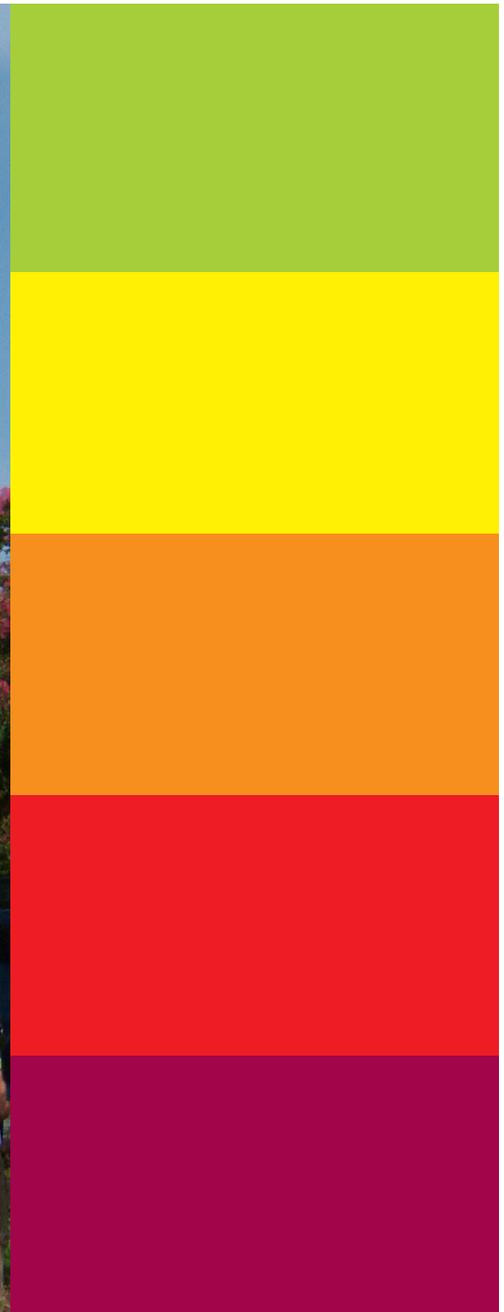




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# School Flag Program Coordinator Handbook



## **School 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 a School Flag Program Coordinator. We hope that you find this handbook helpful. We would appreciate any suggestions you may have to improve it. Questions about the School Flag Program should be directed to your State air quality agency or to Donna Rogers, at [rogers.donna@epa.gov](mailto:rogers.donna@epa.gov).

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## Table of Contents

Overview of the School Flag Program.....	page 2
Steps for a Successful School Flag Program .....	page 3
Background Information.....	page 8
Resources.....	page 10

## Overview of the School Flag Program

The School Flag Program uses brightly colored flags to help children, parents, school personnel, and the community be aware of daily air quality conditions. Knowing the air quality conditions can help protect individuals both at school and at home. 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 members of the school and the surrounding community know what the daily air quality is, 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 school flag program is to help children continue to exercise while protecting their health when the air quality is unhealthy.

Each day, schools raise a 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 all children and people with asthma)
	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 - especially fine particles such as those found in smoke, haze or dust - contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause 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. People with asthma are also more likely to have symptoms when pollution is in the air. Children, including those with

asthma, 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 School Flag Program Coordinator needs to take to implement a successful flag 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 School Flag Program can be a great way to teach people about their local air quality, how air pollution impacts our health, and what actions we can take to protect ourselves. You'll find more information about the School Flag Program, the AQI, ground-level ozone and particle pollution, and the health effects of air pollution in the Background Information and Resources sections of this handbook.

## **Steps for a Successful School Flag Program**

### **Step 1: Purchase flags**

You can buy a set of flags through a local flag vendor, or you can find vendors online. Sometimes sponsors such as a parent teacher organization, a local environmental organization or a community business may be willing to purchase the flags for your school.

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 will usually cost under \$100. The price often goes down if you order a large quantity of flag sets at the same time, so consider joining with other schools when you order your flags.

### **Step 2: Educate and inform the school and the community at the start of the program**

Choose a date to begin flying your flags, and then begin to educate and inform your school 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, the beginning of the ozone season), but any date will do.

Register your program on EPA's school flag website ([www.airnow.gov/schoolflag](http://www.airnow.gov/schoolflag) under "School Flag Program Registration Form"). EPA will add your school to the online table of participating schools and

will send you an official participation certificate for display.

Train school personnel about the Air Quality Index and the Flag Program so they can help administer the program and teach the students. You can request help with this training from your State air quality agency. Give all teachers a copy of the “Air Quality and Outdoor Activity Guidance for Schools” (last page of this handbook). It includes not only actions for each air quality color but also questions and answers that help explain the program. Encourage teachers to take advantage of the many resources available on the School Flag Program website at [www.airnow.gov/schoolflag](http://www.airnow.gov/schoolflag). These include:

- a coloring page
- activity sheets
- a poster
- a fact sheet
- a children’s picture book
- interactive games
- lesson plans about air quality
- an air quality simulator
- asthma resources for schools

Make announcements to the school community through newsletters, emails, flyers, and other

### **New Flag Program**

How much pollution is in the air outside today? Soon, our entire school community will have a simple way to find out....just look up! Starting [insert date], we’ll be flying a brightly colored flag below our American flag that will show how clean or polluted the air is. This new flag program will help us continue to promote exercise while protecting health.

Each colored flag corresponds to an air quality level:

- Green – good air quality
- Yellow – moderate air quality
- Orange – unhealthy for sensitive groups, including all children and those with asthma or other respiratory issues
- Red – unhealthy for everyone
- Purple – very unhealthy for everyone

On green and yellow days, teachers and coaches will encourage students to get outside and get moving! When air quality is orange or red, it is still OK to play outside, but we will encourage kids to take breaks and cut back on activities that involve lots of running. In addition to helping us plan for exercise, the flags will help students and staff with asthma get to know whether their symptoms get worse when air quality is poor and whether they need to take extra steps to protect their health.

The flag program is used in many U.S. cities and we’re proud to be the first school in [city] to adopt it. Thanks to our PTA for buying the flags! In addition to the new flags, we will have in-class activities [include when] to learn more about air pollution, how it affects us, and what we can do to make the air cleaner.

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

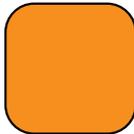
### **Step 3: Find out the daily air quality forecast and fly the corresponding flag**

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. See page 9 for a detailed explanation of the AQI.

In many cities you can get the daily air quality forecast sent to you by email if you subscribe to EnviroFlash. You can see if your local area participates (by entering your zip code in the specified field) and also sign up at [www.airnow.gov/enviroflash](http://www.airnow.gov/enviroflash). This service also provides alerts when there are unusual air quality events such as wildfires.

You can also find the air quality forecast online at [www.airnow.gov](http://www.airnow.gov).

#### 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	
<b>Health Message:</b> People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.				<b>Health Message:</b> 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)		156	Unhealthy
Particles (PM2.5)		57	Moderate	Ozone		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 the current day, ozone is the pollutant that is causing the air quality color to be orange. For tomorrow, particles (PM2.5) are driving the red forecast.

Each morning, assign someone at your school to raise the flag that shows the current 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 will update the current 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. Such updates will also be posted on [airnow.gov](http://airnow.gov).

Fly only the flag showing the current day's forecast. For example, if you receive tomorrow's forecast in the late afternoon, do not change the flag to show tomorrow's color.

Some ideas to involve students and teachers in the flag program:

- Encourage everyone with an email account to sign up for EnviroFlash if it's available in your area.
- Establish student teams to be in charge of checking the forecast and raising the flag each morning.
- Have each classroom teacher assign a rotating student to post the day's air quality color in the classroom.
- Add a message about the day's air quality color to the daily announcements.
- Get the current AQI forecast added to your school's website. You can do this by providing the following link to the person responsible for your school's website: [www.airupdate.info](http://www.airupdate.info)

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

##### **General Actions When Ozone or Particle Pollution Levels are Unhealthy**

Ozone and particle pollution are the most 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.

Children (including teenagers) and those with asthma are two groups EPA considers "sensitive" because they have more health effects at lower pollution levels. For a complete list of sensitive groups, see page 8 (for ozone) and page 9 (for particle pollution) in the Background Information section of this handbook.)

##### **Actions:**

- As either ozone or particle pollution levels become unhealthy, the general advice is to reduce: (1) how hard you exercise, and (2) the length of time you exercise. For 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.
- Sensitive groups, including children and people with asthma, should start taking it easier at code orange alert levels.
- When either ozone or particle pollution is in the air, adults and children with asthma are more likely to have symptoms such as coughing or shortness of breath. Be alert for symptoms and follow the child's asthma action plan. If a child has a quick relief inhaler, be sure it is always handy. Note that even students 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. (See page 8 in Background Information section of this handbook for a more detailed discussion.)

**Actions:**

- When unhealthy levels of ozone are expected, you can reduce exposure by playing and exercising outdoors before noon.
- For specific recommendations on how to modify outdoor school activities such as recess, physical education (P.E.) class, or sporting events when ozone pollution is elevated, see the chart called Air Quality and Outdoor Activities: Recommendations for Schools (the last page of this handbook).

**Specific Actions to Reduce Exposure to Particle Pollution**

In some locations (such as the western United States) 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 for children to walk, exercise and play.
- Make sure children avoid standing or playing near vehicles that are idling.
- Implement policies and education programs to limit idling by school buses and personal vehicles (parent drop off/pickup) on school grounds.
- If it looks or smells smoky outside, it is better not to exercise or play outside.

**Use Your Judgement**

Based on the recommended actions listed here and the chart provided on the last page of this handbook, school staff should use their judgment to decide how to modify planned outdoor activities



when air quality is unhealthy.

## Background Information

### 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<sub>x</sub>) 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<sub>x</sub> 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<sub>x</sub> 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, 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 even 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 in people with heart or lung disease

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)?**

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.

**How Does the AQI Work?**

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.

## Resources

For a list of additional resources, visit [www.airnow.gov/schoolflag](http://www.airnow.gov/schoolflag) and choose “Teacher, Student and School Resources.” The links include lesson plans, student pages, interactive games, asthma resources for schools, and further information on pollutants and health effects.

Your state or local air quality agency may offer free materials such as brochures to educate parents and posters to help display the daily forecast in classrooms, school offices and lobbies. Click on the United States map at <http://www.airnow.gov/> to find information on your state or local agency.

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United States  
Environmental Protection  
Agency

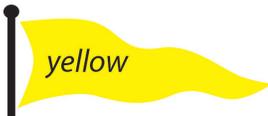
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# Air Quality and Outdoor Activity Guidance for Schools

Regular physical activity — at least 60 minutes each day — promotes health and fitness. The table below shows when and how to modify outdoor physical activity based on the Air Quality Index. This guidance can help protect the health of all children, including teenagers, who are more sensitive than adults to air pollution. Check the air quality daily at [www.airnow.gov](http://www.airnow.gov).

Air Quality Index	Outdoor Activity Guidance
 <p>green</p> <p>GOOD</p>	<p>Great day to be active outside!</p>
 <p>yellow</p> <p>MODERATE</p>	<p>Good day to be active outside!</p> <p>Students who are unusually sensitive to air pollution could have symptoms.*</p>
 <p>orange</p> <p>UNHEALTHY FOR SENSITIVE GROUPS</p>	<p>It's OK to be active outside, especially for <b>short activities</b> such as recess and physical education (PE).</p> <p>For <b>longer activities</b> such as athletic practice, take more breaks and do less intense activities.</p> <p>Watch for symptoms and take action as needed.*</p> <p>Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.</p>
 <p>red</p> <p>UNHEALTHY</p>	<p>For <b>all outdoor activities</b>, take more breaks and do less intense activities.</p> <p>Consider moving <b>longer or more intense activities</b> indoors or rescheduling them to another day or time.</p> <p>Watch for symptoms and take action as needed.*</p> <p>Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.</p>
 <p>purple</p> <p>VERY UNHEALTHY</p>	<p>Move <b>all activities</b> indoors or reschedule them to another day.</p>

## \* Watch for Symptoms

Air pollution can make asthma symptoms worse and trigger attacks. Symptoms of asthma include coughing, wheezing, difficulty breathing, and chest tightness. Even students who do not have asthma could experience these symptoms.

### If symptoms occur:

The student might need to take a break, do a less intense activity, stop all activity, go indoors, or use quick-relief medicine as prescribed. If symptoms don't improve, get medical help.

## Go for 60!

CDC recommends that children get 60 or more minutes of physical activity each day. [www.cdc.gov/healthyyouth/physicalactivity/guidelines.htm](http://www.cdc.gov/healthyyouth/physicalactivity/guidelines.htm)

## Plan Ahead for Ozone

There is less ozone in the morning. On days when ozone is expected to be at unhealthy levels, plan outdoor activities in the morning.

## Questions and Answers

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### How long can students stay outside when the air quality is unhealthy?

There is no exact amount of time. The worse the air quality, the more important it is to take breaks, do less intense activities, and watch for symptoms. Remember that students with asthma will be more sensitive to unhealthy air.

### Why should students take breaks and do less intense activities when air quality is unhealthy?

Students breathe harder when they are active for a longer period of time or when they do more intense activities. More pollution enters the lungs when a person is breathing harder. It helps to:

- ✓ reduce the amount of time students are breathing hard (e.g., take breaks; rotate players frequently)
- ✓ reduce the intensity of activities so students are not breathing so hard (e.g., walk instead of run)

### Are there times when air pollution is expected to be worse?

**Ozone pollution** is often worse on hot sunny days, especially during the afternoon and early evening. Plan outdoor activities in the morning, when air quality is better and it is not as hot.

**Particle pollution** can be high any time of day. Since vehicle exhaust contains particle pollution, limit activity near idling cars and buses and near busy roads, especially during rush hours. Also, limit outdoor activity when there is smoke in the air.

### How can I find out the daily air quality?

Go to [www.airnow.gov](http://www.airnow.gov). Many cities have an Air Quality Index (AQI) *forecast* that tells you what the local air quality will be later today or tomorrow, and a *current* AQI that tells you what the local air quality is now. The AirNow website also tells you whether the pollutant of concern is ozone or particle pollution. Sign up for emails, download the free AirNow app, or install the free AirNow widget on your website. You can also find out how to participate (and register your school) in the School Flag Program ([www.airnow.gov/schoolflag](http://www.airnow.gov/schoolflag)).

### If students stay inside because of unhealthy outdoor air quality, can they still be active?

It depends on which pollutant is causing the problem:

**Ozone pollution:** If windows are closed, the amount of ozone should be much lower indoors, so it is OK to keep students moving.

**Particle pollution:** If the building has a forced air heating or cooling system that filters out particles then the amount of particle pollution should be lower indoors, and it is OK to keep students moving. It is important that the particle filtration system is installed properly and well maintained.

### What physical activities can students do inside?

Encourage indoor activities that keep all students moving. Plan activities that include aerobic exercise as well as muscle and bone strengthening components (e.g., jumping, skipping, sit-ups, pushups). If a gymnasium or open space is accessible, promote activities that use equipment, such as cones, hula hoops, and sports balls. If restricted to the classroom, encourage students to come up with fun ways to get everyone moving (e.g., act out action words from a story). Teachers and recess supervisors can work with PE teachers to identify additional indoor activities.

### What is an asthma action plan?

An asthma action plan is a written plan developed with a student's doctor for daily management of asthma. It includes medication plans, control of triggers, and how to recognize and manage worsening asthma symptoms. See [www.cdc.gov/asthma/actionplan.html](http://www.cdc.gov/asthma/actionplan.html) for a link to sample asthma action plans. When asthma is well managed and well controlled, students should be able to participate fully in all activities. For a booklet on "Asthma and Physical Activity in the School," see <http://www.nhlbi.nih.gov/health/resources/lung/asthma-physical-activity.htm>.