses brightly colored flags to help a community be aware of daily air quality conditions. The flag colors correspond to the colors used in EPA’s Air Quality Index (AQI), which tells how clean or polluted the air is for that day. When community members know the daily air quality, they can adjust their activities to reduce their exposure to air pollution. Regular physical activity – at least 60 minutes a day – promotes health and fitness. The purpose of the Air Quality Flag Program is to help people continue to exercise and work outside while protecting their health when the air quality is unhealthy.

Each day, communities raise a brightly colored flag that corresponds to the local air quality forecast:

	Green flag – good air quality
	Yellow flag – moderate air quality
	Orange flag – unhealthy for sensitive groups (including children and people with heart or lung diseases, like asthma, older adults, and adults who are active outdoors)
	Red flag – unhealthy for everyone
	Purple flag – very unhealthy for everyone

Note: There is a sixth color -- maroon -- used in EPA’s Air Quality Index. It indicates hazardous air quality. It is not included in the school flag program since it is rare and will trigger health warnings of emergency conditions from local media.

Air quality can become unhealthy due to pollutants such as ground-level ozone and particle pollution. Ozone is especially damaging to the lungs of children and those who work and play outside. Particle pollution can be so small that it gets deep into the lungs and causes serious health problems. Children (including teenagers) are at greater risk from air pollution because their lungs are still developing and they breathe more air per pound of body weight than adults. Other groups at greater risk include people with asthma or heart disease, older adults, and those who are active outdoors. These groups can continue to stay active even when air quality is unhealthy by modifying their activities or, in some cases, moving their activities indoors.

This handbook describes the four steps a Program Coordinator needs to take to implement a successful program:

1. Purchase flags
2. Educate and inform the school and the community at the start of the program
3. Find out the daily air quality forecast and fly the corresponding flag
4. Know what actions to take when the air quality is unhealthy

The Air Quality Flag Program can be a great way to teach people about their local air quality, how air pollution impacts health, and what actions we can take to protect ourselves. You'll find more information about the flag program, the AQI, ground-level ozone and particle pollution, and the health effects of air pollution in the Background section of this handbook.

Steps for a Successful Air Quality Flag Program

Step 1: Purchase flags

You can buy a set of flags through a local flag vendor, or you can find vendors online. For schools, sometimes sponsors such as parent teacher organizations, a local environmental organization or a community business may be able to help purchase the flags.

You will need five flags: green, yellow, orange, red, and purple. The purple flag might be needed only on rare occasions, but it is important to have if there is an air quality alert due to a wildfire or other serious air quality episode. There are some suggested color names and PMS (pantone matching system) numbers that your flag vendor may recognize. If you cannot get these exact colors, any similar green, yellow, orange, red, and purple will do. The nylon flag colors are called #349 Irish Green (PMS 3415c), #108 FM Yellow (PMS 102c), #151 Golden Poppy (PMS 151c), #485 Canada Red (PMS 186c), and #2627 Pansy (PMS 2627c).

The flag is pennant style and the dimensions are 3' x 5'. You may choose plain flags or flags with logos, graphics, or words (note that extra printing on the flags will cost more and may not be visible once the flag is raised on the flagpole). A set of five flags usually costs around \$100. The price often goes down if you order a large quantity of flag sets at the same time, which could be beneficial to school districts.

Flying the flag: If you have a flag pole, fly the flag under any other flags you use. If you don't have a flag pole, try a portable flag pole, wall bracket, or a flag hanger that attaches over a door.

Step 2: Educate and inform your community at the start of the program

Choose a date to begin flying your flags, and then begin to educate and inform your organization and the surrounding community. Some suggestions on when to start are Earth Day (April 22) or Air Quality Awareness Week (the first week in May, which is the beginning of the ozone season in many areas), but any date will do.

Register your organization on EPA's Air Quality Flag Program website (www.airnow.gov/flag). EPA will

add your organization to the online table of participants and send you an official certificate for display.

Train your colleagues about the AQI and the flag program so they can help administer the program and teach others. Take advantage of the many resources available on the Air Quality Flag Program website at www.airnow.gov/flag. These include:

- a fact sheet
- a poster to use in schools
- guidelines for outdoor activities when the air is unhealthy

Announce your program to your community through newsletters, emails, flyers, and other outreach materials.

EXAMPLE EMAIL

Subject: NEW -- Air Quality Flag Program

How much pollution is in the air outside today? Soon, our entire [organization] will have a simple way to find out...just look up at the flag pole! We have joined the Air Quality Flag Program, and starting [insert date], we'll be flying a brightly colored flag that shows how clean or polluted the air is each day.

The flags correspond to the colors of the Air Quality Index (www.airnow.gov). The AQI is an index that tells you how clean or polluted the air is, and what health effects might be a concern for you at that level. The Air Quality Flag Program will help us continue to promote exercise while protecting health.

Every business day we will fly a flag with one of the AQI colors:

- Green – good air quality
- Yellow – moderate air quality
- Orange – unhealthy for sensitive groups, which includes children and teens, people with heart or lung issues, older adults, and people who are active outdoors
- Red – unhealthy for everyone
- Purple – very unhealthy for everyone

On green and yellow days, we encourage people to be outside and moving. When air quality is orange or red, it's still OK for most people to exercise and work outside, but we encourage you to take breaks and do activities that are not as strenuous, like walking instead of running. If the flag is purple, you might consider staying inside that day.

The U.S. Environmental Protection Agency promotes the Air Quality Flag Program across the country, and we are proud to be involved. In addition to raising flags, we will have the chance to learn more about air pollution, how it affects our health, and what we can do to make the air cleaner.

For more information on the flag program, go to www.airnow.gov/flag.

We will post more information about this exciting new program and our [date] flag raising event on our website.

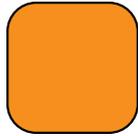
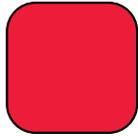
Step 3: Find out the daily air quality forecast and fly the corresponding flag

Like the weather, air quality changes from day to day. Your local or state air quality agency makes a daily air quality forecast that predicts the AQI color for both ozone and particle pollution. The forecast appears in late afternoon and predicts the air quality for the next day.

Here’s how you can get the AQI forecast:

- **Email.** Sign up to get the daily air quality forecast and special alerts (such as wildfires) sent to you by email. Go to www.airnow.gov/enviroflash to see if your city participates.
- **Smart phone.** Download the AirNow app, available for iPhone and Android.
- **Widget.** Add a simple line of code to your organization’s website to have the AQI always appear on your home page. Available at www.airnow.gov.
- **Newspaper and TV.** Many weather pages and weathercasts have the AQI forecast.
- **AirNow.gov.** The AirNow website has the AQI for hundreds of cities.

EXAMPLE: Air Quality Forecast for Anytown, USA

Today’s High		Tomorrow’s High	
Air Quality Index (AQI)		Air Quality Index (AQI)	
	Unhealthy for Sensitive Groups		Unhealthy
Health Message: People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.		Health Message: People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.	
AQI - Pollutant Details			
Ozone	 130	Unhealthy for Sensitive Groups	Particles (PM2.5)
Particles (PM2.5)	 57	Moderate	 156
			 57
			Moderate

In this example, “Today’s High” is forecast to be orange (unhealthy for sensitive groups) and “Tomorrow’s High” is forecast to be red (unhealthy). The “Pollutant Details” tell you the specific pollutant that is driving the forecast. For today, ozone is the pollutant causing the air quality color to be orange. For tomorrow, particles (PM2.5) drive the red forecast.

Each morning, assign someone at your organization to raise the flag showing the day’s AQI color. It is a good idea for the assigned person to check the air quality forecast in the morning before the flag is raised. Some state and local air quality agencies update the day’s forecast to a different color if pollution is worse than originally expected. If you subscribe to EnviroFlash emails, you can choose to be notified via email of forecast updates.

You may also see “Current Conditions” on airnow.gov or in an EnviroFlash email alert. These are air quality values that are updated hourly. For the flag program, it is better to use Tomorrow or Today’s forecast to know which flag to fly because those won’t change by the hour.

Some ideas to involve your employees/colleagues/students in the flag program:

- Encourage everyone to sign up for EnviroFlash emails if they are available in your area.
- Designate one person (or for a school, perhaps establish a team) to be in charge of checking the forecast and raising the flag each morning.
- Add a message about the day’s air quality color to any daily announcements.
- Tell people about the app and the widget to have the AQI on their phone or website. Both are available at www.airnow.gov.

Step 4: Know what actions to take when the air quality is unhealthy

Ozone and particle pollution are the most common and widespread air pollutants. When either ozone or particle pollution is at an unhealthy level, the chances of being affected increase the longer a person is active outdoors and the more strenuous the activity. Since exercise is good for your health, it’s important to stay active and know when to make changes.

EPA considers certain groups to be “sensitive” because they have more health effects at lower pollution levels. “Sensitive groups” include children and teenagers, older adults, people with heart or lung disease (such as asthma), and people who are active outdoors.

General Actions:

- As either ozone or particle pollution levels become unhealthy, the general advice is to reduce:
 - (1) how hard you work or exercise outdoors, and/or
 - (2) the length of time you work or exercise outdoorsFor example, on code orange days, it is still o.k. for children to play outside, but they should reduce activities that involve running and take more frequent breaks.
- When pollution is present in the air, people with asthma are more likely to have symptoms such as coughing or shortness of breath. Be alert for symptoms and follow the person’s asthma action plan. If the person has a quick relief inhaler, be sure it is always handy. Note that even people who do not have asthma could experience symptoms when exposed to unhealthy levels of air pollution.

Specific Actions When Ozone Pollution is at an Unhealthy Level

Ozone is formed when pollutants emitted by industrial facilities and power plants, motor vehicle exhaust, and other sources react in the presence of heat and sunlight. Since heat and sunlight drive ozone formation, warm sunny days have more ozone than cool or cloudy days. Ozone levels are generally much lower in the mornings.

Action:

- When unhealthy levels of ozone are expected, you can reduce exposure by working and exercising outdoors before noon.

Specific Actions to Reduce Exposure to Particle Pollution

In some locations where wood is burned for heat, particle pollution levels can be especially high during wintertime inversions. An inversion occurs when a layer of cooler air is trapped near the ground by a layer of warmer air above. When the air cannot rise, pollution at the surface is trapped and can accumulate, leading to higher pollutant concentrations. A variety of conditions can cause inversions to form. The most common is a nighttime inversion, when cloudless skies allow air at the surface to cool faster than the air above.

Actions:

- Choose areas away from busy streets to walk, exercise and work.
- Avoid standing or working near vehicles that are idling.
- Implement policies and education programs to limit idling by trucks, buses and personal vehicles.
- If it looks or smells smoky outside, it is better not to exercise or work outside.

Use Your Judgement

You should always use your judgment when deciding how to modify outdoor activities when air quality is unhealthy. There are three Activity Guidelines that summarize the actions to take. One is for ozone, one for particle pollution, and one is for schools. You can find the guidelines here:

www.airnow.gov/index.cfm?action=flag_program.outdoorguid



Background

What is Ozone?

Ozone is a colorless gas found in the air we breathe. Naturally occurring ozone high above the earth's surface protects our planet from solar radiation. When ozone is created near the ground it is unhealthy to breathe and can also damage trees and crops.

Ozone is created at ground level by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and power plants, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC. Because ground-level ozone needs sunlight to form, it is usually highest during the hot, sunny days of summer, spring, and fall.

Within the last decade, however, high ozone concentrations have also been observed under specific circumstances in cold months. Specifically, there are a few high elevation areas in the Western U.S. where high levels of local VOC and NO_x emissions have formed ozone when snow is on the ground and temperatures are near or below freezing. Ozone contributes to what we typically experience as "smog" or haze, which still occurs most frequently in the summertime, but can occur throughout the year in some southern and mountain regions.

Health Effects of Ground-level Ozone

- Constriction of airways forcing the respiratory system to work harder to provide oxygen
- Coughing, pain when taking a deep breath, wheezing and inflammation of the airways including the deep portions of the lungs
- Increased fatigue
- Reduced athletic performance
- Aggravated lung disease

For ozone, people with lung disease, children and teenagers, older adults, and people who are active outdoors are considered sensitive and therefore at greater risk.

What is Particle Pollution?

Particles in the air are a mixture of solids and liquid droplets that vary in size and are often referred to as "particulate matter." Some particles - those less than 10 micrometers in diameter - pose the greatest health concern because they can pass through the nose and throat and get deep into the lungs. Ten micrometers in diameter is just a fraction of the diameter of a single human hair. Particles larger than 10 micrometers do not usually reach your lungs, but they can irritate your eyes, nose and throat. Particle pollution, unlike ground-level ozone, can occur year-round.

Very small particles with diameters less than 2.5 micrometers are called "fine" particles. They are produced any time fuels such as coal, oil, diesel or wood are burned. Fine particles come from fuel used in everything from power plants to wood stoves and motor vehicles (e.g., cars, trucks, buses and marine engines). These particles are produced by construction equipment, agricultural burning, trash and brush burning, and forest fires. In fact, forest fires (wildfires) are responsible for some of the worst particle

pollution events. “Coarse” dust particles range in size from 2.5 to 10 micrometers in diameter. Particles of this size are produced during crushing or grinding and from vehicles traveling on paved or unpaved roads.

Health Effects of Particle Pollution

- Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing
- Decreased lung function
- Aggravated asthma
- Development of chronic bronchitis
- Irregular heartbeat
- Heart attacks
- Premature death

For particle pollution, people with heart or lung disease, older adults, and children are considered sensitive and therefore at greater risk.

What is the Air Quality Index (AQI) and How Does it Work?

The Air Quality Index (AQI) is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air.

The higher the AQI value, the greater the level of air pollution and the greater the health concern. For example, an AQI level of 50 represents good air quality with little potential to affect public health, while an AQI value over 201 represents very unhealthy air quality. An AQI value of 100 generally corresponds to the National Ambient Air Quality Standard (NAAQS) for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI levels are above 100, air quality is considered to be unhealthy – at first for certain sensitive groups of people, then for everyone as AQI values get higher.

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

The purpose of the AQI is to help you understand what local air quality means to your health. To make it easier to understand, the AQI is divided into categories. Each category corresponds to a different level of health concern. The levels of health concern and what they mean are:

Air Quality Index Levels of Health Concern	Meaning
Good	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Health alert: everyone may experience more serious health effects.

For more information about the AQI see www.airnow.gov.