OTTAWA-CARLETON
DISTRICT SCHOOL BOARD

PROCEDURE PR.681.SCO

TITLE: EXTREME WEATHER CONDITIONS-SCHOOL PROTOCOL

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1.0 OBJECTIVE

To provide guidelines for use by school principals when weather conditions may have adverse health implications.

2.0 DEFINITIONS

In this procedure,

2.1 **Extreme Weather:** Refers to a variety of inclement weather occurrences, including; extreme high or low temperatures, lightning, hail, heavy rain, flooding, tornado/hurricane warnings, blizzards, ice storms, and any weather that could create unsafe road conditions.

2.2 **Cold Stress:** Refers to the effect on the body when it is exposed to low temperatures. This could be due to a number of variables, including; air temperature, wind speed, and wind chill. If a person is experiencing cold stress a series of health complications can develop, including; frost nip, frost bite, or hypothermia.

2.3 **Heat Stress:** Refers to an increase in the body's core temperature. This could be due to a number of variables, including; air temperature, humidity, radiant heat and the Humidex. If a person is experiencing heat stress a series of health complications can develop, including; heat rash, heat cramps, heat exhaustion, or heat stroke.

2.4 **Humidex:** Refers to the perceived temperature base on a combined measurement of air temperature and humidity.

2.5 **Wind Chill Factor**: Refers to the perceived temperature on exposed skin based on a combined measurement of air temperature and wind speed.

3.0 RESPONSIBILITY

Associate Director, Superintendents of Instruction and school principals.

4.0 PROCEDURE

4.1 Principals will make themselves aware of local weather conditions daily and will make themselves aware of the appropriate responses to extreme temperatures for each season.

4.2 Principals will familiarize themselves with this procedure and be aware of the factors that could induce heat or cold stress, specifically the risks and consequences for children. Primary and elementary students and those with special needs may be less likely to follow appropriate measures against heat or cold stress or recognize the symptoms on their own therefore principals and staff will be especially vigilant in monitoring these students.

4.3 Principals will educate teachers, staff and students through methods such as newsletters and/or announcements, on understanding appropriate practices, good habits for each season, and the symptoms of heat and cold stress and assist them in seeking medical attention if they suffer, or notice someone else suffering, from such symptoms.

4.4 Principals will use their discretion to determine if weather conditions at the school site conflict with maintaining a safe outdoor learning environment (e.g. recess, lunch, or class related activities) by consulting one or more of the following: the website of Environment Canada and/or the City of Ottawa, the immediate local weather conditions and Appendix A and B of this procedure.

4.5 Parents/guardians will be encouraged to make themselves aware of the dangers of extreme weather and take appropriate precautions to prepare for any extreme weather conditions that could occur during the school day or in the outdoor learning environment. Preparations include but are not limited to:

a) In cold weather ensuring children wear hats, mittens, insulated jackets and pants and proper footwear.

b) In warm weather ensuring children wear sunscreen, light weight and light coloured clothing and hats, visors and sunglasses and encourage them to keep hydrated.

<u>Extreme Heat Procedures:</u>

4.6 The OCDSB recognizes Ottawa Public Health as the Heat Action Plan authority that includes monitoring the weather forecasts for heat and smog then notifying service providers including school boards when heat thresholds are met, and offering protective and proactive advice on how to deal with these summer conditions. The smog and heat thresholds are:

a) **Smog Advisory** (based on air quality index (AQI) of > 50);

b) **Heat Alert** (Humidex of 36 or more for at least two consecutive days);

c) **Heat Warning** (Humidex of 40 or more for at least two consecutive days); and

d) **Heat Emergency** (Humidex of 45 or more or situational factors)

4.7 When Ottawa Public Health issues an alert to the OCDSB, this information will be forwarded to schools by the School Operations division. On days where schools receive

the Ottawa Public Health **Heat Warning (Humidex of 40 or more for two consecutive days)** or **Heat Emergency (Humidex of 45 or more or situational factors)**, principals are encouraged to keep students indoors for recess, lunch or class-based activities.

4.8 During the times of year where the possibility of heat stress may occur, Principals and supervisory staff will encourage students to:

a) wear hats and sunscreen when outdoors;

b) drink fluids at frequent intervals, especially immediately before and after time outdoors; and

c) keep water at each of their desks so they can keep hydrated;

4.9 To keep classrooms and schools cool, the Principal and teachers are encouraged to keep lights and computers turned off (when possible), use fans in classrooms (where available), keep open doors and windows, if there are air conditioned areas in the school, such as the library and if possible, rotate groups of students into those rooms throughout the day.

Extreme Cold Procedures:

4.10 Ottawa Public Health issues a cold weather alert notifying service providers, including school boards, when the wind chill thresholds are met, and offering protective and proactive advice on how to deal with these winter conditions. The wind chill thresholds are:

a) **Cold Weather Caution** is in effect when Environment Canada forecasts a wind chill of -15oC or colder.

b) **Frostbite Alert** is in effect when Environment Canada forecasts a wind chill of -25 or colder.

c) **Frostbite Warning** is in effect when Environment Canada forecasts a wind chill of -35 or colder.

4.11 When Ottawa Public Health issues a cold weather alert to the OCDSB, this information will be forwarded to schools by the School Operations division. On days where schools receive the Ottawa Public Health **Frostbite Alert (Wind chill of -25 or colder)** or **Frostbite Warning (Wind chill of -35 or colder)**, principals are encouraged to keep students indoors for recess, lunch or class-based activities.

4.12 During the times of year where the possibility of cold stress may occur, Principals will:

a) encourage students to wear multiple layers when spending time outdoors;

b) encourage students to wear appropriate winter clothing such as, hats, gloves, and scarves, and ensure they are stored in a way that keeps them as dry as possible;

c) monitor the preparedness of students and keep those who do not have adequate clothing for the weather indoors;

d) meet with bus drivers to create a plan for those students who wait outdoors for the bus, possibly designating a place for them to wait indoors.

4.13 In the event that students are kept inside due to extreme weather conditions when they would otherwise be outdoors, Principals will create a plan for indoor activities that are comparable to the physical activity they would receive outdoors, whenever possible.

School Closures:

4.14 School closures do not commonly occur during extreme weather conditions however in the instance that a school closure is necessary (e.g.: in an extended electrical power failure, heating system or air conditioning failure, etc), the Board Procedure PR.506.SCO: Emergency School Evacuations/School Closings will apply.

Transportation and Inclement Weather:

4.15 Transportation falls within the responsibility of the Ottawa Student Transportation Authority (OSTA) and the decision to cancel transportation services during extreme weather conditions is decided by OSTA. For transportation cancellation information please refer to the OSTA website: http://www.ottawaschoolbus.ca/

5.0 APPENDICES

Attachment A - Hot Weather Guidelines
Attachment B – UV index
Attachment C - Cold Weather Guidelines
Attachment D-Wind Chill Hazards

6.0 REFERENCE DOCUMENTS

Board Policy P.058.HR: Health and Safety
Board Procedure PR.506.SCO: Emergency School Evacuations/School Closings Board Procedure PR.581.HR: Healthy and Safety: Extreme Weather Conditions Ottawa Student Transportation Authority: http://www.ottawaschoolbus.ca/
Environment Canada website: www.weatheroffice.ec.gc.ca
Heath and Safety Guidelines – Heat Stress (May 2010) Ministry of Labour, www.labour.gov.on.ca/english/hs/pdf/gl_heat.pdf

HOT WEATHER GUIDELINES

Hot weather is so welcome after a Canadian winter. With this change in seasons, however, comes a whole new set of challenges while you're outdoors: sunburns, sunstroke, heat stress, heat cramps, and heat exhaustion. Take note!

What is the Humidex?

If you listen to the radio in the morning, you're likely to hear the expected Humidex or UV index for the day. What does it all mean?

The Humidex is an equivalent temperature, and is used to express the combined effects of warm temperatures and humidity. It's a measure of how hot we feel. The relation between Humidex and comfort is subjective and varies widely between individuals. Environment Canada provides the following guide in Table 1 below as a measure of discomfort relating to the Humidex value.

Table 1: Degrees of Comfort based on Humidex

Humidex Range	**Degrees of Comfort**
20 – 29 C	Comfortable
30 – 39 C	Some discomfort
40 - 45 C	Great discomfort; avoid exertion
Above 45 C	Dangerous
Above 54 C	Heat stroke imminent

Why is humidity important?

The body produces sweat in hot weather, which evaporates to cool the body. This mechanism helps the body maintain a constant temperature of 37ºC. When the relative humidity approaches 90 %, the sweat can no longer evaporate. The body temperature will then rise, possibly causing illness.

Additional information on Humidex can be found at the Canadian Centre for Occupational Health and Safety website at http://www.ccohs.ca/oshanswers/phys_agents/humidex.html .

HEAT STRESS

(Taken from Heath and Safety Guidelines – Heat Stress (May 2010) Ministry of Labour, www.labour.gov.on.ca/english/hs/pdf/gl_heat.pdf **.**

What is Heat Stress?

Working or playing where it is hot puts stress on your body's cooling system. When heat is combined with other stresses such as hard physical work, loss of fluids, fatigue or some medical conditions, it may lead to heat-related illness, disability and even death.

This can happen to anybody – even the young and fit. In Ontario, heat stress is usually a concern during the summer. This is especially true early in the season, when people are not used to the heat.

Heat exposure may occur in many workplaces. Significant sources of heat can be found in workplaces such as foundries, smelters, chemical plants, bakeries and commercial kitchens. For outdoor workers, direct sunlight is usually the main source of heat. In mines, geothermal gradients and equipment contribute to heat exposure. Humidity in workplaces also contributes to heat stress.

How We Cope With Heat

Your body is always generating heat and passing it to the environment. The harder your body is working, the more heat it has to lose. When the environment is hot or humid or has a source of radiant heat (for example, a furnace or the sun), your body must work harder to get rid of its heat.

If the air is moving (for example, from fans) and it is cooler than your body, it is easier for your body to pass heat to the environment.

Workers on medication or with pre-existing medical conditions may be more susceptible to heat stress as some medication may impair the body's response to heat. These workers should speak to their personal physicians about work in hot environments.

UV INDEX

The following information is taken from Environment Canada's website at

http://www.ec.gc.ca/uv/default.asp?lang=En&xml=DCF1C20A-B3E1-4751-8B8F-EB670888D0AE

Environment Canada developed the UV Index to inform Canadians about the strength of the sun's UV (ultraviolet) rays. UV rays can cause sunburns, eye cataracts, skin aging and skin cancer. The higher the UV Index number, the stronger the sun's rays, and the greater the need to take precautions. The table below outlines the sun protection actions recommended at different levels of the UV Index.

UV Index Sun Protection		
UV Index	**Description**	**Sun Protection Actions**
0 - 2	Low	Minimal sun protection required for normal activity. Wear sunglasses on bright days. If outside for more than one hour, cover up and use sunscreen. Reflection off snow can nearly double UV strength, so wear sunglasses and apply sunscreen on your face.
3 - 5	Moderate	Take precaution by covering up, and wearing a hat, sunglasses and sunscreen, especially if you will be outside for 30 minutes or more. Look for shade near midday when the sun is strongest.
6 - 7	High	Protection required - UV damages the skin and can cause sunburn. Reduce time in the sun between 11 a.m. and 4 p.m. and take full precaution by seeking shade, covering up exposed skin, wearing a hat and sunglasses, and applying sunscreen.
8 - 10	Very High	Extra precaution required - unprotected skin will be damaged and can burn quickly. Avoid the sun between 11 a.m. and 4 p.m. and seek shade, cover up, and wear a hat, sunglasses and sunscreen.
11+	Extreme	Values of 11 or more are very rare in Canada. However, the UV Index can reach 14 or higher in the tropics and southern U.S. Take full precaution. Unprotected skin will be damaged and can burn in minutes. Avoid the sun between 11 a.m. and 4 p.m., cover up, and Wear a hat, sunglasses and sunscreen. Don't forget that white sand and other bright surfaces reflect UV and

Sun Protection Tips

The amount of UV you receive depends on both the strength of the sun's rays (measured by the UV Index) and the amount of time you spend in the sun. Reduce your time in the sun – seek shade, particularly between 11:00 a.m. and 4:00 p.m. from April to September

Cover up, wear a broad-brimmed hat, a shirt with long sleeves and wrap-around sunglasses or ones with side shields

Use sunscreen – with a sun protection factor (SPF) of 15 or higher, with both UVA and UVB protection. Apply generously before going outside, and reapply often, especially after swimming or exercise

Listen for Environment Canada's UV Index – it's included in your local weather forecast whenever it is forecast to reach 3 (moderate) or more that day

Environment Canada has a one page poster with the above information, available at:
www.ec.gc.ca/Publications/9C0A3543-2DB7-4673-905D-0541E9622C68%5CUVIndex.pdf

COLD WEATHER GUIDELINES

What does wind chill mean?

There's no doubt about it - wind does indeed have an effect on the temperature. If you've ever waited for a bus on a cold day, you know that a strong wind makes you feel much colder than the actual temperature on the thermometer. The wind chill represents how the temperature would feel on your skin if the wind were equivalent to 4.8 km/h, an average walking pace.

Wind Chill Index

A new Wind Chill Formula was developed in 2001. The new index is based on the loss of heat from the face, the part of the body that is most exposed to severe winter weather. The wind chill index is expressed in temperature-like units, without the degree sign because it is not the actual temperature. For example: the outdoor temperature may be –22ºC, but the wind chill is –30º*C*. The temperature remains at –22ºC, however, your face will feel as cold as it would on a calm day when the temperature is –30ºC.

The higher the values of the wind chill indexes, the greater the need for precaution with respect to outdoor activity. Environment Canada has developed a chart that explains what wind chill means in terms of dress and activity.

In Ontario, the wind chill warning levels vary with geographic location: -35ºC is the warning level for outdoor activity for people who live in the more southern areas of Ontario. The chart below shows that even though the temperature on the thermometer may stay the same, increasing the wind speed causes the wind chill factor to increase. The shaded areas indicate under which conditions the wind chill reaches - 35ºC or lower.

Table 1: Wind Chill Calculation Chart,
T air = Air temperature in °C and V_{10} = Observed wind speed at 10m elevation, in km/h.

T air / V_{10}	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57	-64	-70
30	0	-7	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-70	-76
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66	-73	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

Approximate Thresholds:

Risk of frostbite in prolonged exposure: wind chill below	-25	
Frostbite possible in 10 minutes at	-35	War skin suddenly exposed. Shorter time if skin is cool at the start.
Frostbite prossible in less than 2 minutes at	-60	Warm skin suddenly exposed. Shorter time is skin is cool at the start.

Wind Chill Hazards

Environment Canada has developed the Wind Chill Hazards chart that explains what wind chill means in terms of health concern, dress and activity. The chart provides a range of wind chill values and describes the precautions an individual should take at each level. Wind chill values are easy to understand. The higher the wind chill indexes the greater the need for precaution with respect to outdoor activity.

Check the wind chill before you go outdoors in the winter, and make sure you are well prepared for the weather. Even moderate wind chills can be dangerous if you are outside for long periods.

Table 2: Wind-chill Hazards and Prevention

Wind Chill (*ºC*)	**Description**	**Health Concern**	**What to do**
0 to -10	Low	Slight increase in discomfort	Dress warmly, with the outside temperature in mind.
-10 to -25	Moderate	Uncomfortable Exposed skin feels cold Risk of hypothermia if outside for long periods without adequate protection	Dress in layers or warm clothing, with an outer layer that is wind-resistant. Wear a hat, mittens and scarf. Keep active.
-25 to -45	Cold	Risk of skin freezing (frostbite) Check face and extremities (fingers, toes, ears and nose) for numbness or whiteness Risk of hypothermia if outside for long periods without adequate protection	Dress in layers of warm clothing, with an outer layer that is wind-resistant. Cover all exposed skin, particularly your face and hands. Wear a hat, mittens and a scarf, neck tube or face mask. Avoid exposing the skin directly to
WARNIN G LEVEL* **-45 to -59**	Extreme	Exposed skin may freeze in minutes Check face and extremities frequently for numbness or whiteness (frostbite) Serious risk of hypothermia if outside for long periods	Be careful. Dress very warmly in layers of clothing, with an outer layer that is wind- resistant. Cover all exposed skin, particularly your face and hands. Wear a hat, mittens and a scarf, neck tube or face mask. Limit outdoor activities to short periods. Be ready to cut short or cancel outdoor activities.
60 and colder	Extreme	DANGER! Outdoor conditions are hazardous Exposed skin may freeze in less than two minutes	Stay indoors.

*****In parts of the country with a milder climate (such as southern Ontario and the Atlantic provinces except

Labrador), a wind chill warning is issued at -35^{o}C. Further North, people have grown more accustomed to the cold, and have adapted to the more severe conditions.

Because of this, Environment Canada issues warnings at progressively colder wind chill values as you move north. Most of Canada hears a warning at about -45^{o}C. Residents of the Arctic, northern Manitoba and northern Quebec are warned at about -50^{o}C, and those of the high Arctic, at about -55^{o}C.

Cold Weather Conditions

Low temperatures, especially combined with strong winds, can lead to frost nip and frostbite and in extreme cases, hypothermia.

Frost nip is a relatively minor reaction to the cold. It happens when ice crystals form under the skin. It is usually not painful and is easy to treat.

Signs and symptoms: coldness in extremities: cheeks, nose, ears, fingers, toes, hands and feet. Treatment**:** rub area or blow air onto it.

Frostbite happens when soft tissue freezes. It is a particular danger on days with a high wind-chill factor. If not properly treated, frostbite can lead to the loss of tissues or even limbs.

Signs and symptoms**: swelling** and redness at first, tingling and burning of extremities, numbness or partial paralysis, waxy white skin as frostbite progresses, skin may feel hard.

Treatment**:** put frozen area in warm (not hot) water for 30 minutes; if no water available, hold between two warm hands (do not rub). After area is warm, bandage it and keep it raised. Do not use a hot water bottle or put area near hot stove. Seek medical help in all but most mild cases.

Hypothermia is the most severe form of cold-related injury. It is define as a body temperature of less than 35°C or 95°F. Hypothermia is a major danger because the symptoms come on so gradually that many victims and their co-workers don't notice them until it's too late. While generally not a concern in daily activities, knowledge of signs and symptoms and treatment may be important during prolonged outdoor work or winter excursions or field trips.

Signs and symptoms**:** body temperature of less than 35°C (95°F), drowsiness, slurred speech, irritability and combativeness, impaired coordination, weakness and lethargy and cool skin.

Treatment**:** remove victim from the source of cold and shelter from old and wind; replace wet clothes with dry ones immediately; warm the person with reflected heat from a stove or campfire; wrap victim in blankets and huddle under them with victim; cover head; give warm, sweet, non-alcoholic drinks if victim is conscious; look for signs that you should start artificial respiration and CPR; don't use direct heat, electric blankets, or hot water bottles; don't massage skin; don't give drugs, alcohol, or tobacco; don't walk victim around; don't assume victim is dead, even if you can't detect breathing or a pulse - start CPR; seek medical care immediately.

Wind chill - Minutes to Frostbite

Table 3: Minutes to frostbite for the 5% most susceptible segment of the population

Temperature (°C) Wind (km/h)	-15	-20	-25	-30	-35	-40	-45	-50
10	*	*	22	15	11	8	7	6
20	*	*	14	10	7	6	5	4
30	*	18	11	8	6	4	4	3
40	42	14	9	6	5	4	3	2
50	27	12	8	5	4	3	2	2
60	22	10	7	5	3	3	2	2
70	18	9	6	4	3	2	2	2
80	16	8	5	4	3	2	2	1

Legend:

*** = Frostbite unlikely**

Frostbite possible in 2 minutes or less

Frostbite possible in 3 to 5 minutes

Frostbite possible in 6 to 10 minutes

The wind speed, in km/h, is at the standard anemometer height of 10 metres (as reported in weather observations).

Equation to approximate minutes to frostbite valid for times of less than 15 minutes

$$t_f = \{ (-24.5 \bullet [(0.667 \bullet V_{10}) + 4.8]) + 2111 \} \bullet (-4.8 - T_{air})^{-1.668}$$

where:

t_f = time to frostbite, in minutes, for the 5% most susceptible segment of the population

V_{10} = Wind speed, in km/h, at the standard anemometer height of 10 metres

(as reported in weather observations)

T_{air} = Actual air temperature in °C