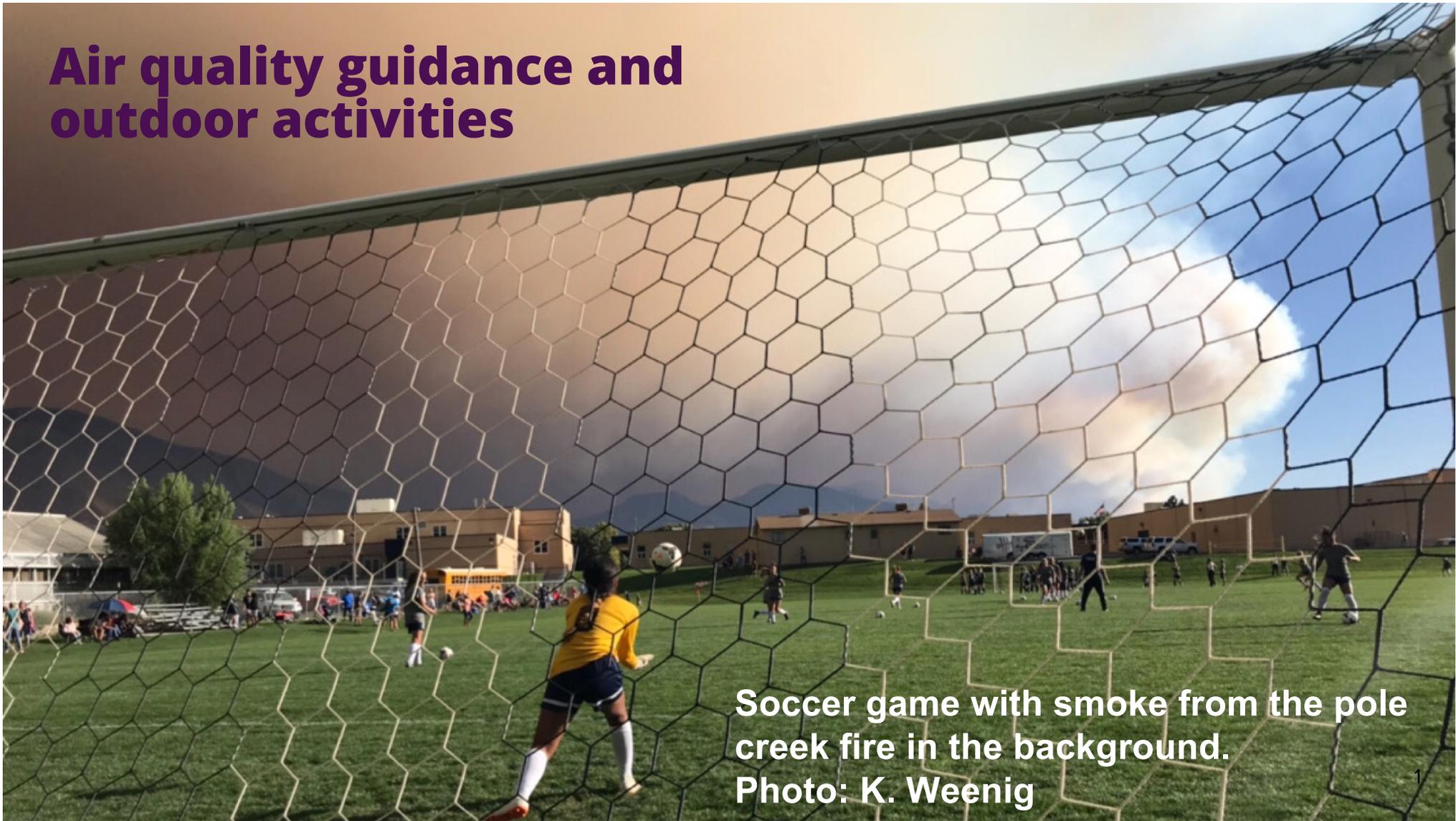


Air quality guidance and outdoor activities

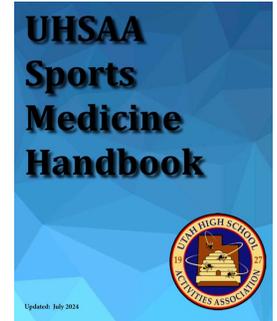


Soccer game with smoke from the pole creek fire in the background.
Photo: K. Weenig

Agenda

- Introductions
- Goal – protect youth participating in outdoor activities from air quality hazards
- Air quality language in SMAC handbook (and a few comments)
- Is it worth looking at uidelines from other states, regions, and organizations
- How to get the needed air quality information to make decisions
 - Ideas for addressing the uncertainty if using a low-cost sensor

UHSAA Air quality guidance



AQI	0-50 good	51-100 Moderate	101-150 Unhealthy for sensitive	151-200 Unhealthy	200+ Very unhealthy/hazardous
No restrictions			Athletic training staff and coaches should consult with athletes who have respiratory issues and modify their practice and competition.	Athletic training staff and coaches should consult with all athletes and modify their practice and competition.	Athletic training staff and coaches should postpone or cancel outdoor practice and competition, or consider relocating to an area with a lower AQI.

As specific public health department recommendations may vary, state associations and schools should consult local and state health departments for guidelines on when outdoor activities should be modified or cancelled.

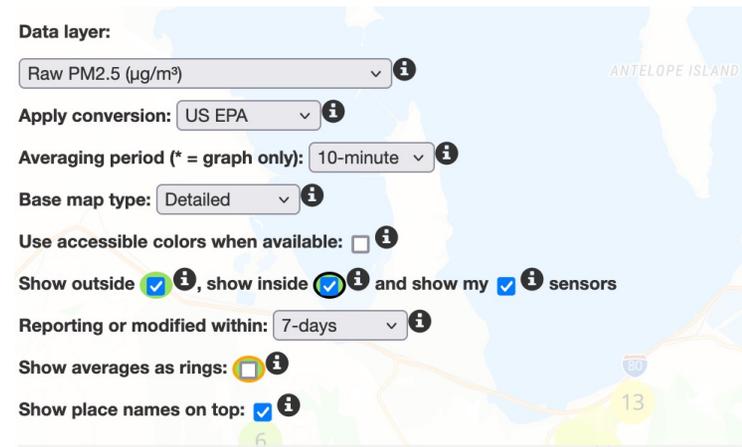
USHAA - Example Response Grid

Good AQI 0 - 50	<ul style="list-style-type: none"> If air quality has or is forecasted to deteriorate significantly, athletics department staff and medical staff should review and familiarize themselves with these guidelines and the institutional air quality monitoring protocol.
Moderate AQI 51-100	<ul style="list-style-type: none"> Medical /athletic training staff and coaches should know which athletes have respiratory issues. If air quality has or is forecasted to deteriorate significantly, a designated member of the athletic department staff should implement air quality protocol and begin work on a communications plan. Athletics department staff and/or medical staff should regularly monitor air quality, with localized and/or venue specific data (when available).

Unhealthy for Sensitive Groups AQI 101 – 150	<ul style="list-style-type: none"> Medical /athletic training staff and coaches should consult with athletes who fall into the sensitive groups about participation in practice or competition. Limit outdoor activity for sensitive groups and have athletics medical/athletic training staff in attendance, as able, to monitor athletic performance for respiratory compromise. Notify visiting teams of air quality conditions. If air quality has or is forecasted to deteriorate significantly, athletics and medical/athletic training staff should discuss the Air Quality Guidelines, the institutions Air Quality Monitoring Protocol, and the possibility of postponements and cancellations with school school and district administration. Reduce heavy and/or prolonged exertion in athletes with a pre-existing pulmonary or cardiac condition.
Unhealthy AQI 151 – 200	<ul style="list-style-type: none"> Medical/athletic training staff and coaches should closely monitor the health of all athletes in practice or competition. Athletics department staff should work with medical staff to move indoors (to facilities with better air quality than outdoors), relocating practice to an area with better air quality, postponing practice to a time when air quality is expected to be better, modifying practice to avoid activities that increase minute ventilation (e.g., intense (duration or speed) running, strenuous aerobic activity, etc.). Outdoor activity and exertion levels should be minimized for athletes with a pre-existing pulmonary or cardiac condition. Implement air quality messaging and communications plan.
Very Unhealthy AQI > 200	<ul style="list-style-type: none"> Use localized and venue specific data (when available) to determine the time period when the air quality is anticipated or projected to be above AQI 200. Athletics department staff should work with medical staff to either move indoors (based on facility availability), relocate practice to an area with better air quality(Requests for transporting a team out of the area will be handled on a case by case basis and upon approval by the Director of Athletics), postponing practice until a time when air quality is expected to be better, or cancel practice. Special consideration should be given to athletes with a pre-existing pulmonary or cardiac condition and outdoor activities should be avoided for those individuals. If there is substantive evidence that the AQI will remain consistently above 200 for the majority of a competition, that competition should be postponed, canceled, rescheduled or relocated.

USHAA - where to get AQ measurements?

- A particular location's AQI can be found at:
 - <https://www.airnow.gov/>
 - <https://www2.purpleair.com/>
 - **CAUTION, MAKE SURE YOU SELECT APPLY CONVERSION (Select US EPA correction factor)**
 - **CAUTION: ineffective at dust**
 - <https://air.utah.gov/forecast.php>
 - <https://fire.airnow.gov/> (Suggest adding, above purple air, already corrected)
 - <https://airview.tellusensors.com/> (already corrected and has schools)
 - [Aqandu.org](https://aqand.org/) (will have forecasts, updates coming)
- Use measurements plus visibility (great)
KK's comments in red



Consider adding ozone and PM2.5 to AQI chart

Air Quality Index (AQI) Values	Levels of Health Concern	Colors	PM2.5 (ug/m3)	O3 ppb
<i>When the AQI is in this range:</i>	<i>..air quality conditions are:</i>	<i>...as symbolized by this color:</i>		
0 to 50	Good	Green	>9.1	>54
51 to 100	Moderate	Yellow	9.1 – 35	55- 70
101 to 150	Unhealthy for Sensitive Groups	Orange	36-55	71-85
151 to 200	Unhealthy	Red	56-125	86-105
201 to 300	Very Unhealthy	Purple	>126	>106
301 to 500	Hazardous	Maroon		

Consider adding PM2.5 and Ozone, maybe PM10 cutpoints

How do other states and organizations address the issue?

- The NCAA, Montana, Minnesota, California, and Oregon have rules or guidelines for student athletes and air quality.

	PM _{2.5} ug/m ³ >9.1	9.1-35	36 - 55	56-125	> 126
AQI	0-50 good	51-100 Moderate	101-150 Unhealthy for sensitive	151-200 Unhealthy	200+ Very unhealthy/hazardous
	No restrictions	Monitor sensitive groups and limit vigorous activities	Students with chronic lung or heart conditions refrain from outdoor activities based on severity of their condition and sensitivity to air quality. Consider moving activities indoors or cancel. If activities are not cancelled, increase rest periods to allow for lower breathing rates.	Reschedule or relocate events to an area with good air quality. Move practices to an indoor environment with good air quality. Limit students to light activities.	Reschedule/cancel events. Move practices to an indoor environment with good air quality. Limit students to light activities.

From Montana school guidance (highlights) – others are similar

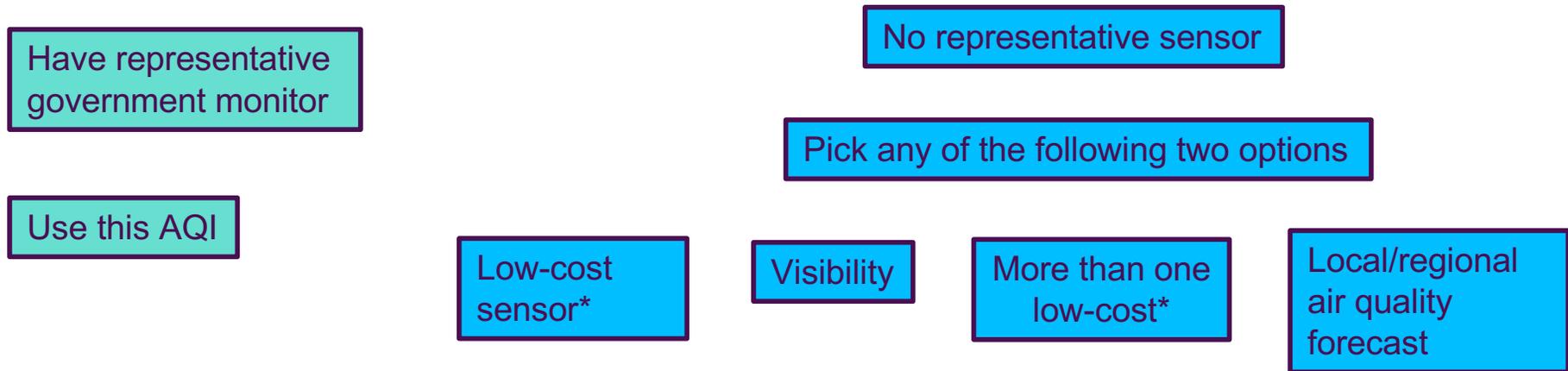
NCAA

AQI	< 100	> 100	> 150	> 200	> 300
None		consider removing sensitive athletes from outdoor practice or competition venues and should closely monitor all athletes for respiratory difficulty. Reduce heavy or prolonged exertion in sensitive individuals.	outdoor activities should be shortened, and exertion should be minimized by decreasing the intensity of activity. Sensitive athletes should be moved indoors	serious consideration should be given to rescheduling the activity or moving it indoors. Prolonged exposure and heavy exertion should be avoided. Avoid all outdoor physical activity for sensitive individuals	outdoor activities should be moved indoors or canceled if indoor activity is not an option

NFHS Position Statement on Air Quality

- Follow state or health department guidance.
- They suggest a combination of air quality measurements and visibility
- Check with maintenance staff if HVAC systems provide properly filtered air (don't say what this is). They warn that air quality can be worse indoors.
- Follow heat and hydration guidance. They warn that temperatures may be higher indoors than outdoors.
- Many states in the Western US have passed Occupational Safety and Health Administration (OSHA) Rules for exposure to wildfire smoke and heat
 - Cal OSHA - AQI for PM2.5 is 151- provide indoor filtered location or N95 (or similar) respirators
 - Oregon – AQI between 101 to 276 –monitor and optional respirators, above 276 respirator required
 - Washington – language being drafted

Potential Decision Tree



* Make sure that low-cost sensor is being corrected for the event (i.e., wildfire smoke). EPA's smoke and fire map is corrected for wildfire smoke. Note: PurpleAir/KLS, EPA smoke and fire map are inaccurate for dust.

California Guidance – more detailed

SCHOOL DISTRICTS

HOW TO USE THIS CHART

STEP 1
Find the current local air quality conditions (AQI) at fire.airnow.gov. To find forecasted air quality conditions go to AirQuality.org.

STEP 2
Once you know the AQI nearest your school or outdoor event, use the table below to help you plan and make decisions during a wildfire smoke event or anytime the AQI increases.



ACTIVITY	LEVEL 1 GOOD	LEVEL 2 MODERATE	LEVEL 3 UNHEALTHY FOR SENSITIVE GROUPS	LEVEL 4 UNHEALTHY	LEVEL 5 VERY UNHEALTHY SCHOOL CLOSURE MAY BE CONSIDERED ¹	LEVEL 6 HAZARDOUS SCHOOL CLOSURE MAY BE CONSIDERED ¹
AQI	0-50	51-100	101-150	151-200	201-300	≥301
RECESS (15 MIN)	No Restrictions	Ensure sensitive individuals ¹ are medically managing their condition	Sensitive individuals ¹ should exercise indoors or avoid vigorous outdoor activities Allow individuals who complain of difficulty breathing to play indoors	Exercise indoors or avoid vigorous outdoor activities Sensitive individuals ¹ or any individual who complains of difficulty breathing should remain indoors	No outdoor activity All activity should be moved indoors or discontinued	No outdoor activity All activity should be moved indoors or discontinued
PHYSICAL EDUCATION CLASS (60 MIN)	No Restrictions	Ensure sensitive individuals ¹ are medically managing their condition	Sensitive individuals ¹ should exercise indoors or avoid vigorous outdoor activities Make indoor space available for sensitive individuals ¹ Increase rest periods and substitutions to lower breathing rates	Exercise indoors or limit vigorous outdoor activity to maximum 15 minutes Sensitive individuals ¹ or any individual who complains of difficulty breathing should remain indoors	No outdoor activity All activity should be moved indoors or discontinued	No outdoor activity All activity should be moved indoors or discontinued
ATHLETIC PRACTICE/ SCHEDULED SPORTING EVENT	No Restrictions	Ensure sensitive individuals ¹ are medically managing their condition	Ensure sensitive individuals ¹ are medically managing their condition Reduce vigorous exercise to 30 minutes per hour Increase rest periods and substitutions to lower breathing rates	Reduce vigorous exercise to 30 minutes per hour Increase rest periods and substitutions to lower breathing rates Sensitive individuals ¹ should remain indoors	Practice or event should be rescheduled, moved indoors or discontinued	Practice or event should be rescheduled, moved indoors or discontinued
SCHEDULED OUTDOOR EVENT	No Restrictions	Ensure sensitive individuals ¹ are medically managing their condition	Ensure sensitive individuals ¹ are medically managing their condition	Decrease duration of events exceeding two hours Consider rescheduling or relocating event	Event should be rescheduled, moved indoors or discontinued	Event should be rescheduled, moved indoors or discontinued

¹Sensitive individuals include anyone with asthma or other heart/lung conditions. Those with asthma should follow their asthma action plans and keep their quick-relief inhalers with them at all times.

SACRAMENTO METROPOLITAN SACRAMENTO COUNTY

Washingt on State

Outside Air Quality Index (AQI): PM2.5				
Activity Duration	Good (0-50 AQI)	Moderate (51-100 AQI)	Unhealthy for Sensitive Groups (101-150 AQI)	Unhealthy, Very Unhealthy, or Hazardous (≥151 AQI)
15 mins to 1 hour (e.g., recess, PE, classes typically held outside)	No restrictions.	Allow children and youth with health conditions to opt out or stay indoors. Limit intensity of activities for these children and youth if needed.	Limit to moderate intensity activities outside. For children and youth with health conditions, further limit intensity or move to an area with safer air quality if needed.	Cancel outdoor activity or move to an area with safer air quality, either indoors with filtered air or to a different location. Limit to light intensity activities indoors if indoor PM2.5 levels are elevated.
1-4 hours (e.g., athletic events and practices)	No restrictions.	Allow children and youth with health conditions to opt out or stay indoors. Limit intensity of activities for these children & youth if needed.	Limit to light intensity activities or to a 1-hour total duration with moderate intensity activities. If intensity level and time cannot be modified, consider canceling outdoor activity or move to an area with safer air quality, either indoors or to a different location. For children & youth with health conditions, further limit time or intensity if needed.	Cancel outdoor activity or move to an area with safer air quality, either indoors with filtered air or to a different location. Limit to light intensity activities indoors if indoor PM2.5 levels are elevated.
> 4 hours (e.g., outdoor school or programming, day camp, overnight camp)	No restrictions.	Move children and youth with health conditions to an area with safer air quality, either indoors or to a different location if needed. Allow children and youth without health conditions to opt out or stay indoors and limit intensity of activities.	Limit to light intensity activities and under 4-hr total duration. If intensity level and time cannot be modified, cancel outdoor activity, or move it to an area with safer air quality, either indoors or to a different location. For children and youth with health conditions, further limit time or intensity if needed.	Cancel outdoor activity or move to an area with safer air quality, either indoors with filtered air or to a different location. Limit to light intensity activities indoors if indoor PM2.5 levels are elevated.

Oregon includes visibility guidance

Air Quality Index (AQI)	5-3-1 Visibility Index	Required Actions for Outdoor Activities
51 – 100	5–15 Miles	Athletes who are unusually sensitive to air pollution should consider indoor activities only. Athletes with asthma should have rescue inhalers readily available and pretreat before exercise if directed by their healthcare provider. All athletes with respiratory illness, asthma, lung or heart disease should monitor symptoms and reduce/cease activity if symptoms arise. Increase rest periods as needed.
101 – 150	3–5 Miles	Athletes who are unusually sensitive to air pollution should consider indoor activities only. Athletes with asthma should have rescue inhalers readily available and pretreat before exercise if directed by their healthcare provider. All athletes with respiratory illness, asthma, lung or heart disease should monitor symptoms and reduce/cease activity if symptoms arise. Athletes with asthma or other lung diseases, heart conditions or diabetes may need additional rest breaks during practices / contests. Consider rescheduling to a different time and / or an area with a lower AQI. Schools should consider the impact of elevated AQI lasting for multiple days and the impact of prolonged exposure for athletes and staff on multiple practice session days when making decisions. Consider moving practices indoors, if available. Be aware that, depending on a venue's ventilation system, indoor air quality levels can approach outdoor levels.
151 – 200	1–3 Miles	All outdoor activities (practice and competition) shall be canceled or moved to an area with a lower AQI. Move practices indoors, if available. Be aware that, depending on a venue's ventilation system, indoor air quality levels can approach outdoor levels.
>200	1 Mile	All outdoor activities (practice and competition) shall be canceled or moved to an area with a lower AQI. Move practices indoors, if available. Be aware that, depending on a venue's ventilation system, indoor air quality levels can approach outdoor levels.

EPA & CDC Guidance for Schools

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.

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

* 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

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.

<https://www.airnow.gov/publications/activity-guides/air-quality-activity-guidance-for-schools/>

Minnesota

- Minnesota: Coach guidance for students with asthma, starting at AQI > 100 warmup and monitoring

Where to get your measurements

- Balancing – accurate measurements, location specific, and doability
- UDAQ or US EPA
- EPA Fire & Smoke Map
- Visibility
- UofU/Tellus/AQ&U/Fox 13
- PurpleAir/KSL

New AQI values <i>(effective May 2024)</i>	Wildfire Smoke standards' key requirements for exposure level using new AQI values
101 - 276	<ol style="list-style-type: none"> 1. Assess and monitor air quality at each work location where employees are exposed 2. Provide and document employee training 3. Implement two-way communication system 4. Implement engineering and administrative controls 5. Provide NIOSH-approved filtering facepiece respirators for voluntary use
277 - 848	<p>Follow steps 1-4 above; and</p> <ol style="list-style-type: none"> 6. Provide NIOSH-approved filtering facepiece respirators for mandatory use by implementing a Wildfire Smoke Respiratory Protection Program in accordance with Appendix A, in the Protection from Wildfire Smoke standards
849 and above	<p>Follow steps 1-4 above; and</p> <ol style="list-style-type: none"> 7. Provide NIOSH-approved respirators for mandatory use by implementing a Respiratory Protection Program in accordance with 29 CFR 1910.134 or OAR 437-004-1041