SAFEGUARD YOUR STUDENT ATHLETES WITH WET BULB GLOBE TEMPERATURE

EARTH NETWORKS®

HEAT: THEIR BIGGEST OPPONENT

While your student athletes focus on training to beat their rivals, it's up to you to protect them from their greatest opponent: Extreme Heat.

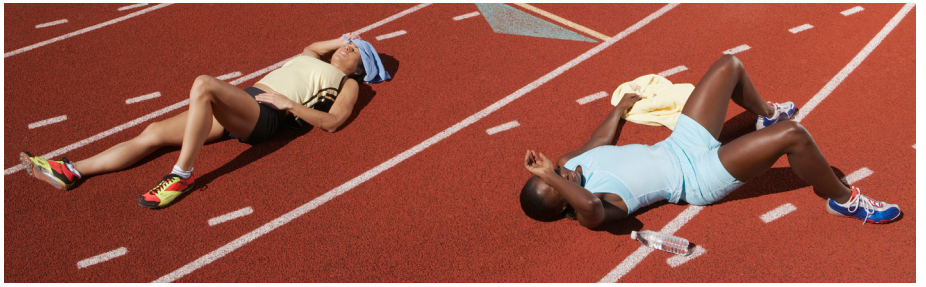
Respected athletic associations such as the National Collegiate Athletic Association (NCAA), the National Athletic Trainers Association (NATA), and U.S. Soccer recommend safety protocols based on Wet Bulb Globe Temperature (WBGT) thresholds. State high school associations are increasingly adding WBGT to their heat safety policies as well, with Florida recently joining leaders like New Jersey, North Carolina, and Georgia.

You need to be ready to tackle heat stress before it reaches your student athletes **and** know what to do if it sneaks through your defense. Keep reading to learn more about this important threat and how you can manage it properly with Wet Bulb Globe Temperature.

HEAT-RELATED DEATHS AND ILLNESSES

Extreme heat pushes the body beyond its limits and can result in the illness or death of even your most in-shape athletes.

How? Extreme heat and high humidity work together as a team to slow evaporation in the body. In response, the body has to work extra hard to maintain a normal temperature. This can result in a number of responses, ranging from the inability to concentrate to heat stroke[1].



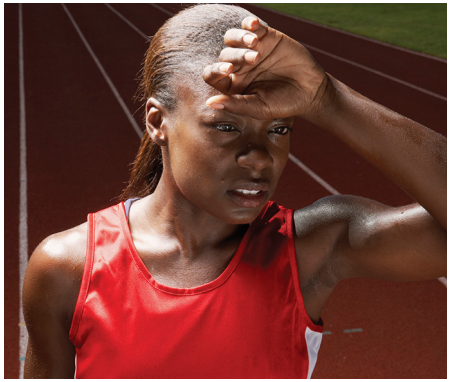
Heat illness isn't something rare, either. In fact, an average of 2,800 heat-related hospitalizations happen in the U.S. alone each year[2] with approximately 618 people in the U.S. dying from extreme heat every year.[3]

Unfortunately, a lot of these illnesses and fatalities happen to student athletes. According to a study by the Centers for Disease Control (CDC), heat illness is the leading cause of death and disability among high school athletes. If heat stress is so preventable, why do more than 9,000 students suffer from heat illness every year?[4]

A lot of this has to do with a lack of awareness and prevention protocol. Protecting athletes starts with awareness and ends with a detailed policy grounded in Wet Bulb Globe Temperature technology.

[1] Earth Networks | Heat Fact Sheet https://www.earthnetworks.com/heat-101/#heat-threats
[2] U.S. EPA https://www.epa.gov/climate-indicators/heat-related-illnesses
[3] U.S. CDC | Natural Disasters and Extreme Weather Fact Sheet https://www.cdc.gov/disasters/extremeheat/heat_guide.html
[4] U.S. CDC | https://www.earthnetworks.com/blog/how-to-use-wbgt-for-heat-stress-management/#hb7011

SPOTTING HEAT ILLNESSES IN STUDENT ATHLETES



While it's not as obvious as a broken bone or a concussion, heat illnesses have their own lists of symptoms. These symptoms differ depending on the specific illness. Heat exhaustion and heat stroke have their own list of symptoms and action plans[5].

Learning these symptoms is a key component in treating athletes before heat illness progresses to life-threatening conditions like exertional heat stroke (EHS).

Beyond knowing the signs of heat illness, the most important piece of the game plan is using Wet Bulb Globe Temperature to automate your decision making.

Heat-Related Illnesses

WHAT TO LOOK FOR	WHAT TO DO
HEAT STROKE	
• High body temperature (103ºF or higher) • Hot, red, dry, or damp skin • Fast, strong pulse • Headache • Dizziness • Nausea • Confusion • Losing consciousness (passing out)	• Call 911 right away-heat stroke is a medical emergency • Move the person to a cooler place • Help lower the person's temperature with cool cloths or a cool bath • Do not give the person anything to drink
HEAT EXHAUSTION	
• Heavy sweating • Cold, pale, and clammy skin • Fast, weak pulse • Nausea or vomiting • Muscle cramps • Tiredness or weakness • Dizziness • Headache • Fainting (passing out)	• Move to a cool place • Loosen your clothes • Put cool, wet cloths on your body or take a cool bath • Sip water **Get medical help right away if:** • You are throwing up • Your symptoms get worse • Your symptoms last longer than 1 hour

[5] U.S. CDC | Warnings Signs and Symptoms of Heat-Related Illnesses https://www.cdc.gov/disasters/extremeheat/warning.html

WHAT IS WET BULB GLOBE TEMPERATURE?

The most important aspect of protecting student athletes from heat is using Wet Bulb Globe Temperature. Wet Bulb Globe Temperature (WBGT) is the apparent measurement used to estimate the most accurate level of heat stress in direct sunlight.

IT IS CALCULATED USING...

- **Temperature**
- **Wind speed**
- **Humidity**
- **Sun Angle**
- **Cloud cover (solar radiation)**

The real purpose of using Wet Bulb Globe Temperature as a heat measurement is to keep people safe while performing strenuous outdoor activities at high temperatures.

	WBGT	HEAT INDEX	TEMPERATURE
Measured in the sun	✓		
Measured in the shade		✓	
Uses temperature	✓	✓	✓
Uses relative humidity	✓	✓	
Uses cloud cover	✓		
Uses wind speed	✓		
Uses sun angle	✓		

BEST PRACTICES

Preparing for an emergency should be the top priority for schools to ensure the safety of their athletes. School sanctioned athletic programs should use Wet Bulb Globe Temperature as a preventive measure against heat[6].

Along with a plan grounded in WBGT, you should also consider the following best practices:

THINGS TO CONSIDER...

Best practice times:

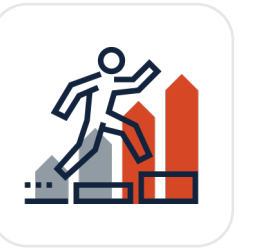
6–9 a.m.
6–9 p.m.

Practice duration:

Less than
three hours

Take it slow:

The first 3 weeks of August
pose the greatest risk



Ease into it:

Build up to full equipment
& intensity

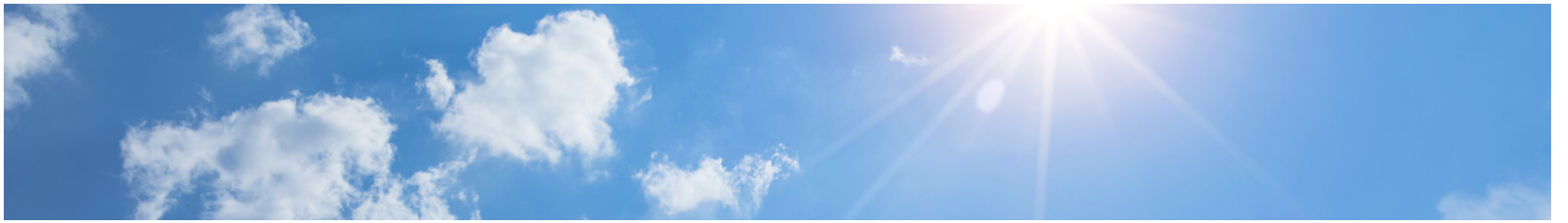
Drink up:

Keep players
well hydrated

[6] Korey Stringer Institute | WBGT Guidelines https://ksi.uconn.edu/prevention/wet-bulb-globe-temperature-monitoring/

CREATE YOUR OWN HEAT SAFETY PLAN

Here are some things to consider when creating or updating your own heat safety plan:



THINGS TO CONSIDER...

Make your guidelines region specific

Account for the time of year & athlete acclimatization

Consider the level & duration of workouts

Understand & use Wet Bulb Globe Temperature

Acquire the proper tools to monitor conditions

Over the next few pages, we'll cover WBGT suggested actions and plans from different organizations to help you protect your players. We'll also help you understand some of the concepts above a little better.

NATA WET BULB GLOBE TEMPERATURE GUIDELINES

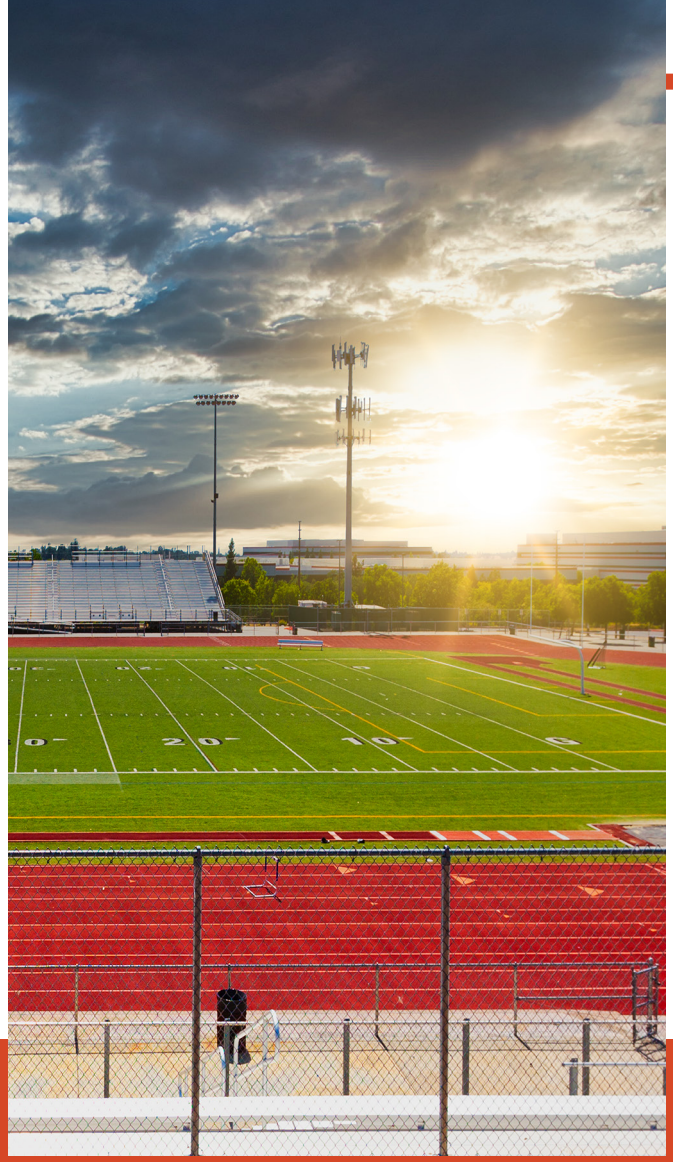
The National Athletic Trainers Association uses the Georgia High School Association's WBGT Guideline[7], which was developed with the help of the Korey Stringer Institute. The thresholds and recommended actions are as followed:

GHSA WBGT Guideline

WBGT READING (°F)	ACTIVITY GUIDELINES & REST BREAK GUIDELINES
Under 82.0	**Normal activities**; Provide at least three separate rest breaks each hour of minimum 3 minutes each during workout
82.0-86.9	**Use discretion for intense or prolonged exercise**; watch at-risk players carefully; Provide at least three separate rest breaks each hour of a minimum of four-minute duration each
87.0-89.9	**Maximum practice time is two hours**. For Football: players restricted to helmet, shoulder pads, and shorts during practice. All protective equipment must be removed for conditioning activities. For all sports: Provide at least four separate rest breaks each hour of a minimum of four minutes each
90.0-92.0	**Maximum length of practice is one hour, no protective equipment** may be worn during practice and there may be no conditioning activities. There must be 20-minutes of resh breaks provided during the hour of practice
Over 92.1	**No outdoor workouts**; Cancel exercise; delay practices until a cooler WBGT reading occurs

It is important to note that your WBGT Guidelines will look different than Georgia's depending on what region your school is located in. To find out what region your state/organization is in, please read this recommended document.[8]

[7] NATA | GHSA WBGT Guideline https://www.nata.org/sites/default/files/environmentalmonitoringactivitymodifications.pdf
[8] ResearchGate | Regional heat safety thresholds for athletics in the contiguous United States https://ksi.uconn.edu/wp-content/uploads/sites/1222/2018/08/RegionalWBGT_2015_AppliedGeography.pdf



STATE & REGIONAL HEAT POLICIES

Our friends at the Korey Stringer Institute have done a lot of excellent, life-saving research and work around heat-related illnesses and heat safety for student athletes. Through their research, they've ranked the U.S. states regarding the implementation of evidence-based best practice for preventing and managing the leading causes of sudden death in secondary school athletes.

Here are the top ten 2020 high school sports safety policy rankings[9]:

1. **New Jersey**
2. **Massachusetts**
3. **North Carolina**
4. **Kentucky**
5. **Hawaii**
6. **Georgia**
7. **Oregon**
8. **Illinois**
9. **Missouri**
10. **Florida**[10]

Six out of the top ten states use WBGT in their heat safety policies. All policies in the top include heat acclimatization. Even if your state doesn't require WBGT readings or heat acclimatization, your school should to best protect your student athletes.

Heat Acclimatization: A complex series of changes or adaptions that occur in response to heat stress in a controlled environment over the course of 7 to 14 days.[11]

[9] Korey Stringer Institute | High School State Policies https://ksi.uconn.edu/high-school-state-policies-2-2-2/
[10] A new Florida law, the "Zachary Martin Act" does not mention WBGT by name, but requires "the ambient temperature, humidity, wind speed, sun angle, and cloud cover at the site of athletic activity." That is the definition of WBGT. https://www.forbes.com/sites/jimfoerster/2020/07/10/new-florida-law-brings-use-of-wet-bulb-globe-temperature-forecasts-to-forefront/#706621fa1b12
[11] Korey Stringer Institute | Heat Acclimatization https://ksi.uconn.edu/prevention/heat-acclimatization/

HOW CAN I GET ACCURATE WBGT DATA?

Now that you've drafted a detailed plan, you have to power it with accurate WBGT information. While there are devices - like handheld sensors – for determining Wet Bulb Globe Temperature, they are expensive and single purpose. As a school, you want to prioritize student safety in **the most comprehensive yet cost-effective way as possible**.

MEASUREMENT BEST PRACTICES

The best, most accurate and timely WBGT measurements have these three criteria:

1. **Independent measurements**
2. **Audit trail**
3. **Forecast based on location observations**

That's why we recommend a school weather station as a WBGT monitoring and alerting best practice. This multi-use, commercial-grade technology not only includes WBGT information, but other life-saving weather data as well.

Earth Networks offers every criteria above, as well as:

- **Real-time readings for Wet Bulb Globe Temperature**
- **Hyperlocal forecasts for Wet Bulb Globe Temperature**
- **Wet Bulb Globe Temperature 10-minute averages**
- **Custom alerts for Wet Bulb Globe Temperature**

PROTECT YOUR STUDENTS ATHLETES TODAY

No matter what happens in this world, student health and safety will always be at the top of your priority list. Start protecting them today from the dangers of extreme heat and anything else Mother Nature might throw at your with an professional-grade school weather station and safety solution from Earth Networks.

www.earthnetworks.com
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ABOUT EARTH NETWORKS

Earth Networks, part of the Advanced Environmental Monitoring family of companies, helps organizations mitigate financial, operational and human risk by providing environmental intelligence from the world's largest hyperlocal weather network. We work with schools around the country to provide them accurate forecasts, hyperlocal alerts, real-time weather conditions, and historical data to protect their greatest athletes: **Their students**.