



UNIVERSITY OF  
NEW ENGLAND



# HEAT STRESS TRAINING

PRESENTED BY ENVIRONMENTAL HEALTH AND SAFETY



# WHY IS IT IMPORTANT TO PREVENT HEAT ILLNESS?

- ☀ Heat illness can be a matter of life and death. Workers die from heat stroke every summer and every death is preventable.
- ☀ When heat stroke doesn't kill immediately, it can shut down major body organs causing acute heart, liver, kidney and muscle damage, nervous system problems, and blood disorders.
- ☀ Having a serious injury or death occur at work affects everyone at a worksite.
- ☀ Workers suffering from heat exhaustion are at greater risk for accidents, since they are less alert and can be confused.



## Operations involving :

- High air temperatures,
- Radiant heat sources,
- High humidity
- Direct physical contact with hot objects,
- Strenuous physical activities

have a high potential for causing heat-related illness.



Outdoor operations conducted in hot weather and direct sun, such as:

- farm work
  - construction
  - oil and gas well operations,
  - asbestos removal,
  - landscaping,
  - emergency response operations,
  - hazardous waste site activities,
- also increase the risk of heat-related illness in exposed workers.

# Who could be affected by heat?

- ❖ Some workers might be at greater risk than others if they have not built up a tolerance to hot conditions, or if they have certain health conditions.
- ❖ New workers and those returning from time away are especially vulnerable.
- ❖ It is important to prepare for the heat:
  - ❖ Educate workers about the dangers of heat
  - ❖ Acclimatize workers, gradually increase the workload or allow more frequent breaks to help new workers and those returning to a job after time away build up a tolerance for hot conditions.

## Factors That Put Workers at Greater Risk

### Environmental

- High temperature and humidity
- Radiant heat sources
- Contact with hot objects
- Direct sun exposure (with no shade)
- Limited air movement (no breeze, wind or ventilation)

### Job-Specific

- Physical exertion
- Use of bulky or non-breathable protective clothing and equipment

# HOW DO I KNOW IF IT'S TOO HOT??

- ❖ The temperature rises
- ❖ Humidity increases
- ❖ The sun gets stronger
- ❖ There is no air movement
- ❖ No controls are in place to reduce the impacts of equipment that radiates heat
- ❖ Protective clothing or gear is worn
- ❖ Work is strenuous
- ❖ **Heat Index**= a quantity expressing the discomfort felt as a result of the combined effects of the temperature and humidity of the air.

The heat index, which takes both temperature and humidity into account, is a useful tool for outdoor workers and employers:

Heat Index	Risk Level	Protective Measures
Less than 91 °F	<u>Lower (Caution)</u>	Basic heat safety and planning
91 °F to 103 °F	<u>Moderate</u>	Implement precautions and heighten awareness
103 °F to 115 °F	<u>High</u>	Additional precautions to protect workers
Greater than 115 °F	<u>Very High to Extreme</u>	Triggers even more aggressive protective measures

# WHY IS HEAT A HAZARD TO WORKERS?

- When a person works in a hot environment, the body must get rid of excess heat to maintain a stable internal temperature. It does this mainly through circulating blood to the skin and through sweating.
- When the air temperature is close to or warmer than normal body temperature, cooling of the body becomes more difficult.
  - Blood circulated to the skin cannot lose its heat. Sweating then becomes the main way the body cools off.
  - Sweating is effective only if the humidity level is low enough to allow evaporation, and if the **fluids and salts that are lost are adequately replaced**.
- If the body cannot get rid of excess heat, it will store it.
  - The body's core temperature rises and the heart rate increases.
  - As the body continues to store heat, the person begins to lose concentration and has difficulty focusing on a task, may become irritable or sick, and often loses the desire to drink.
  - The next stage is most often fainting and even death if the person is not cooled down.

# HEAT RELATED ILLNESS

- Excessive exposure to heat can cause a range of heat related illness:
  - heat rash
  - heat cramps
  - heat exhaustion
  - heat stroke (heat stroke can result in death and requires immediate medical attention).
- Exposure to heat can also increase the risk of injuries because of sweaty palms, fogged-up safety glasses, dizziness, and burns from hot surfaces or steam.



# HEAT RELATED ILLNESSES:

## Heat cramps

- May occur alone or simultaneously with other heat-related illnesses.
- Heat cramps are painful muscle spasms caused by sweating while performing hard physical labor in a hot environment.
- The cramps may be caused by either too much or too little salt.
- Tired muscles are very susceptible to heat cramps.



## Heat Rash

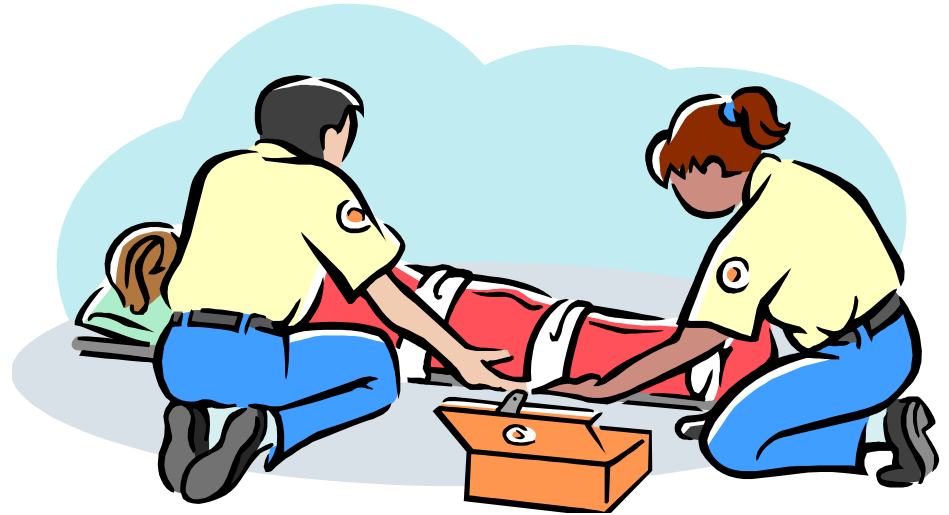
- (Also known as prickly heat) often occurs in hot, humid environments where sweat does not easily evaporate from the skin.
- The sweat ducts become clogged, resulting in a rash.
- Heat rash can be very uncomfortable if the rash is extensive or complicated by infection.
- Taking frequent breaks in a cool place during the work day and bathing and drying the skin regularly can help prevent heat rash.



# FAINTING...

## Fainting:

- May occur when an employee who is not used to the heat stands in one position for an extended period of time.
- An employee who has fainted should recover after a brief period of sitting or lying down.
- Moving around, rather than standing still, will reduce the possibility of fainting



# HEAT EXHAUSTION

- Caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt.
- An employee suffering from heat exhaustion still sweats but may experience the signs and symptoms listed below:
  - headache
  - weakness
  - mood changes (confused or irritable)
  - vomiting
  - decreased /dark-colored urine
  - light-headedness or fainting
  - dizziness
  - pale clammy skin
  - feeling sick to stomach



# TREATING HEAT EXHAUSTION...

- Move person to a cool, shady area
- Provide cool water to drink
- Cool the person by fanning them
- Cool the skin with a wet cloth
- Lay victim on his or her back and raise the victim's legs 6 to 8 inches if he or she is dizzy;
- Lay victim on his or her side if nausea occurs
- Loosen and remove heavy clothing
- Stay with the victim.

*Call for emergency help if the victim does not feel better in a few minutes. If heat exhaustion is not treated, the illness may advance to heat stroke.*



# HEAT STROKE

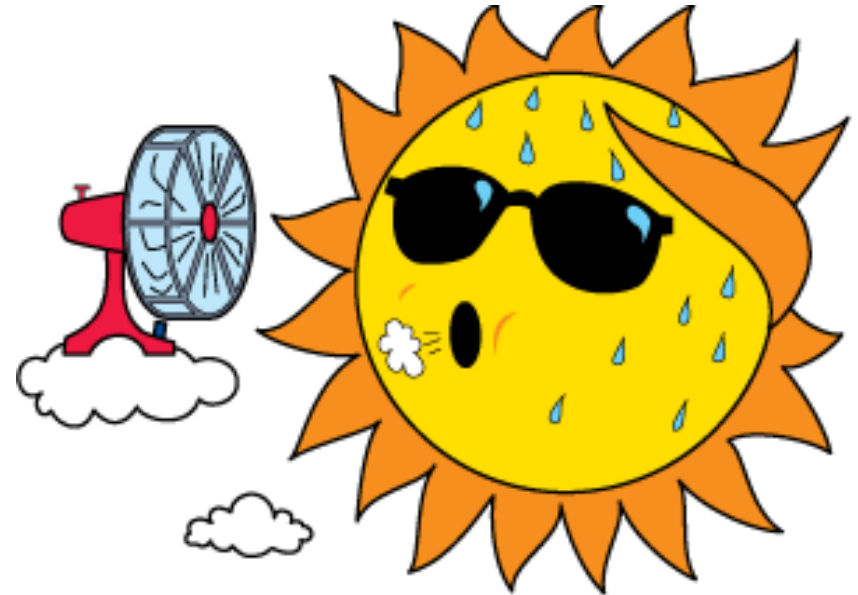


- Heat stroke is the most serious heat-related illness.
- Heat stroke occurs when the body's temperature-regulating system fails and sweating becomes an inadequate way of removing excess heat.
- Signs that an employee may be suffering a heat stroke are:
  - dry pale skin (no sweating);
  - hot red skin;
  - mood changes (irritable, confused);
  - seizures/fits; and
  - collapse/unconsciousness



# WHAT ARE SOME SIGNS OF HEAT STROKE?

- May be confused
- May be unable to think clearly
- May pass out
- May collapse
- May have seizures (fits)
- May stop sweating



# CONTRIBUTING RISK FACTORS:



- You aren't used to working in heat or doing heavy work.
- You are new to working outdoors.
- You are not physically fit or are overweight.
- You drink alcohol or take drugs (illegal drugs or prescription medicine).
- You wear heavy, dark, or tight clothing, or use personal protective equipment.
- You had some early heat-related symptoms the day before.
- Some health conditions can put you at greater risk of heat illness:
  - ✓ Diabetes, kidney and Heart problems, pregnancy, and being overweight.

*If you have these, it would be good to talk to your doctor about the work you do and ask whether there are any special precautions you need to take.*

# HOW CAN HEAT-RELATED ILLNESS BE PREVENTED?



## 1) ENGINEERING CONTROLS:

- Air conditioning and ventilation, that make the work environment cooler

## 2) WORK PRACTICES:

- Work/rest cycles,
- Drinking water often
- Providing an opportunity for workers to build up a level of tolerance to working in the heat.
- Wearing sunscreen to prevent burns
- Wearing hats, sunglasses, and light weight clothing

# WHAT DO I DO??

## 1. Call 9-1-1 and call Security, then notify your supervisor:

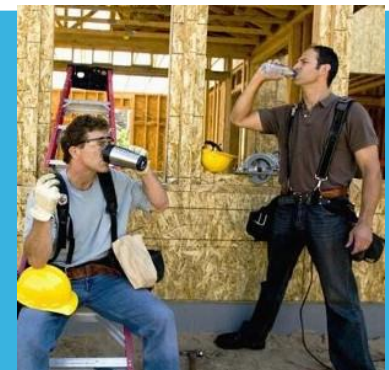
-Be prepared to describe the symptoms and know how to describe our location to the emergency personnel so they can find us quickly. Don't wait because heat exhaustion can quickly become more dangerous. (Time: 15 minutes)

## 2. Move the person to a cooler place to rest in the shade. Don't leave him alone.

## 3. Little by little, give him water.

## 4. Loosen his clothing.

## 5. Help cool the person. Fan him put ice packs on his groin and underarms, or soak their clothing with cool water.





# REMEMBER THESE THREE SIMPLE WORDS: **WATER, REST, SHADE.**

TAKING THESE PRECAUTIONS CAN MEAN THE DIFFERENCE BETWEEN LIFE AND  
DEATH.



- ✓ Drink water every 15 minutes, even if you're not thirsty.
- ✓ Rest in the shade to cool down.
- ✓ Wear a hat and light-colored clothing.
- ✓ Learn the signs of heat illness and what to do in an emergency.
- ✓ Keep an eye on fellow workers.

# SUNBURNS

## What Causes Sunburn:

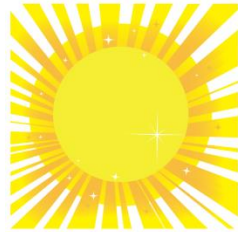
The simple explanation behind sunburn is when your skin is exposed to the sun for a period of time, eventually it burns, turning red and irritated.

Under the skin, things get a little more complicated. The sun gives off three wavelengths of ultraviolet light:

UVA

UVB

UVC



UVC light doesn't reach the Earth's surface. The other two types of ultraviolet light not only reach your beach towel, but they penetrate your skin. Skin damage is caused by UVA and UVB rays.

But sun damage isn't always visible. Under the surface, ultraviolet light can alter your DNA, prematurely aging your skin. Over time, DNA damage can contribute to skin cancers, including deadly melanoma.

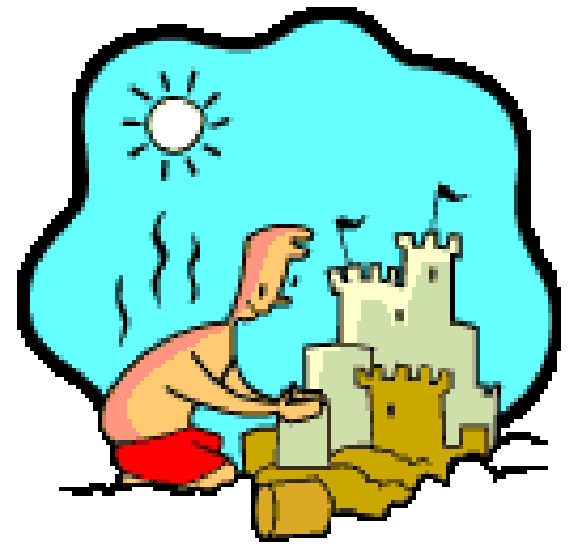
# SUNBURNS

How soon a sunburn begins depends on:

- Your skin type
- The sun's intensity
- How long you're exposed to the sun

Signs of Sunburn

- When you get a sunburn, your skin turns red and hurts.
- If the burn is severe, you can develop swelling and sunburn blisters. You may even feel like you have the flu – feverish, with chills, nausea, headache, and weakness.
- A few days later, your skin will start peeling and itching as your body tries to rid itself of sun-damaged cells.



# SUNBURNS

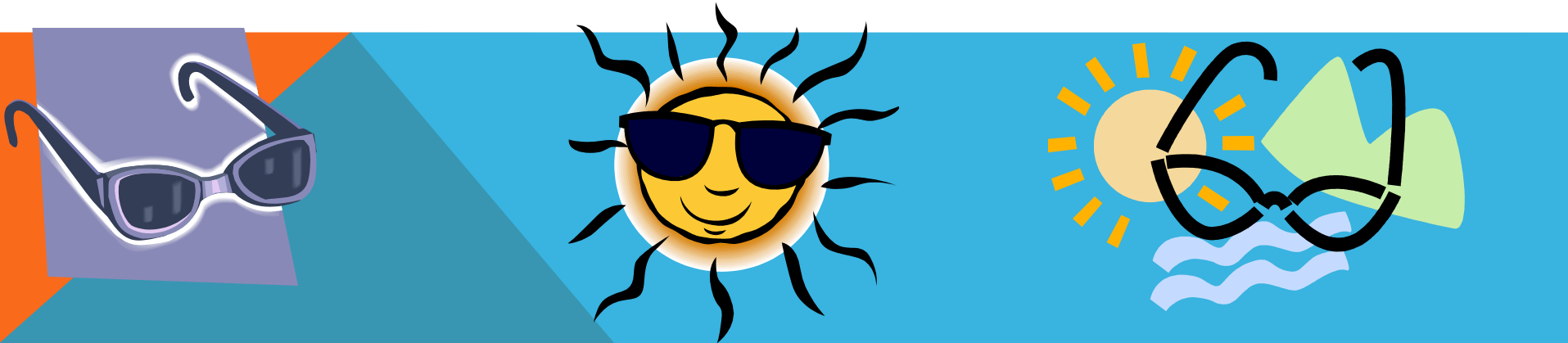
## Factors of sunburn include:

- ❖ The time of day. Between 10am and 4pm daylight saving time, the sun's rays are the strongest. Even on a cloudy day, the sun's damaging UV light can pass through clouds.
- ❖ Proximity to reflective surfaces, such as water, white sand, concrete, snow, and ice. All of these reflect the sun's rays and can cause sunburns.
- ❖ The season of the year. The position of the sun on late spring and summer days can cause a more severe sunburn.
- ❖ Proximity to the equator (latitude). The closer to the equator, the more direct sunlight passes through the atmosphere. For example, the southern United States gets fifty percent more sunlight than the northern United States.
- ❖ The UV index of the day, which shows the risk of getting a sunburn that day.



# SUNBURN PREVENTION

- The World Health Organization recommends to limit time in the midday sun (between 10 a.m. and 4 p.m.) and to watch the UV index.
- Sunlight is generally strongest when the sun is close to the highest point in the sky. Due to time zones and daylight saving time, this is not necessarily at 12 p.m., but often one to two hours later.
- Sun blocks/sunscreen has a sunburn protection factor (SPF) rating, based on the sunblock's ability to suppress sunburn: The higher the SPF rating the lower the amount of direct DNA damage.
- The eyes are also sensitive to sun exposure.
  - Wrap-around sunglasses or the use by spectacle-wearers of glasses that block UV light reduce harmful UV radiation.
  - UV light can cause the development of age-related macular degeneration,



# SUNBURN PREVENTION

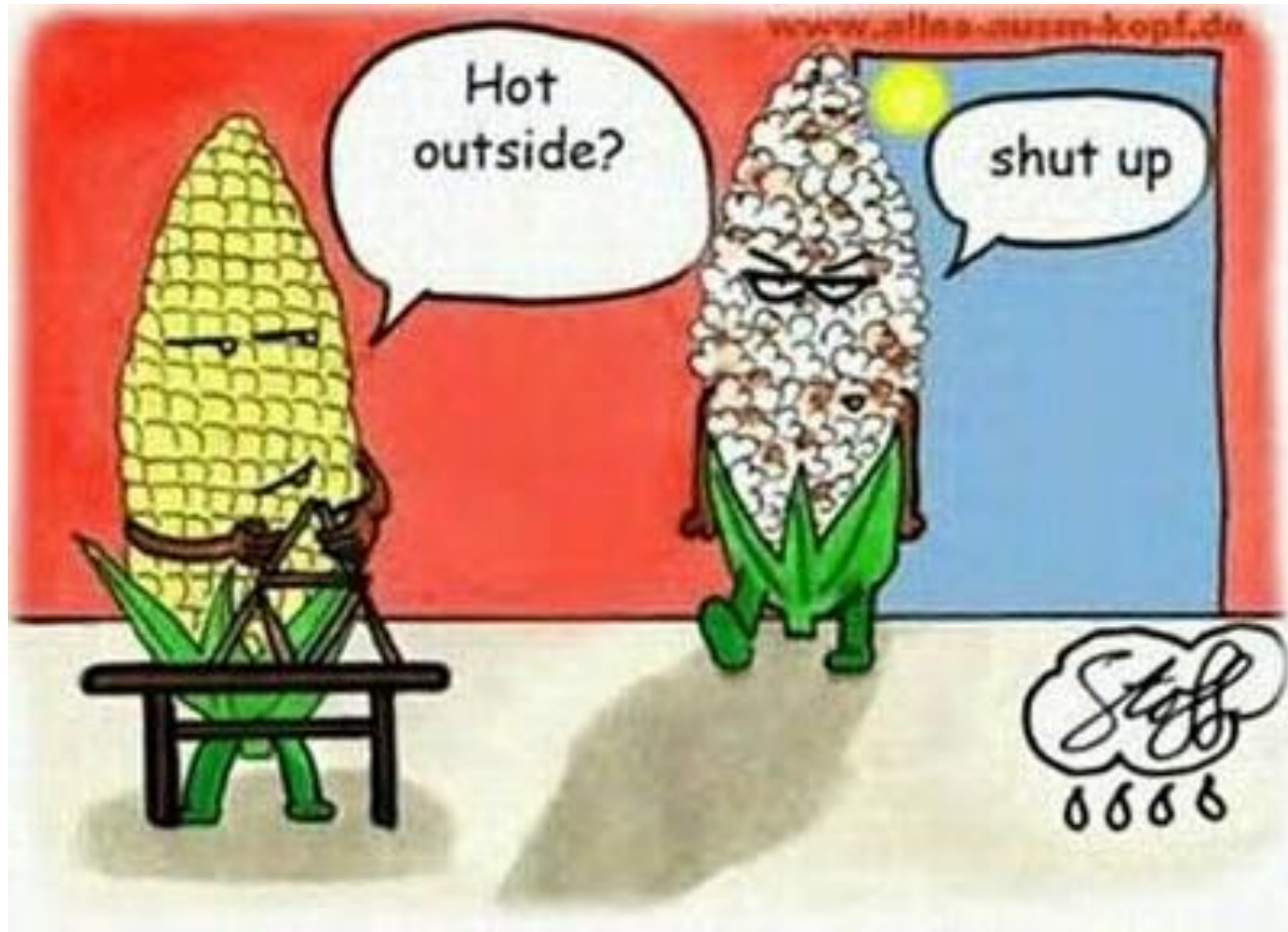


- Sunscreens contain filters for UVA radiation as well as UVB. The stated protection factors are correct only if apply 1 oz to cover the whole body of an adult male, which is much more than many people use in practice.
- Although UVA radiation does not cause sunburn, it does contribute to skin aging and an increased risk of skin cancer. Many sunscreens provide broad-spectrum protection, meaning that they protect against both UVA and UVB radiation.
- Research has shown that the best protection is achieved by:
  - Application 15 to 30 minutes before exposure,
  - Followed by one reapplication 15 to 30 minutes after exposure begins.
  - Further reapplication is necessary only after activities such as swimming, sweating, and rubbing. This varies based on the indications and protection shown on the label — from as little as 80 minutes in water to a few hours, depending on the product selected.



# STAY COOL!







# HYDRATE...WE HAVE GATORADE AVAILABLE!!

