Flag Program

FACT SHEET

- The Air Quality Index (AQI) categorizes the quality of the air through easy to understand terms and colors
- AQI flags are provided to school districts by Pinal County Air Quality (through an EPA grant to ADEQ)
- Participating schools will receive a daily email with the Pinal County air quality forecast through EnviroFlash
- Each school raises the appropriate AQI color coded (i.e. green – good, moderate – yellow, etc.) flag daily
- Schools will have the information necessary to take appropriate measures to protect students during days with poor air quality
- AQI flags inform students, parents and the general public about air quality conditions in Pinal County
- It is the goal of the AQI flag program that the increased awareness through the AQI Flag Program will help people make decisions to minimize polluting activities
- Questions? Contact Scott DiBiase with Pinal County Air Quality, (520)866-6929 or scott.dibiase@pinalcountyaz.gov
What is the Air Quality Index (AQI)?

The Air Quality Index (AQI) is a unit less number that tells you how clean or polluted the air outside is along with what associated health effects may be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air.

There are six criteria air pollutants regulated by the Clean Air Act (CAA) through the Environmental Protection Agency (EPA):

1. Ground-level ozone \( (O_3) \)
2. Particulates 10 microns and smaller in diameter \( (PM_{10}) \)
3. Particulates 2.5 microns and smaller in diameter \( (PM_{2.5}) \)
4. Carbon Monoxide \( (CO) \)
5. Sulfur Dioxide \( (SO_2) \)
6. Nitrogen Dioxide \( (NO_2) \)

The AQI is a yardstick that runs from 0 to 500. 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 300 represents hazardous air quality.

An AQI value of 100 corresponds to the National Ambient Air Quality Standard (NAAQS) for a particular pollutant.

The table below shows the AQI levels:

<table>
<thead>
<tr>
<th>Air Quality Index (AQI) Values</th>
<th>Levels of Health Concern</th>
<th>Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When the AQI is in this range:</strong></td>
<td><strong>...air quality conditions are:</strong></td>
<td><strong>...as symbolized by this color:</strong></td>
</tr>
<tr>
<td>0 to 50</td>
<td>Good</td>
<td>Green</td>
</tr>
<tr>
<td>51 to 100</td>
<td>Moderate</td>
<td>Yellow</td>
</tr>
<tr>
<td>101 to 150</td>
<td>Unhealthy for Sensitive Groups</td>
<td>Orange</td>
</tr>
<tr>
<td>151 to 200</td>
<td>Unhealthy</td>
<td>Red</td>
</tr>
<tr>
<td>201 to 300</td>
<td>Very Unhealthy</td>
<td>Purple</td>
</tr>
<tr>
<td>301 to 500</td>
<td>Hazardous</td>
<td>Maroon</td>
</tr>
</tbody>
</table>
What is the Air Quality Index (AQI)? (Continued)

Below is another more descriptive AQI table with meanings for the various AQI categories.

<table>
<thead>
<tr>
<th>Air Quality Index Levels of Health Concern</th>
<th>Numerical Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>0-50</td>
<td>Air quality is considered satisfactory, and air pollution poses little or no risk.</td>
</tr>
<tr>
<td>Moderate</td>
<td>51-100</td>
<td>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.</td>
</tr>
<tr>
<td>Unhealthy for Sensitive Groups</td>
<td>101-150</td>
<td>Members of sensitive groups may experience health effects. The general public is not likely to be affected.</td>
</tr>
<tr>
<td>Unhealthy</td>
<td>151-200</td>
<td>Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.</td>
</tr>
<tr>
<td>Very Unhealthy</td>
<td>201-300</td>
<td>Health alert: everyone may experience more serious health effects.</td>
</tr>
<tr>
<td>Hazardous</td>
<td>&gt; 300</td>
<td>Health warnings of emergency conditions. The entire population is more likely to be affected.</td>
</tr>
</tbody>
</table>

What is the AQI Flag Program?

The AQI Flag Program is an education and outreach tool for schools to use in order to inform and educate students, parents, teachers and the general public about the air quality in their local area.

The program was funded through an EPA grant and the sets of flags are provided by the Arizona Department of Environmental Quality (ADEQ) through Pinal County Air Quality.

The set of flags includes the following:

1. Green flag – represents good on the AQI scale
2. Yellow flag – represents moderate on the AQI scale
3. Orange flag – represents unhealthy for sensitive groups on the AQI scale
4. Red flag – represents unhealthy for everyone on the AQI scale
**How does the AQI Flag Program work?**

A daily air quality forecast for Pinal County is developed by Pinal County Air Quality.

A school representative (i.e. AQI Flag Program Coordinator) signs up with EPA sponsored EnviroFlash ([http://www.enviroflash.info/signup.cfm](http://www.enviroflash.info/signup.cfm)) and automatically receives a daily email (approximately 1-3 p.m.) with the next day’s AQI forecast (see example below)

The AQI Flag Program Coordinator raises the appropriate colored flag corresponding to the daily forecast using the school’s flagpole.
How does the AQI Flag Program work? (Continued)

Depending on the forecasted AQI level, schools can plan outdoor activities and if necessary move outdoor activities indoors in order to limit possible health effects due to poor air quality.

The AQI Flag Program also provides a possible teaching curriculum for science teachers. It’s a great opportunity for students to learn about air quality along with meteorology which plays a large role in air quality. (http://www.airnow.gov/index.cfm?action=learning.forteachers)

The AQI Flag Program empowers schools, teachers, students and parents by providing air quality information so that people can make informed decisions on their outdoor activities. In addition, the Flag Program is a tool that can educate people about their local air quality, the importance of the air we breathe, and how it impacts our health.

What are the coordinator’s responsibilities?

- Either sign up directly or have Scott DiBiase (scott.dibiase@pinalcountyaz.gov) sign you up to EnviroFlash (http://www.enviroflash.info/signup.cfm). If you choose to do the subscription to EnviroFlash yourself, do the following in the subscription screen (see screen shot below)
Fill in the subscriber information with the zip code that your school is located.
The zip code will help select the Forecast City (see screen shot below).
If you’re interested, you can also receive the AQI forecasts via Twitter by clicking on the Twitter links. This will open up the appropriate Twitter page for the forecast location and from there you can click the Follow button to start following.

Click the Receive Forecasts box in the Email Preferences section and the type of email format you’d like to receive (i.e. HTML, Text Only, etc.)
Choose the 0-50 Forecasts AQI Values in order to receive all forecasts.
Click the Next button.
The next screen will look like this,

- Read the Privacy Policy and click the “I have read the privacy policy box below it.
- Information on what you will receive (including a sample email) is below the Privacy Policy.
- **Click the Subscribe button to complete the EnviroFlash subscription process.**
  - You will receive the daily AQI forecast from EnviroFlash between 1-3 p.m. everyday.
  - Each morning raise the appropriate colored AQI flag for that day.
  - If you have any questions or inquiries about the AQI flag program, please call Scott DiBiase at (520)866-6969 or email scott.dibiase@pinalcountyaz.gov
  - **If/when the AQI Flag coordinator is replaced with a new person; please contact Scott DiBiase with the new coordinator’s contact information.**
What are the coordinator’s responsibilities? (Continued)

- Provide educational information to school staff, parents, students and the community on the purpose of the AQI Flag Program and the meaning behind each colored flag.
  - Educational materials on air quality can be found on the www.AIRNOW.gov website (LEARNING CENTER on the right hand side of the main webpage)

- Thank you for your participation.
Why do we need an AQI Flag Program?

The Pinal County Air Quality Department has a monitoring network which monitors the air for several of the criteria air pollutants. The monitoring data shows that several Pinal County monitors violate the federal health standards for PM$_{10}$ (particulates 10 microns and smaller in diameter size, to put into context, human hair is about 70 microns in diameter).

In addition, there are a couple of ozone monitors in Pinal County that violate the federal health standard for ground-level ozone.

See map below for monitors that violate the PM$_{10}$ federal health standards (red circles denote violating monitors). In addition, the Apache Junction and Queen Valley monitors exceed the federal health standard for ground-level ozone.
Why do we need an AQI Flag Program? (Continued)

The bar graph below shows the number of daily PM10 exceedances (of the federal health standard) for the period 2006-2012 by monitoring location. Keep in mind, the standard is only allowed to be exceeded on average once per year.

Pinal County PM$_{10}$ Exceedances
2006-2012

The Environmental Protection Agency (EPA) designated portions of Pinal County nonattainment for PM2.5 and PM10 in 2011 and 2012 respectively. The map below shows the locations of the nonattainment areas in Pinal County.
According to the American Lung Association, there are 8,404 cases of pediatric asthma in Pinal County; 15,708 cases of COPD and 27,145 cases of adult asthma in Pinal County.

Particle pollution contains microscopic solids and/or liquid droplets that are small enough to get deep into the lungs and can cause serious health problems. Small particles (less than 10 microns in diameter) pose the greatest problems since they can get deep into the lungs and some may even reach the bloodstream.

Pollutants of Concern For Pinal County

The two pollutants of concern for Pinal County are PM$_{10}$ and ground-level ozone.

Typically PM$_{10}$ has two distinct meteorological (i.e. weather) conditions that aid in exceedances of the federal health standard.

1. Stagnation (i.e. no or very light winds) – Typically occurs in the fall, winter and early spring when high pressure is over the local area. It results in warm air aloft during the overnight period which places a “lid” on top of the cool air at the ground. There is little air movement and whatever dust causing activities take place result in suspended particulates close to the ground and higher PM$_{10}$ concentrations. Typically there is a peak in the early morning and also in the evening hours. A typical daily PM$_{10}$ concentration graph during a stagnation event is shown in the graph below.

So, basically this means, light winds in the early morning and evening, increased dust causing activities (more traffic on dirt roads, agricultural activity, etc.) and the inversion keep the air pollution close to the ground (instead of dispersing the particulates higher in the atmosphere) which increases the air pollution concentrations. Higher pollution concentrations are bad for people to breathe.
Pollutants of Concern For Pinal County (Continued)

2. Wind events – Typically the wind events occur in the spring when frontal passages move through the area. Wind events also occur during the monsoon season during the summer when locally (and sometimes regionally) strong monsoon storms with strong winds cause areas of blowing dust.

Wind events typically result in several hours of high PM\textsubscript{10} concentrations and can vary by time of day depending on the specific wind event. Frontal passages can occur at any time of day while monsoon storms are typically during the afternoon and evening hours. See graph below for an example of a wind event.

So, basically this means, the stronger the wind blows, the higher the PM\textsubscript{10} concentrations, the worse the air is for all of us to breathe.
Pollutants of Concern For Pinal County (Continued)

Ozone concentrations are typically the highest during the late spring and summer months. Ozone forms with the combination of strong sunlight, high temperatures and ozone “precursors” which include volatile organic compounds (VOCs) and nitrogen oxides (NOx). The daily peak for ozone levels is typically in the late afternoon/early evening timeframe.

The typical wind pattern for central Arizona is easterly (winds from the east) winds during the morning hours switching to westerly (winds from the west) winds in the afternoon and evening hours. This typical wind pattern aids in the influence of the metropolitan Phoenix area’s contribution of ozone precursors and subsequent ozone formation into portions of Pinal County.

The ozone monitors that have the highest ozone levels (on average) are in Apache Junction and Queen Valley. That said, any of the ozone monitors in Pinal County can reach moderate and even unhealthy for sensitive groups on the AQI scale for a given day depending on the weather setup. That’s why the AQI Flag Program is such an important tool. It gives schools in Pinal County the opportunity to inform students, teachers and general public about the quality of the air we all breathe and the knowledge to make informed choices about our level of exposure to unhealthy air.

Other sources for the daily AQI Forecast

The Pinal County AQI forecast report is also located on the Air Quality Website at,

http://pinalcountyaz.gov/Legacy/AirQual/pdf/Forecast/aqforecast.pdf

and also at the AIRNOW website,

http://airnow.gov/index.cfm?action=airnow.showlocal&cityid=450

If you have any questions about the AQI Forecast, call Scott DiBiase with Pinal County Air Quality at (520)866-6929 or via email scott.dibiase@pinalcountyaz.gov
The Air Quality Index (AQI) Flag Program that <insert school name here> is participating in is a voluntary information and outreach program. The AQI is an easy to understand index that tells people how clean or polluted the air is. The AQI focuses on health effects people may experience from air pollution. There are four AQI flags provided to the school, good (green), moderate (yellow), unhealthy for sensitive groups (orange) and unhealthy (red).

Each school day an AQI Flag Coordinator will raise the appropriate colored AQI flag that represents the AQI level that Pinal County Air Quality has forecasted.

The goal of the AQI Flag Program is to give schools the information necessary to take appropriate measures to protect students during days with poor air quality. In addition, the AQI Flag Program also provides a visual informational tool for the general public to see how good (or bad) the local air quality is for a particular day.

The AQI flags were provided by the Arizona Department of Environmental Quality (ADEQ) through an EPA grant.