Some of you are enjoying summer vacation and getting ready for the next school year, while others are working in a year-round school system. Regardless, all of you as physical educators will have to deal with warm or hot temperatures at some point. Although July and August tend to be the warmest months of the year, the months leading up to summer as well as the months just following summer can also be quite warm or even very hot. Therefore, we want to share some important information to help prepare you for overseeing activities in the heat and, just as importantly, to prepare your students, their parents, and school administrators.

A child’s ability to regulate core body temperature in the heat is influenced by a number of factors, including the environment, intensity and duration of physical activity, hydration status, cardio-respiratory fitness, body composition, health status, current use of medications, and clothing, uniforms, or protective equipment. Keep in mind that your students can still overheat while exercising in the heat, even if they are well hydrated and fit.

Preparation

**Prepare school administrators and staff**

Every school should develop a policy and guidelines that provide specific measures to keep students safe in the heat. And all staff should be well aware of this important information. For example, all staff should be provided with regular professional development on recognizing the signs and symptoms of developing heat illness. All staff should also be trained (and up-to-date) in first-aid and CPR to address any problems that may arise. Be sure that your first-aid kit has all the necessary equipment and is readily accessible. Everyone should also know where the AED is and how to use it.

**Emergency action plan**

It is imperative to develop and regularly practice an emergency action plan that clearly outlines procedures for responding to a heat-related illness –
especially for a child who experiences exertional heatstroke. Facilities for rapid cooling, if necessary, should be available on-site. If a bout of heat illness is minor, a student will oftentimes indicate that he or she is fine and will want to get back to the normal routine after a brief rest period. Criteria should be established in order for a student to be allowed to return to activity after being cleared by the school nurse or another appropriate healthcare provider.

**Prepare the students**

Children have a certain degree of personal responsibility for managing hot conditions. Eating well, being properly hydrated, wearing the right clothing, and getting enough rest are actions they can take to minimize risk. Children need to also be taught the signs and symptoms of heat illnesses. Each child should be able to recognize the difference between being uncomfortable and a potentially dangerous situation. Importantly, your students should be encouraged to promptly inform an adult when they are or they see someone else suffering from the heat.

**Helpful Hint:** Write a letter to parents in the spring with specific directions to prepare for activities in hot and humid weather. Send a reminder at the beginning of the school year.

**Prepare the parents**

Parents can also help in making sure that their children are prepared. This includes being adequately hydrated, wearing the right clothing, having sunscreen appropriately applied, and limiting their activities so they are well-rested (see attached letter for more helpful tips).

**Acclimatization and Other Measures**

**Graduated exposure**

It can take one or two weeks to become fully acclimated to hot conditions. The intensity and duration of exercise and heat exposure should be considerably reduced at first and then progressively increased throughout the acclimatization period. Gradual exposure to exercise in the heat lessens the potential for overdoing it and incurring exertional heat illness.

**Clothing/sun screen**

Wear protective clothing. Lightweight, loose-fitting, breathable clothing is best. The skin surface should be open to the air for evaporative cooling to take place. Wearing a broad spectrum sunscreen with an SPF of at least 30 is recommended, even on cloudy days. Research shows that approximately half of all new cancers are skin cancers, so using sunscreen is an easy preventive step. Also, be aware of your surroundings. Water and concrete reflect about 85% of the sun’s rays. A hat will provide protection from the downward UV rays. Sunscreen on the face, neck and ears will provide protection from UV rays that reflect upward from the surface.

**Helpful Hint:** Apply sunscreen (SPF 30 or greater) that protects against UVA and UVB rays and don’t forget to re-apply as needed.

**Hydration**

**Thirst**

Thirst is sometimes not a sufficient stimulus to prevent significant body water deficits, especially during vigorous, long-term exercise in the heat.

**Before and during activity**

Drinking plenty of fluids, even the night before, can be a major help in avoiding problems in the heat. Encourage your students to also drink plenty of fluids just prior to any type of exercise or other physical activity in the heat. During sports and other physical activities, have ample water available and readily accessible, and provide enough breaks for students to rehydrate. Drinking 4-8 ounces every 15 minutes will help to prevent significant dehydration and heat-related problems.

**Helpful Hint:** 4-8 ounces is equivalent to about 4-8 swallows.

**After activity**

After the activity is over, students should be encouraged to continue to hydrate. If sweat loss was extensive, students can be encouraged to add a little salt to food or drinks. This helps to retain the fluid consumed.

**Carbohydrate-electrolyte (sports) drinks**

Sweat is mostly water, but it contains a fair amount of electrolytes – primarily sodium and chloride (salt). In addition to replacing electrolytes, sports drinks provide carbohydrates for energy, which is particularly helpful during and after long-duration or repeated sport and other physical activities.

**Food sources of water**

Keep in mind that water does not have to come exclusively in a fluid form. Food can also contribute significant amounts of water to a child’s diet. These foods, especially fruits and vegetables, supplement fluid intake and supply other important nutrients as well.

**Add chart:** Food % of water

<table>
<thead>
<tr>
<th>Food</th>
<th>% of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>96%</td>
</tr>
<tr>
<td>Cucumber</td>
<td>95%</td>
</tr>
<tr>
<td>Tomato</td>
<td>94%</td>
</tr>
<tr>
<td>Squash</td>
<td>93%</td>
</tr>
<tr>
<td>Cabbage</td>
<td>92%</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>91%</td>
</tr>
<tr>
<td>Watermelon</td>
<td>91%</td>
</tr>
<tr>
<td>Cantaloupe</td>
<td>89%</td>
</tr>
<tr>
<td>Peach</td>
<td>88%</td>
</tr>
<tr>
<td>Orange</td>
<td>86%</td>
</tr>
<tr>
<td>Blueberry</td>
<td>85%</td>
</tr>
<tr>
<td>Pear</td>
<td>84%</td>
</tr>
<tr>
<td>Banana</td>
<td>75%</td>
</tr>
</tbody>
</table>

**Modification**

**Time of day**

Limit outdoor vigorous exercise between Noon and 4 p.m. This is the time of day when the sun’s ultraviolet rays are the strongest and it is usually the hottest.

**Frequency/duration of breaks and intensity/duration of activity**

The hotter and/or more humid it gets, the more frequent and longer rest and rehydration breaks should be. Also, be sure to reduce the intensity and duration of exercise and other activities.

**Indoor vs. outdoor activities**

Don’t forget that indoor gyms that are not air conditioned can be very hot and humid – and there is no breeze! Treat these conditions as if you are outdoors in the heat.

**Medical conditions**

Be aware of any medical conditions...
affecting your students or any medications they may be taking that might increase risk during physical activity in the heat. Work with the school nurse and the child’s physician on special considerations and modifications to activity that would better ensure the safety of these students.

Response

Recognition of signs and symptoms
If your students experience any of the following signs or symptoms, immediately stop the activity, have them sit or lie in a shaded area, and drink cool liquids. Medical attention should also be promptly sought.

- Chills or shivering
- Dizziness
- Fatigue
- Headache
- Vomiting
- Loss of consciousness
- Pale, moist, cool skin
- Profuse sweating
- Rapid, weak pulse
- Tingling sensations on arm or back

Staff and students’ responsibilities
All staff members, including the principal and fellow teachers, should be appropriately trained before there is a problem. This will help in dealing with any heat issue or emergency much faster and more appropriately. Because you are often by yourself out on the field or playground, train your students to be your extra eyes and ears. The children are frequently the first ones to see a problem with a fellow student. Stress to your students that they should immediately let you know if anyone shows signs of struggling and/or seems to have any of the above symptoms. Make it clear to students that the sooner a problem is identified, the sooner help can be given.

Rest and Recovery
Proper sleep and rest is essential to tolerating the heat. Adolescents and pre-adolescents need more sleep than adults. Lack of sleep can also cause students to be inattentive in class and, over time, the negative effects can accumulate. In your letter to the parents, stress the importance of a good night’s sleep.

When participating in repeated same-day sports or other physical activities, be sure there is enough recovery time between exercise bouts and games/matches.

Conclusion
Remember, heat stress should be taken seriously. Early signs of evolving heat illness can rapidly lead to a more dangerous situation, especially if the child reaches the point of incurring exertional heat stroke. As a physical educator, the best thing you can do is to be prepared and prepare others. Being very familiar with and incorporating the recommendations highlighted in this article can help you avoid many, if not most, heat-related problems in your classes. The goal is to allow your students to have an educational, enjoyable, and safe environment.

Reference Points
* This article was based on teachings and research in the following literature.


E. Paul Roetert is the Chief Executive Officer of the American Alliance for Health, Physical Education, Recreation and Dance in Reston, VA; Cheryl L. Richardson is the Senior Program Director of the National Association for Sport and Physical Education in Reston, VA; and Michael F. Bergeron is the Executive Director of the National Youth Sports Health & Safety Institute in Sioux Falls, SD.
Sample Letter

Dear Parents:
Physical activity is very important to your child’s health and well-being. The Physical Activity Guidelines for Americans recommend that all children accumulate at least 60 minutes of physical activity every day – and most of this should be moderate- or vigorous-intensity aerobic physical activity. However, it can be challenging to safely reach this goal, especially when the weather is hot and/or humid. Whether your child is in physical education, organized sport activities or participating in recreational activities with family and friends, it is important to be prepared for these conditions.

Your friends at the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) have prepared seven tips to help keep your child safe during physical activity in warm to hot weather:

1. Be aware that children need time to adapt to physical activity in the heat. This process can take 1-2 weeks of gradually increasing the intensity and duration of physical activity.
2. Adequate rest and good overall nutritional habits are always important and can be big factors in your child’s ability to tolerate the heat. Make sure your child eats properly and gets a good night’s sleep every day.
3. Be sure your child is drinking regularly throughout the day and is well-hydrated. His/her urine should be the color of lemonade (or lighter), rather than the color of apple juice. Water is the best choice, but many foods also contain a lot of water (e.g., watermelons, oranges, and bananas). Sports drinks (without caffeine) are another option, particularly when activity lasts longer than one hour or your child hasn’t eaten in a while.
4. Dress your child in appropriate (lightweight, loose-fitting) clothing.
5. Apply sunscreen prior to sun exposure and send the bottle/tube/spray along for regular applications.
6. Limit outdoor physical activity between 12-4 p.m. when the sun’s rays are the most intense and it’s usually hottest.
7. If your child is participating in organized activity, inform the teacher or the coach if he/she is taking any type of medication. For example, medication commonly prescribed to treat symptoms of Attention Deficit Disorder can increase body temperature and make it more difficult for a child to exercise safely in the heat. Talk with your child’s physician about any necessary modifications that may need to be made.

The heat does not have to keep your child indoors. Some simple steps can make a big difference in providing a safe and enjoyable environment when participating in physical activity.

Yours in good health,

AAHPERD

American Association for Health Education • American Association for Physical Activity and Recreation
National Association for Girls and Women in Sport • National Association for Sport and Physical Education • National Dance Association