TENJAM

Comfortable Year-Round

A facility planner's guide to making outdoor learning spaces comfortable in hot, humid, cold, and four-season climates, with ideas that use little or no energy.



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Why Comfort Decides Everything

A space gets used when it is comfortable. Teachers decide in about thirty seconds, standing at the door, whether today is an outdoor day. If the answer is no too often, the space becomes a place nobody goes.

The research behind outdoor learning is laid out in Tenjam's white paper, *The Case for Outdoor Learning*, and the buying side is covered in *Six Questions to Ask Before You Buy Furniture for Outdoor Learning Spaces*. This guide covers what comes between them: how to make the space comfortable enough to use often.

Facility planners ask the same question in every climate. *Does this mean we can only go outside on the few nice days?* The answer is no. You cannot change the weather, but you can change most of what makes weather uncomfortable. Sun, wind, surfaces, airflow, and how long people stay out are all design choices. A few of them, chosen well, can double the number of days and hours a space works.

This guide is built for choosing. Each climate section lists many ideas, sorted from free to larger investments, with a note on how much power each one needs. Pick the ones that fit your campus, budget, and maintenance team. Then start with a pilot, not a build. Every campus is different, so treat this guide as a menu of ideas to bring to your local architecture and design firm, not as a substitute for one.

> **84%**
>
> **reduction in solar radiation exposure from shade alone, measured directly on children in a Texas schoolyard**
>
> *Vanos, McKercher, Naughton, & Lochbaum, Photochemistry and Photobiology, 2017*

How Outdoor Comfort Works

Four things decide whether a person feels comfortable outside. Air temperature is the one you cannot control. The other three are where the design work happens.

Sun

Sun is the biggest swing factor. In summer it is the enemy, and in winter it is the free heater. A study of 1,284 people on Arizona State University's Tempe campus found that shade improved thermal comfort in every season except winter, when people wanted the sun (Middel et al., 2016). Air temperature differed by only a couple of degrees between sun and shade in the same research program, while a comfort index called PET, which captures how the body feels, differed by about 20 degrees between sun and shade in summer (ASU News, 2016). The sun is felt as radiant heat, not as air temperature.

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Wind

Wind strips heat from the body. The table below uses the National Weather Service wind chill formula to show how a cool day changes with wind. It applies to exposed skin at 50°F and below.

Air temp	5 mph	10 mph	15 mph	20 mph
50°F	48°F	46°F	45°F	44°F
45°F	42°F	40°F	38°F	37°F
40°F	36°F	34°F	32°F	30°F
35°F	31°F	27°F	25°F	24°F

Feels-like temperature, computed from the NWS wind chill formula.

Read the 45°F row. A 15 mph wind takes a 45°F day down to a feels-like 38°F. Cut that wind to a light breeze with a windbreak and the same day feels like roughly 42°F. That is a real gain, though a modest one by itself. Add sun and insulated seating and the day becomes workable.

Humidity and airflow

In heat, the body cools by sweating, and sweat only works if it can evaporate. Dry air lets it evaporate easily. Humid air does not. That is why misting works in Phoenix and does not work well in Orlando, and why moving air matters so much in humid places. The ASHRAE 55 comfort standard includes a method for crediting the cooling effect of air movement (ACHR News, 2010).

Contact, clothing, and time

What people sit on, what they wear, and how long they stay all shift comfort. Sitting still on a cold surface pulls heat from the body quickly. Wet clothing and wet seats are the main reason damp cold feels worse than dry cold, because water carries heat away from the body far faster than air does. Time matters most of all. Practitioners who run winter programs in Minnesota report that the key strategy is to start with small steps and extend gradually (Johnson, 2025).

Step One: Find the Best Spot on Your Campus

Before you buy anything, choose where the space goes. The right spot does most of the comfort work for free, in every climate. A mediocre spot can cost thousands to fix.

Walk the site three times a day

Visit at arrival, midday, and dismissal. Note where the shade falls, where the wind hits, and where the sun lands. Repeat in a second season if you can. If you cannot, use the sun rules below.

Test the wind

Tie a strip of ribbon to a pole at head height and watch it. Look at which way trees lean, how flags fly, and where leaves and litter pile up. Wind direction differs by site, so general regional wind data can miss the mark. In much of the U.S., winter wind comes from the west or northwest, and summer breezes in

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the Southeast come from the south or southwest, but your campus may differ. Airport weather stations publish wind rose charts for your area.

Use the sun rules

In the Northern Hemisphere, these hold on most campuses:

- **North side of a building:** shaded most of the day in summer, cold and shadowed in winter. Good for heat, poor for cold.
- **East side:** gets morning sun and is shaded by the building in the afternoon. A strong summer choice.
- **West side:** shaded in the morning, then takes the hottest afternoon sun. Needs added shade in summer.
- **South side:** gets the low winter sun all day. With a roof overhang, it can be shaded in summer. The best winter spot.

Avoid wind tunnels

Building corners, gaps between buildings, and narrow breezeways speed wind up. The lee side of a building, out of the main wind, slows it down. Avoid the first and use the second.

Watch for low spots

Low areas can collect cold air on still, clear nights and hold water after rain. Higher, well-drained ground stays drier and often warmer.

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Score your candidates

Pick three or four possible spots, then score each one. Zero means it fails, one means it is acceptable, and two means it is strong.

Look for	Why it matters	Hot season / cold season
Shade from buildings or trees at class time	Cuts radiant heat, the biggest summer load	Strong in summer; in winter you want sun, so check for deciduous trees
Winter sun access	Free heat on cool days	A south or southeast exposure scores high
Wind exposure	Wind cools you in winter and can be welcome in summer	Block it in winter; open to breeze in humid summer
Surface underfoot	Grass, mulch, and planted beds stay cooler than asphalt, concrete, and rubber	Matters most in summer
Drainage	Wet ground and standing water end outdoor days	Matters in rain and thaw
Distance to indoors	Short sessions need a quick retreat, and restrooms and water matter	Matters most in extreme weather
Sightlines and access	Staff can see students; wheelchairs and mobility aids can reach it	Always

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Know Your Climate Type

Comfort problems differ by climate, so the best ideas differ too. This guide uses five playbooks. Find yours below, and if you live in a four-season climate, read two of them.

Playbook	Example places	Main comfort problem	Biggest levers
Hot-dry	Phoenix, Las Vegas, Albuquerque, inland California	Intense sun, very high surface temperatures	Shade, surfaces, timing, misting
Hot-humid	Orlando, Houston, New Orleans, Miami, Tampa	Heat plus humid air that blocks sweat from evaporating	Shade, airflow, timing, covered rain protection
Cold-dry	Minneapolis, Denver, Salt Lake City, the Dakotas, Montana	Wind, cold surfaces, short days	Winter sun, windbreaks, insulated seating, short sessions
Cold-wet	Seattle, Portland, Great Lakes snowbelt, New England	Rain, wet snow, mud, gray skies	Overhead cover, drainage, gear, daylight
Four-season	Atlanta, Charlotte, Nashville, St. Louis, Washington DC	Humid summers and cool winters	Deciduous trees, a summer plan and a winter plan

Does humid cold exist?

Yes, with a caveat. Cold air holds very little moisture, so winter air is rarely humid the way a Florida summer is. What differs between cold climates is wetness: rain, wet snow, fog, overcast skies, and damp ground. In the Pacific Northwest, the Great Lakes snowbelt, and New England, the challenge is staying dry and keeping light, not dry air. This guide calls that cold-wet. Cold-dry places, such as Minnesota on a clear day or the Mountain West, have sun and wind as the main variables.

Many climates mix two problems. Atlanta has hot-humid summers and cool, sunny-to-gray winters. Look at the four-season playbook and the Atlanta worked example for how to combine them.

Playbook 1: Hot-Dry (Phoenix, Las Vegas, Albuquerque)

In hot-dry climates, the sun is the problem and shade is the answer. Dry air also means evaporation works well, which makes misting and wetted surfaces effective. The biggest opportunity is that most schoolyards are not yet designed for the heat they already have. In a study of five Phoenix elementary schoolyards, only 18 to 28 percent had any shade (Poulos & Vanos, 2025).

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18–28%

of Phoenix schoolyards studied had any shade at all, against a national average of roughly 30 percent

Poulos & Vanos, 2025

Start free: choose and schedule

- **Pick north or east exposures.** These are shaded by the building in the afternoon. *(No power)*
- **Map building shadows at class time.** A wall that shades a patio at 10 a.m. may not at 1 p.m. Choose for the hours you will use. *(No power)*
- **Use existing tree canopy.** An existing tree is the cheapest shade you will ever buy. *(No power)*
- **Schedule the first part of the day.** Surfaces have not yet absorbed heat and the air is still cool. *(No power)*
- **Set a heat trigger.** Use your district's existing heat index or WBGT trigger as the line for moving indoors. Georgia's athletic policy, for example, stops outdoor workouts above a WBGT of 92°F. *(No power)*
- **Choose surfaces carefully.** Asphalt, concrete, and rubber surfacing hold heat for hours after the sun moves. Grass, wood chips, and planted beds do not (Green Schoolyards America). *(No power)*
- **Check with a thermometer.** An inexpensive infrared thermometer shows which surfaces and seats are too hot to touch. *(Low power)*
- **Build in water.** Place hydration stations close, and make drinking part of the lesson routine. *(No power)*

Low cost: add and adjust

- **Shade sails.** Hang them high, overlap them, and leave air gaps between the sails and nearby walls so hot air can escape. Breathable shade cloth passes heat through. *(No power)*
- **Portable canopies and umbrellas.** Useful for pilots. Check wind ratings and anchor them. *(No power)*
- **Light-colored surfaces and furniture.** Light colors absorb less sun. *(No power)*
- **Misters on timers.** A study of misters in Tempe found they improved comfort at every site and in every condition, and that misting plus shade gave the largest improvement of all (Vanos et al., 2022). *(Low power)*
- **Cooling stations.** Cold towels, water, and a shaded bench give students somewhere to reset. *(No power)*
- **Trellis with native, low-water vines.** Vines on a west-facing trellis shade a wall and a seating zone. *(No power)*
- **Plant shade trees now.** Young trees take time. Pair them with shade sails while they grow. The Department of Energy notes that slow-growing trees can take up to 10 years to shade a roof. *(No power)*

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- **Windscreens for dust.** Desert wind carries dust and grit. A light screen on the windward side helps. *(No power)*

Invest: build and install

- **Permanent shade structures.** Make them tall for airflow. Run the long axis east to west so the roof blocks the high sun, and add side shade on the west. *(No power)*
- **Double-skin or insulated roofs.** An air gap between roof layers keeps heat from radiating onto people below. *(No power)*
- **Misting under shade.** Use low-flow nozzles and a sensor that shuts the system off in high humidity or high wind. *(Moderate power for the pump)*
- **Fans under shade.** Moving air boosts the cooling of misting and the cooling of sweat. *(Low power)*
- **Lighter paving around the space.** Replace the closest asphalt with lighter or permeable surfaces. The EPA notes that shaded surfaces can be 20 to 45°F cooler than the peak temperature of unshaded ones. *(No power)*
- **A campus tree program.** Phoenix's Canopy for Kids program plants 10 to 50 native shade trees per school, with water-harvesting rain gardens. *(No power)*

Low-energy power options

- A small solar panel can run a DC fan with no grid connection.
- Timers and temperature or humidity sensors keep misters and fans from running when they do not help.
- Passive choices (placement, shade, surfaces, planting) need no power at all and should come first.

Watch outs

- Misting uses water, and some areas restrict it. Check local rules.
- Misting systems need clean water and regular cleaning. Follow manufacturer and public-health guidance on water quality and filtration.
- Hard water leaves mineral deposits on nozzles and furniture.
- Monsoon winds can lift shade structures. Have them engineered to local wind loads.
- Bare metal seats and tables can burn skin in the sun. Check surface temperatures before use.

Playbook 2: Hot-Humid (Orlando, Houston, New Orleans)

Humid heat is a different problem. Sweat cannot evaporate well, so shade alone feels sticky and misting adds to the discomfort. Airflow, shade with ventilation, timing, and protection from sudden rain do the work. Orlando shows the scale of the issue and the response: 97 percent of its public school students attend school in an extreme urban heat zone (Climate Central, 2025), and Orange County Public Schools has installed playground sunshades at more than 100 elementary schools, with about a dozen to go. At Hamlin Elementary, the principal pairs sunshades with fans, hydration stations, and tinted windows, and says recess may need to move earlier as temperatures rise.

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97%

of Orlando public school students attend school in an extreme urban heat zone, third-highest of 65 cities studied

Climate Central, 2025

Start free: choose and schedule

- **Choose a spot that gets breeze.** Face the open side toward the prevailing summer wind, and avoid closed courtyards where air stagnates. *(No power)*
- **Pick shade with raised canopies.** Trees with high crowns shade the ground while letting air pass underneath. *(No power)*
- **Use the morning.** Late morning to afternoon is the hardest stretch. *(No power)*
- **Watch the dew point, not just the temperature.** Dew point tells you how much your sweat can evaporate. A high dew point makes the same air temperature feel much worse. *(No power)*
- **Plan around afternoon storms.** Where pop-up storms arrive in the afternoon, put outdoor blocks in the morning. *(No power)*
- **Set a heat trigger.** Use your district's heat index or WBGT line. *(No power)*
- **Choose furniture that dries fast.** Wet seats and cushions that stay damp stop students from using the space. *(No power)*
- **Build shade breaks into the schedule.** Short blocks with a rest in shade keep the space usable longer. *(No power)*

Low cost: add and adjust

- **Shade sails with generous gaps.** Keep them high, and do not seal them tight to buildings. Trapped hot air is worse than no shade. *(No power)*
- **Outdoor-rated fans.** Use damp- or wet-location rated fans, clamped or mounted overhead. Do not use indoor fans outdoors. *(Low power)*
- **Plant trees with high canopies.** Shrubs under them should stay low so air moves. *(No power)*
- **Trellis vines on a west wall.** Add an air gap between plants and the wall. *(No power)*
- **Cooling stations.** Cold water, cool towels, and a place to sit in shade. *(No power)*
- **Roof overhang or canopy for rain.** If a downpour does not cancel the lesson, the space gets used more. *(No power)*
- **Hydration stations.** Place them near the space. *(No power)*
- **A cool-down room.** Pick a nearby indoor space for rotations. This costs nothing and you cannot dehumidify outdoors. *(No power)*

Invest: build and install

- **Open-sided pavilion with a high roof.** Eaves ten feet or higher, and a vented ridge, let hot air rise out. *(No power)*
- **Ceiling fans under the pavilion.** Large, slow fans move a lot of air for little power. *(Low power)*

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- **High-volume low-speed fans.** These move large volumes of air across a big area and suit larger pavilions. Compare watts at the speed you will really use. *(Moderate power)*
- **Cool or reflective roofs on structures.** Lighter roofs absorb less sun. *(No power)*
- **Covered walkways from the building.** Shaded transitions keep the walk from being the hottest part of the day. *(No power)*
- **Planting and bioswales.** Evapotranspiration, alone or with shade, can lower peak summer temperatures by about 2 to 9°F (EPA). *(No power)*
- **A lightning shelter plan.** An open pavilion is not lightning-safe. Know your nearest building and your trigger. *(No power)*

Low-energy power options

- Efficient DC-motor fans are among the lowest-energy ways to add comfort. Compare watts at the speed you will use.
- A solar panel and small battery can power fans on a pavilion with no grid connection.
- Timers and occupancy sensors keep fans off when nobody is there.

Watch outs

- Misting in humid air adds stickiness and gives little cooling. Put money into shade and airflow first.
- Enclosed shade traps hot, wet air. Keep sides open.
- Shaded surfaces can grow mold and algae. Choose materials that tolerate pressure washing.
- Standing water breeds mosquitoes. Check drainage.
- In hurricane regions, take down shade sails before storms and engineer permanent structures to local wind codes.

Playbook 3: Cold-Dry (Minnesota, Denver, the Mountain West)

In cold-dry climates, the sun is your heater and wind is your enemy. Clear days can be pleasant in the sun and harsh in the shade. Minnesota practitioners already show what works. A 2025 University of Minnesota Duluth study of nature-based preschool practitioners in Minnesota and Norway found that both groups use the same approach: start with small steps and build up gradually (Johnson, 2025). One Minnesota practitioner called cold-weather play "a part of being in Minnesota" (Johnson & Ernst, 2025).

Start free: choose and schedule

- **Choose a south or southeast exposure.** A wall behind you that faces the sun is a heater. *(No power)*
- **Sit on the lee side of a building.** Out of the main wind, the same day feels several degrees warmer. *(No power)*
- **Avoid building corners and gaps.** They speed up wind. *(No power)*
- **Schedule the sunny window.** Late morning to early afternoon is usually the warmest stretch. *(No power)*

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- **Run short blocks.** Ten to twenty minutes, paired with a nearby indoor space, is the usual pattern. *(No power)*
- **Move.** Active lessons keep bodies warm. Sitting still is what makes cold feel worse. *(No power)*
- **Use wind chill as the trigger.** Set cutoffs by wind chill, not air temperature alone, and align them with your district's cold-weather policy. *(No power)*
- **Build up gradually.** Start with a few minutes on mild days and extend. *(No power)*

Low cost: add and adjust

- **Insulated, off-the-ground seating.** Avoid bare metal. Sitting on a cold surface pulls heat out quickly. *(No power)*
- **Seat pads.** Closed-cell foam pads are cheap and carry easily. *(No power)*
- **A gear closet.** Winter-ready handbooks from the Minnesota research include sample gear lists and a gear lending check-out system. Spare mittens, hats, and boots remove the main barrier for many families. *(No power)*
- **Temporary windbreaks.** Hay bales, snow fence, or portable panels. A fence with openings about half open works well. *(No power)*
- **Hand warmers and a warm drink station.** Small comforts, big effect on attitude. *(No power)*
- **Light-colored walls.** A light wall on the sunny side reflects sun into the nook. *(No power)*
- **Keep surfaces clear.** Shovel and treat paths and seating zones. *(No power)*
- **Dress guidance for families.** Send a short gear list at the start of winter. *(No power)*

Invest: build and install

- **A permanent windbreak.** Dense evergreen rows on the north and northwest sides form the most common windbreak (DOE). A windbreak that is about 40 to 60 percent dense gives the greatest downwind protection (Brandle et al.).
- **A sun-trap shelter.** Three sides closed, open to the south, with clear panels that let the sun in. *(No power)*
- **Retractable wind panels.** Choose panels engineered to stay flexible in cold. *(No power)*
- **Deciduous trees on the south.** Bare in winter, they let sun through. *(No power)*
- **Masonry on the sunny side.** A south-facing masonry wall soaks up sun and gives off warmth after the sun moves. *(No power)*
- **Foot warmers.** UC Berkeley's Stefano Schiavon recommends personal comfort devices such as foot warmers in place of space heaters, and the Center for the Built Environment notes that warming the feet is one of the most effective ways to provide comfort. *(Low power)*
- **Electric radiant heat, as a pilot.** See the watch outs. *(Moderate power)*
- **A three-season structure.** It extends the usable window into late fall and early spring. *(No power)*

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How far does a windbreak reach?

Windbreak research from the University of Nebraska shows how wind reduction changes with distance. H is the height of the windbreak.

Windbreak type	At 5H	At 10H	At 15H	At 20H
Solid fence	75%	30%	10%	5%
Conifer rows (40–60% dense)	70%	50%	40%	25%
Deciduous (25–35% dense)	50%	35%	20%	15%
Multi-row (60–80% dense)	75%	65%	35%	15%

Percent reduction in wind speed at each distance downwind, for a 20 mph open wind (Brandle, Zhou, & Hodges, 2002).

A six-foot windbreak therefore protects best within about 30 to 60 feet downwind. Place seating inside that zone.

Low-energy power options

- Heat the person, not the air. Foot warmers draw far less power than space heating.
- Use rechargeable battery packs and timers so devices run only during class.
- Passive choices (sun, wind, insulation) come first.

Watch outs

- Snow and wind loads. Shade and wind structures must be engineered for them, or taken down for winter.
- De-icing salt corrodes untreated steel, degrades wood and fabric, and does not affect polyethylene.
- Radiant heaters need a safety review: supervision, fire code, and your district's policy. Use electric only, mount them out of reach, and put them on timers. Wind strips heat away, so put windbreaks first.
- Short days: add low-energy lighting for late-afternoon winter use.
- Ice on paths and seating zones.

Playbook 4: Cold-Wet (Seattle, Portland, Great Lakes, New England)

In cold-wet climates, the challenge is staying dry. Rain, wet snow, mud, and gray skies matter more than the thermometer. Outdoor schooling in Norway and the UK, where rain is routine, shows that wet weather does not have to end the outdoor day. Norwegian kindergartens spent an average of 31

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percent of the winter day outdoors (Moser & Martinsen, 2010), and UK Forest School programs run through wet seasons (O'Brien & Murray, 2007).

Start free: choose and schedule

- **Use existing cover.** Roof overhangs, porches, covered walkways, and building entrances. *(No power)*
- **Pick conifers.** Evergreens catch rain and break wind. *(No power)*
- **Choose high, well-drained ground.** Avoid low spots that collect water. *(No power)*
- **Treat rain as normal.** Set a clear threshold, such as heavy rain or lightning, and treat everything else as a go with the right gear. *(No power)*
- **Time blocks around showers.** Check radar before class. *(No power)*
- **Pick furniture that sheds water.** Smooth surfaces dry fast. *(No power)*
- **Add daylight where you can.** Choose open sites with sky access. *(No power)*
- **Rotate and retreat.** Pair a short outdoor block with a warm, dry return. *(No power)*

Low cost: add and adjust

- **A rain gear library.** Ponchos, rain pants, and boots in shared sizes. *(No power)*
- **A boot rack and dry-off station.** Wet clothing is what makes cold feel dangerous, so give students a place to dry. *(No power)*
- **Wood chips, gravel, or boardwalks.** Keep mud out of the space and keep wheelchair access in mind. *(No power)*
- **Tarps or sails as rain canopies.** Pitch them with a slope so water drains and does not pool. *(No power)*
- **Light-colored furniture and surfaces.** They brighten a gray day. *(No power)*
- **Windscreens.** Showers often come with wind. *(No power)*
- **Warm drink station.** *(No power)*
- **Seat pads.** *(No power)*

Invest: build and install

- **A covered pavilion with generous overhangs.** Add gutters and downspouts that drain away from seating. *(No power)*
- **Clear polycarbonate roof panels.** They keep rain off and daylight in. *(No power)*
- **An arcade along the building face.** A roofed edge makes a dry transition from the door. *(No power)*
- **Raised decks or platforms.** Dry and mud-free. *(No power)*
- **Permeable paving, swales, and rain gardens.** They move water through and away. *(No power)*
- **A three-season shelter.** Open sides, solid roof. *(No power)*
- **Low-energy lighting.** Solar-charged LEDs for short winter afternoons. *(Low power)*
- **Electric radiant heat, as a pilot.** See the watch outs. *(Moderate power)*

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Low-energy power options

- Roofs, drainage, and gear need no power and do most of the work.
- LED lighting and solar charging cover short days.

Watch outs

- Wet clothing and cold can be dangerous. Water carries heat from the body far faster than air does, so keep a dry-off plan and clear cutoffs.
- Snow load. Canopies and shelters must be engineered for it.
- Moss and algae make surfaces slippery.
- Mud blocks wheelchairs and mobility aids. Choose accessible, firm surfaces.
- Keep a lightning plan. Pavilions are not lightning shelters.

Playbook 5: Four-Season Climates (Atlanta, Charlotte, Nashville, St. Louis)

Four-season climates combine two playbooks. Summer is hot-humid. Winter is cool, often sunny, and sometimes gray and wet. The most useful single tool in this climate is the deciduous tree. In summer it shades. In winter it drops its leaves and lets the sun through (DOE, *Guide to Home Landscaping*, 2010).

The two-season plan

Season	Main challenge	Top three moves
Late spring to early fall	Heat and humidity	Shade with open sides, fans, morning blocks (Playbook 2)
Late fall to early spring	Cool air, wind, short days	Winter sun exposure, windbreak, insulated seating (Playbook 3)
Wet spells in any season	Rain and mud	Overhead cover, drainage, gear (Playbook 4)

Design for both seasons

- **Deciduous canopy on the south and west.** Summer shade, winter sun.
- **Evergreens on the north and west, not the south.** They block winter wind without blocking winter sun.
- **A roofed, open-sided structure with fans.** It serves in summer for shade and in winter as a rain shelter.
- **Seating that is insulated and dries fast.** It works in a cold morning and a wet afternoon.
- **Removable or retractable pieces.** Panels and sails you can add in winter or take down in summer.

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Worked Example: Atlanta

A facility planner in Atlanta told us their concern directly: the climate gives nice 50 to 70°F days from November through March, but that might mean outdoor learning only works on a few days. Here is how we would think about it.

What the numbers say

According to National Weather Service Atlanta-area climate summaries, normal mean temperature in Atlanta is about 45°F across December to February and about 54°F in March. Those are daily averages, so afternoons run warmer and early mornings colder. The 50 to 70°F days the planner describes are mostly afternoons. That is the window to design around.

The goal: widen the window

You do not need 60°F to hold a good outdoor lesson. With sun, shelter from wind, insulated seating, and a short block, a 45°F afternoon becomes workable. The aim is to stretch the useful range from "nice days only" toward "most sunny afternoons."

> **38°F**
>
> **what a 45°F day feels like with a 15 mph wind. A windbreak takes it back to roughly 42°F.**
>
> *Computed from the NWS wind chill formula*

A starting framework

Use thresholds like these as a starting point, then adjust to your district's policies and your teachers' experience. They are our suggested starting points, not a published standard.

Condition	What to do
About 55°F and up, sun, light wind	Normal outdoor use.
About 45 to 55°F, sunny, in a sheltered spot	Run a 20 to 30 minute block with movement, insulated seating, and a windbreak.
Below about 45°F, or windy, or wet	Short active activities near the door, or use a covered space.

What to build first

- **A south or southeast spot, sheltered from the west and northwest wind.** Look for the lee side of a building, or add a short windbreak.
- **Deciduous trees on the south and west.** They shade in summer and let the winter sun through.
- **Insulated seating.** It removes the biggest comfort penalty on a cool day.

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- **A pavilion roof with open sides.** Rain cover for winter and shade for summer.
- **Ceiling or pedestal fans under the roof.** For the humid months.
- **A pilot.** Try portable shade and a hay-bale or fence windbreak for one season before you build permanent structures.

Summer in Atlanta

Atlanta summers are hot and humid. Georgia's athletic policy (GHSA By-Law 2.67) sets a WBGT of 92°F as the line above which outdoor workouts stop, and it increases rest breaks as WBGT climbs. Borrowing the same trigger for outdoor learning gives your teachers a clear, defensible rule. Plan for morning blocks, shade with airflow, and a nearby cool-down room.

Low-Energy Picks at a Glance

Use this table to scan ideas by power needs and relative cost. Cost is relative: $ is low, $$ is moderate, $$$ is a larger capital project.

Idea	Power	Cost	Best for
Choosing a shaded or sheltered spot	None	$	Every climate
Scheduling around the weather	None	$	Every climate
Existing trees and building shade	None	$	Hot-dry, hot-humid, four-season
Shade sails with air gaps	None	$$	Hot-dry, hot-humid, four-season
Deciduous trees on the south and west	None	$	Four-season, cold-dry
Permanent pavilion with high, vented roof	None	$$$	Hot-humid, cold-wet, four-season
Light-colored surfaces and furniture	None	$	Hot-dry, hot-humid, cold-wet
Windbreaks (evergreens, fences, bales, panels)	None	$ to $$	Cold-dry, cold-wet, four-season
Insulated, off-the-ground seating	None	$ to $$	Cold-dry, cold-wet, four-season
Gear closet or rain gear library	None	$	Cold-dry, cold-wet
Solar-powered DC fans	Very low	$$	Hot-humid, hot-dry, four-season
Ceiling fans under a roof	Low	$$	Hot-humid, four-season
Misting (timers, humidity sensors)	Low to moderate	$$	Hot-dry only
Foot warmers	Low	$ to $$	Cold-dry, cold-wet
Electric radiant heat (pilot only)	Moderate	$$ to $$$	Cold climates, with safety review

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Idea	Power	Cost	Best for
High-volume low-speed fans	Moderate	$$$	Hot-humid, large pavilions

Safety, Structural, and Code Checks

Comfort features add loads and risks. Check these before you build.

- **Wind and snow loads.** Shade sails, canopies, and windbreaks need engineering for local loads, or removal before storms and in winter.
- **Anchoring.** Footings and ground anchors must suit local soil and frost depth.
- **Permits and codes.** Check with your building and fire officials before adding structures, fans, or heaters.
- **Lightning.** Open pavilions are not lightning shelters. Name a nearby building and a clear trigger.
- **Heaters.** If you pilot radiant heat, use electric only, mount out of reach, use timers, supervise, and get a fire-marshal review. Put windbreaks and insulated seating first.
- **Water systems.** Misting systems need clean water, filtration, and regular cleaning.
- **Surface temperatures.** Check seats and tables in summer sun. Bare metal and dark surfaces can burn.
- **Accessibility.** Make sure paths, surfaces, and seating work for wheelchairs and mobility aids, including in mud, snow, and ice.
- **Staff training.** The white paper's research found that teacher confidence is often the bottleneck. Give teachers a one-page weather plan.
- **Professional review.** Have a licensed architect or engineer review any permanent structure, shade sail, or heater before it goes in.

Bring in Local Architecture and Design Professionals

Local architects, landscape architects, and engineers know your climate, soils, codes, and permitting process. They can turn the ideas in this guide into a plan that fits your campus. Bring one in early, ideally before you commit to a spot or a structure.

- **Site and climate analysis.** They can study sun paths, prevailing winds, drainage, and microclimates across your whole campus, and rank the best candidate spots.
- **Shade, wind, and structure design.** They can size and engineer shade structures, windbreaks, and pavilions for local wind, snow, and seismic loads.
- **Codes, permits, and safety.** They know which approvals your district, fire marshal, and building officials will require, and they can handle submissions.
- **Accessibility and campus fit.** They can lay out paths, seating, and sightlines so the space works for every student and ties into supervision, circulation, and emergency plans.

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- **Planting and long-term care.** A landscape architect can choose native, low-water trees and plants and plan how they mature over ten years.
- **Budget and phasing.** They can price the work, phase it over several years, and help you find funding.

Many districts already have a design partner. Ask them to take on outdoor learning as part of their next project. Use the pilot below to test ideas, and let your design team shape what becomes permanent.

Start Small: A 30-Day Pilot Plan

Observe first, then build. The research and field evidence both favor a small, well-executed space over an ambitious one.

- **Week 1: Survey.** Walk three candidate spots at three times of day. Score them. Test the wind with ribbons.
- **Week 2: Set up a pilot.** Add portable shade or a temporary windbreak. Bring insulated seating or seat pads. Use what you have.
- **Week 3: Try it.** Run lessons with two or three willing teachers, on a mix of days.
- **Week 4: Measure and decide.** Ask teachers and students to rate comfort from 1 to 7, and note which days worked and why. Use the results to decide what to make permanent.

Then expand season by season: a permanent windbreak or shade structure where the pilot proved the spot, and fans or covers where ratings show a gap. For the research, see *The Case for Outdoor Learning*; for furniture, see *Six Questions to Ask Before You Buy Furniture for Outdoor Learning Spaces*.

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Peer-reviewed research is labeled as such. Government guidance, university research summaries, and practitioner materials are labeled by type.

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The classroom has never been defined by four walls.
The opportunity has always been beyond them.

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