



WICKED COOL WEATHER

STEM Preschool Teaching Unit

Ages 2.9-5 years

www.massaudubon.org/education

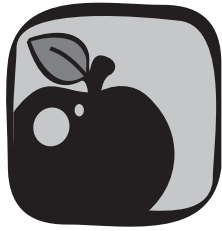
Weather. It's all around us. It affects us every day from the clothes we wear to the kinds of activities we do outside. Watching the weather—clouds, rainfall, and wintry weather gives young children the opportunity to make connections between the weather they experience and how it affects the world around them.

1. What is Weather?
2. Weather Tracking Tools
3. Weather in the World
4. Seasonal Cycles
5. Water, Water Everywhere
6. How Does the Weather Affect Plants and Animals?

Mass Audubon Philosophy on Early Education.....	1
Brain Building in Progress.....	2
The Nature of Early Childhood Science in the Outdoor Classroom.....	3
Tips for Taking Preschoolers Outdoors.....	4

Wicked Cool Weather

Teaching about Weather.....	5
Investigation Objectives.....	6
Materials.....	8
Teacher’s Corner.....	9
Preschool Interest Areas Planning Form.....	12
Investigation Summaries.....	14
INVESTIGATION 1	
What is weather?.....	15
INVESTIGATION 2	
Weather Tracking Tools.....	18
INVESTIGATION 3	
Weather in the World.....	21
INVESTIGATION 4	
Seasonal Cycles.....	24
INVESTIGATION 5	
Water, Water Everywhere.....	26
INVESTIGATION 6	
How does the weather affect plants and animals?.....	29
Resources.....	33



What we strive for

At Mass Audubon we strive to create learning experiences that are enriching, innovative, meaningful, and engaging. Our preschool programs support Massachusetts Science, Technology, and Engineering Standards. Our network of wildlife sanctuaries and nature centers located in urban, suburban, and rural communities around the state enable us to develop, evaluate, and sustain nature-based early childhood education programs in all settings. We are fully committed to creating a positive and supportive learning environment that is inclusive, open to all learners, and sensitive to cultural diversity.

Place-based learning

Place-based learning is an educational philosophy that connects learning to what is local to the learner. As children, we develop an understanding of where we are and what this place is like. It might be the child's backyard, local park, beach, forest, or meadow. By learning and understanding your own city, town, or neighborhood, as you grow you have the power and commitment to become an active part of that community.

Play-based learning

Play-based learning in nature takes advantage of a child's innate curiosity in the world around them and, like all play-based learning utilizes discovery as a motivator in learning by supporting children as they choose activities that engage and match their own interests and ideas. Teachers create learning environments that encourage play and exploration in the natural world and even step aside to let a child engage directly with the wonder of nature to guide curriculum. Nature play encourages and provides opportunities for children to construct their own surroundings, design tools and materials, develop give-and-take of social relationships, and solve problems as individuals and part of a team.

Inquiry-based learning

Inquiry-based learning is focused on teamwork, being learner centered, questioning ourselves and the world around us, providing a more focused time-intensive exploration, promoting lifelong learning, communication, and learning as fun.

Embracing the serendipity of outdoor exploration

Nature exploration is dependent upon the weather and other conditions. A class might observe different wildlife than they expected to see. An outdoor lesson can sometimes provide unexpected but enriching teachable moments on a natural history topic that was not planned. Enjoy and celebrate the learning and discovery that nature will offer your classroom.

Brain Building in Progress



Building Young Brains and a More Prosperous Future For All

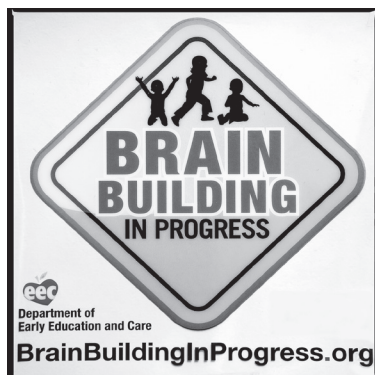
The Brain Building in Progress campaign is a public/private partnership of the Massachusetts Department of Early Education and Care, United Way of Massachusetts Bay and Merrimack Valley and a growing community of early education and child care providers, academic researchers, business leaders and individuals. Our work is based upon the latest science and research on early childhood development. Our mission is to raise awareness of the critical importance of fostering the cognitive, social and emotional development of young children by emphasizing its future impact on the economic prosperity of everyone in Massachusetts. We welcome the business, education, and policy-making communities, as well as members of the media to be part of this crucial venture. By giving a strong start to our youngest citizens, we create a stronger, more prosperous future for all.

Learn how you can take action for young minds and Massachusetts' future at www.brainbuildinginprogress.org/

The Science Behind Brain Building

When we understand the sequence and process by which brains are built, it's easy to understand why it's a smart investment to start every child out strong. Scientific research shows that early experiences directly shape how the brain develops. According to the Harvard University Center on the Developing Child, Stanford University and other leading researchers:

- In the first few years of life, 700 new neural connections are formed every second.
- Neural connections and the architecture of the developing brain are built through back-and-forth interactions with adults in enriching environments.
- Brain building is disrupted by “toxic stress,” a term that describes chronic stressful conditions rooted in causes such as poverty, neglect, or maternal depression. Toxic stress increases the likelihood of developmental delays.
- Several studies have shown that, as early as 18 months, there are notable disparities in vocabulary between children from language-rich, high interaction homes and those who are not. Recent Stanford research showed that by age two, this equals a six month gap in language processing skills and vocabulary. By increasing interaction, using richer language and child-directed talk, parents can help their child to learn more quickly.



Brain Building can happen anywhere, not just in a formal school or early education programs. Anyone can be a Brain Builder by reading with children, asking lots of open-ended questions or engaging them in play. For fun ideas about how you can turn any moment into a brain building moment, download our activity guides.

The Nature of Early Childhood Science In the Outdoor Classroom



Children have wonderful imaginations and an innate desire to explore through direct experience. Like scientists, children are continuously gaining new knowledge about the world around them through observation, inquiry, and experimentation. Often they do this by asking questions, lots of them. These questions, flowing from experience and observation, are at the heart of early childhood science. Early childhood educators can guide this natural curiosity as well as model skills and attitudes for learning. Teachers, you will have questions too, as you explore the natural world together with your students. Share your questions with children—your willingness to “not know” is actually one of the easiest and most powerful ways that you can model what it means to “practice science” in the early years.

When you are exploring the natural world, science is all around you, but where do you start with a group of young learners? Sometimes it’s best to start with their curiosity and other times you may begin your explorations with activities and tools that help to focus attention and observation. Integrating science exploration in early education can both develop future scientific understanding as well as promote essential learning attitudes and confidence. It also provides a strong foundation for critical thinking and comfort with the practice of science.

Outside the classroom door, the natural world opens up the child’s innate sense of wonder. Here’s an example from a classic:

“That’s funny,” said Pooh (standing by a picket fence). “I dropped it on the other side,” said Pooh, “and it came out on this side! I wonder if it would do it again?” And he went back for some more fir cones.” It’s likely that you recognize this passage from A.A. Milne’s *The House at Pooh Corner*. It embodies what is at the heart of practicing science in the early childhood classroom—that learners observe, question, experiment, ask questions, and inquire, through direct experience of the world around them.

Through these four units, you can jump start nature-based science learning and discovery by exploring your school yard or outdoor classroom and focusing on the things that capture children’s attention in any setting—birds, soil, trees, and weather. We encourage you to experiment with methods and activities for using the natural world to create a culture of wonder and scientific thinking in your early childhood education setting.





Ten Tips for Taking Preschoolers Outdoors

1. Start with free play. Playing outdoors, exploring textures and colors, running and jumping, designing and building are all learning activities in and of themselves.
2. Continue with short focused trips outside. A ten-minute walk can yield lots of observations. If possible, ask additional adults to come along for outdoor activities.
3. Be safe. Preview the space to be explored whenever possible. Point out dangers such as broken glass or thorny plants. Make sure everyone has appropriate clothing for the weather and think about a plan in case of emergency.
4. Encourage respect for nature. Tell children that they need to respect plants and animals just like they respect one another. Be a good role model by being gentle with leaves and insects. Before you go out, talk about whether it is okay to pick flowers or collect worms.
5. Focus on one question or phenomenon, such as, “Can you find anything green outside?” or “What sounds do you hear?” Make sure students know what they are looking and listening for before they go outside.
6. Look for things to study in unlikely places. Students can find amazing things looking at brick walls rock outcrops, lawns, broken pavement, and weeds.
7. Encourage a sense of wonder. If you don’t know the names of plants or birds, don’t worry. Just make sure students are observing and using their senses. There are plenty of field guides available if students want to try to identify something.
8. Visit the same spot multiple times over the course of the year. Even in winter, there can be interesting rocks, twigs, birds, and signs of animals to observe.
9. Draw and write. When students record observations, they are more focused and have more to think and talk about when you get back inside.
10. Be flexible. You never know what you might see. If the lesson is about clouds, but a cluster of ladybugs captures children’s attention, be ready to change your plans.





Grab your raincoat and step into the exciting world of weather. In Massachusetts, our weather is always changing and these changes generate opportunities for questions, investigations, and discovery. Observing the weather on a regular basis and providing opportunities to collect data and record how weather changes over time can nurture a fascination with the science behind the rain, clouds, fog, snow, and sun that we experience throughout the year.

Weather affects our lives in many ways as well as the world around us. Children love stomping through puddles after a heavy rain, but why do some puddles collect in the same place on the school yard? How do heavy rains affect the playground? How many sunny days does a puddle need before it dries up? Why does snow change to rain on an early spring day? Weather is a reminder that science is happening all around us, all the time.



**Investigation Objectives and Alignment to
Massachusetts Department of Education Pre-K Science, Technology
and Engineering Standards 2013
for 2015-2016 implementation**

Investigation	Children will be able to:	Pre-K STE Learning Standards
#1: What is Weather?	<ul style="list-style-type: none"> • Describe and act out different types of weather. • Observe and collect data shadows throughout the day. 	<p>PreK-ESS1-2. Observe and use evidence to describe that the sun is in different places in the sky during the day.</p> <p>PreK-PS4-2. Connect daily experience and investigations to demonstrate the relationships between the size and shape of shadows, the objects creating the shadow, and the light source.</p>
#2: Weather Tracking Tools	<ul style="list-style-type: none"> • Observe and track weather over time, categorizing and noting patterns throughout a period of time. • Describe how weather changes from day to day and throughout the year. • Construct simple weather-tracking tools that will support data collection in the field. 	<p>PreK-ESS2-4. Use simple instruments to collect and record data on elements of daily weather, including sun and clouds, winds, snow or rain, and higher or lower temperatures.</p> <p>PreK-ESS2-5. Describe how local weather changes from day to day and over the seasons and recognize patterns in those changes.</p> <p>PreK-ESS2-6. Understand the impact of weather on living things.</p> <p>PreK-LS-I-4. Use their five senses in their exploration and play to gather information.</p>
#3: Weather in the World	<ul style="list-style-type: none"> • Observe and discuss how weather affects the landscape and our lives. • Build and use simple wind tracking tools to collect information on wind speed and its impact. 	<p>PreK-LS-I-4. Use their five senses in their exploration and play to gather information.</p> <p>PreK-ESS2-4. Use simple instruments to collect and record data on elements of daily weather, including sun and clouds, winds, snow or rain, and higher or lower temperatures.</p>
#4: Seasonal Cycles	<ul style="list-style-type: none"> • Describe how weather changes over time from day to day and season to season. • Observe and describe patterns in data that demonstrate changes in the seasons (i.e., rain in the fall, snow in the winter). 	<p>PreK-ESS2-5. Describe how local weather changes from day to day and over the seasons and recognize patterns in those changes.</p> <p>PreK-ESS2-6. Understand the impact of weather on living things.</p> <p>PreK-LS-I-4. Use their five senses in their exploration and play to gather information.</p>



<p>#5: Water, Water Everywhere</p>	<ul style="list-style-type: none"> • Build a simple model to learn about the water cycle. • Describe the relationship between water, snow, and ice. • Describe and act out the water cycle. 	<p>PreK-ESS3-2. Observe and discuss the impact of people’s activities on the local environment.</p> <p>PreK-PSI-1. Raise questions and investigate the differences between liquids and solids and develop awareness that a liquid can become a solid and vice versa.</p> <p>PreK-LS-1-4. Use their five senses in their exploration and play to gather information.</p>
<p>#6: How does weather affect plants and animals?</p>	<ul style="list-style-type: none"> • Describe how animals and plants adapt to the changing seasons. 	<p>PreK-LS-1-4. Use their five senses in their exploration and play to gather information.</p> <p>PreK-ESS2-6. Understand the impact of weather on living things.</p>



Suggested outdoor exploration materials

- String or yarn
- Coffee filters
- Hand lenses
- Popsicle sticks
- Clipboards (can attach pencils with string or velcro)
- Trowels (small shovels)
- Penlight or other small flashlight
- Small plastic containers to hold living things
- White plastic plates to observe samples
- Ziploc bags, various sizes
- Plastic terrariums
- Spray bottles
- Measuring tapes or string
- Disposable or digital camera
- Crayons and markers (fine and thick point)
- Paints
- Clay or play dough
- Collage materials
- Bendable wire or pipe cleaners

Keep it easy!

- Assemble outdoor kits in backpacks to pick up and go as you walk outdoors!
- Families will gladly save and send in recyclable containers that are both reusable and disposable. Just ask!



WICKED COOL WEATHER

Basic Concepts and Fun Facts



What is Weather?

- Weather is the day-to-day atmospheric conditions in a particular location.
- Weather includes temperature, precipitation, cloud cover, wind, and air pressure.
- Examples of weather – today is warm and humid; the weather prediction for tomorrow is for clouds and rain.

What causes weather?

- The energy at the earth's surface comes from the sun's rays being absorbed by the earth and the atmosphere.
- The earth is round so the sun's rays do not reach the surface of the earth at the same angle from the equator to the poles. Example – the sun is directly overhead at the equator so the equator is much warmer than the North Pole where the sun is never very high over the horizon.
- The differences in temperature (energy) and the daily rotation of the earth cause the movement of air and moisture around the globe that creates weather.

What is Climate?

- Climate is the average of weather patterns over a long period of time, at least 30 years. Example – weather is what determines what we will wear each day, but climate is what determines our wardrobe.
- Climate can refer to a particular location. Example – the climate of Boston is colder than the climate of Miami. Or it can refer to the overall climate of the earth. Example – the average temperature of the earth has increased 1 degree Fahrenheit over the past 30 years.

How does weather change throughout the seasons?

- In the northern hemisphere, the amount of sunlight is greatest during the summer and least in the winter.
- With less sunlight in the winter, there is less energy and winter is colder than summer when there is more energy from the sun.

Why do we have seasons?

- The earth's axis tilts 23.5 degrees from vertical. As the earth orbits the sun, this causes the northern hemisphere to be away from the sun during the winter and toward the sun during the summer. This results in less sunlight reaching Massachusetts, which means less energy and lower temperatures in the winter and more sunlight reaching Massachusetts, which means more energy and higher temperatures in the summer.

How do we track weather?

- Weather is tracked by satellite and stationary weather stations that record air temperature, air pressure, wind speed and direction, precipitation, and cloud cover.
- By analyzing and comparing the current data gathered to decades worth of data and patterns, meteorologists can make weather predictions.



How does weather and climate affect the world around us?

In Massachusetts, our seasons cycle from cold, snowy, short-day winters to hot, humid, long-day summers, with spring and fall transitional periods in between. All living things have survival strategies that allow them to get through the variation in weather throughout the seasons and reproduce successfully.

Humans

- Weather determines what we wear every day and often what we do. Examples – The baseball game was cancelled because of the rain.
- Weather and climate both affect how people live and heat or cool their houses.
- Even our school year is based on our climate since traditionally schools close during the summer because the students had to work on the farm during the busy growing season.

Land

- Precipitation has an impact whenever it falls on the land. Water can cause erosion or can accumulate in low-lying areas and cause flooding.
- Water levels rise and fall seasonally depending on precipitation, snow melt, etc.

Plants

- Plants in Massachusetts are adapted for a seasonal cycle that exhibits a lot of temperature variation throughout the year. All plants need to have adaptations to survive the freezing temperatures of the winter – most plants here become dormant in the winter. Leaf drop in the fall is a sign of dormancy in trees. Many perennials die off back to their roots. Plants also need adaptations to survive the heat of the summer.
- Plant life cycles have to be adjusted to the seasons. Plants grow and flower in the spring and summer, and produce seeds in the summer and fall, and then die off or go dormant in the winter.

Animals

- Similar to plants, animals in Massachusetts need to adapt to the wide temperature

variations in our climate. Animals survive the winter through one of 3 strategies – dormancy, migration, staying active, or resistance

- **Dormancy** – Physiological changes in the animals allow them to survive the winter in a colder state than normal and with little to no food requirement. Hibernation is a form of dormancy in some mammals. Amphibians and reptiles exhibit another form of dormancy called brumation and spend the winter buried in the mud or under leaves or rocks. Insects go into diapause, which allows them to suspend all growth and development during the winter.

Migration – moving to an area with greater food availability is a survival strategy for some animals. Almost all of the migrators are birds and some of the larger insects. Birds that migrate don't do so because they get cold; they migrate in response to the change in day length. Mammals and reptiles do not migrate in this part of the world.

Staying active – Many mammals in Massachusetts remain active all winter. The biggest survival factor for these animals is having a food supply to get them through until spring, which is why squirrels store nuts in the fall.

- Reproductive activities are timed to ensure that offspring are produced when there is maximum food supply and time for the offspring to mature enough to survive the winter. This means most small mammals, birds, amphibians, and reptiles breed in the late winter or early spring to give birth or hatch their young in the spring or early summer. Larger mammals breed in the fall or winter in order to give birth in the spring.

What is the Water Cycle?

- The amount of water on the earth is a constant. The water cycle describes the continuous movement of water on, above, and below the surface of the Earth. Rain, snow, glaciers, fog, clouds, evaporation, condensation, rivers, lakes, streams, ground water, marshes, oceans, etc are all part of the water cycle. All living things are also part of the water cycle because they use water during their life cycles.



- Water vapor in the air condenses into tiny water droplets and forms clouds. As the droplets come together, they eventually get too heavy and fall to the ground as rain, snow, hail, sleet, etc. If the water lands on the ground, it can flow along the surface and eventually enter a stream, river, lake, or ocean or it can infiltrate into the groundwater. Water on the earth or in the ocean is constantly evaporating back to water vapor. The water vapor moves through the atmosphere to condense back into clouds. The movement of water through the atmosphere is a critical component of weather systems and storms.
- At any given moment, most of the water is in the oceans as saltwater. The amount of available freshwater, which all plants and animals require to survive, is a very small percentage of the total amount of water on earth.



PRESCHOOL INTEREST AREAS PLANNING FORM

THEME: WICKED COOL WEATHER

(#1-6 indicates the investigation to go to for detailed instructions)

<p>ART</p> <ul style="list-style-type: none"> • Sun-catchers (#1) • Epsom salt painting (#5) • Cloud splotches (#2) • 3-D clouds, sun (#1) • Snowflake cutouts (#1) • Wind sculptures (#3) • Rain paintings (#3) • Seasonal collages (#4) • Water art (#5) • Ice sculptures (#5) 	<p>DESIGN/ENGINEERING</p> <ul style="list-style-type: none"> • Pinwheels (#2) • Make a wind sock (#2,3) • Make a weathervane (#2,3) • Make a rain gauge (#2) • Make a barometer (#2) • Building with ice blocks and snow (#5) • Plants and water (#6) • Wind power (#3) • Insulation experiment (#6) • Kites, bubbles in the wind (#2) 	<p>COOKING</p> <ul style="list-style-type: none"> • Fresh vs sun-dried (#3) • Solar oven (#3) • Sun tea (#3) • Meringue clouds (#1) • Sugar on snow (#5) 	<p>DISCOVERY/SCIENCE</p> <ul style="list-style-type: none"> • Air catchers (#1) • Cloud in a jar • Make a barometer (#1) • Condensation (#5) • Weather detectives (#3) • Cloud categories (#3) • Water table water cycle (#5) • 4-season tree (#4,6) • What season is it? (#6) • Investigate buds (#6) • Investigate water drops (#5)
<p>DRAMATIC PLAY</p> <ul style="list-style-type: none"> • Weather forecast station (#1,2,3,4) • Weather doll (#1,3,4) • Weather/Rain Theater (#1,5) • Migration game (#6) • Coping with cold (#6) • Winter adaptations – the long trip (#6) 	<p>LITERACY</p> <ul style="list-style-type: none"> • See attached annotated bibliography for multiple selections. • Use your local library as a resource. 	<p>MUSIC/MOVEMENT</p> <ul style="list-style-type: none"> • Act out a rainstorm (#1,#5) • Move in the wind (#3) • Be a water molecule through the water cycle (#5) • Have a wind parade (#1,#2,#3) • Sounds form wind (#3) • Water cycle dance (#5) • Snow songs (#5) 	<p>OUTDOORS</p> <ul style="list-style-type: none"> • Keep a weather journal (#1, 2,3,4) • Weather tools outside (#2,3,4) • Signs of seasons/effects of weather (all) • Weather watching (#2,#3) • Animals through the seasons (#6) • Weather walk (#1,#4,#5) • Winter twigs (#6) • Ice sculptures (#5)
<p>SENSORY</p> <ul style="list-style-type: none"> • Feel the weather (#3) • Water cycle in the water table (#5) • Snow/ice in the water table (#5) • Insulation experiments (#6) • Moving in weather (#3) • Comparing snow (#5) 	<p>MATH/NUMERACY</p> <ul style="list-style-type: none"> • Cloud matching game (#2) • Tally types of weather (#4) • Record rainfall/snowfall (#2,4) • Beaufort wind scale (#2,3,4) • Chart temperatures (#2,4) • Track shadows (#4) 	<p>COMMUNITY CONNECTIONS/ PARENT INVOLVEMENT</p> <ul style="list-style-type: none"> • Record weather at home (#2,3,4) • Weather watching at home (#2,3,4) • 4-season tree at home (4, 6) 	<p>GAMES/MANIPULATIVES</p> <ul style="list-style-type: none"> • Weather charting (#2,3,4) • Make a cloud (#5) • Ice sculptures (#5) • Squirrel it away (#6) • What season is it? (#6) • Flying south (#6)



INVESTIGATION SUMMARIES

Big Ideas	Investigation #1 What is weather?	Investigation #2 How do we track weather? What kinds of tools do we use?	Investigation #3 How does weather affect the world around us?
LARGE GROUP LEARNING	<ul style="list-style-type: none"> • What do children already know about weather, seasons, weather words, etc? • Discuss types of weather, signs of weather . • Act out different types of weather. 	<ul style="list-style-type: none"> • Use weather tools to make daily observations. • Use a standard preschool calendar and record more detailed information of weather. • Make weather charts to track weather – temperature, wind speed, clouds, etc. 	<ul style="list-style-type: none"> • Be weather detectives – how does the weather effect our daily routines? • Feel the weather • Wind power • Measuring wind speed • Fresh vs sun-dried • Rain paintings
SMALL GROUP LEARNING	<ul style="list-style-type: none"> • Create a weather forecast station • 3-D weather cut-outs • Snowflake cutouts • Suncatchers • Weather forecast station 	<ul style="list-style-type: none"> • Cloud shapes/cloud matching • Cloud splotches • Make and use weather tools – pinwheel, windsock, weather vane, barometer, rain gauge • Weather reports from the weather station 	<ul style="list-style-type: none"> • Weather dolls • Cloud categories • Sound of the wind • Wind sculpture • Sun tea • Solar oven
OUTDOOR LEARNING	<ul style="list-style-type: none"> • Take a weather walk and look for signs of weather. • How does the weather feel – cold, warm, wet, dry, windy, calm, etc.; compare to actual weather data. 	<ul style="list-style-type: none"> • Air catchers • Weather watching together • Kites and bubbles in the wind 	<ul style="list-style-type: none"> • Searching for evidence of weather – erosion, puddles/streams, broken branches, mud, snow • Observe how weather effects our movement (ice, snow, mud, puddles, wind).



INVESTIGATION SUMMARIES

BIG IDEAS	Investigation #4 How does weather change throughout the seasons?	Investigation #5 Water, Water, Everywhere... Where does water come from? Where does it go?	Investigation #6 How does weather affect plants?
LARGE GROUP LEARNING	<ul style="list-style-type: none"> • Talk about seasonal clothing needs. • List the signs of a season. • Record daily temperature over a season or year. • List aspects of weather by season – which change and which stay the same? • Dress a weather doll • Four seasons tree 	<ul style="list-style-type: none"> • Act out a rainstorm • Act out the water cycle • Water cycle dance • Cloud in a jar • Make a cloud • What is snow? • Snowflake match-up • Snow songs 	<ul style="list-style-type: none"> • Seasonal tree and animal activities • Guess the season • Plants and water • Winter twigs • Coping with cold • Landmark migration game • Migration planning – the long trip
SMALL GROUP LEARNING	<ul style="list-style-type: none"> • Weather math – tally the number of days of each type of weather. • Make seasonal collages. 	<ul style="list-style-type: none"> • Dropper doodles • Epsom salt painting • Water table play with snow/ice, water with sponges, watering cans, pipettes and containers • Cloud matching game 	<ul style="list-style-type: none"> • Look at buds • Insulation experiment • Flying south
OUTDOOR LEARNING	<ul style="list-style-type: none"> • Weather walk • Seasonal investigations • Sugar on snow 	<ul style="list-style-type: none"> • Ice sculptures • Condensation experiment • Water cycle walk • Snow sticks • Water art • Comparing snow 	<ul style="list-style-type: none"> • Squirrels and nuts • Buds • Twigs • Seasonal signs • Dressing for the weather



What is Weather?

LARGE GROUP LEARNING ACTIVITIES

W is for Weather: Start with a discussion that allows children to describe what they already know about weather, how it affects their lives, and how it affects the lives of plants and animals. Talk with the group about types of weather – rain, snow, sun, wind, clouds, etc. You can provide colorful pictures or photographs of weather as you discuss.

See how many “weather words” children can come up with, including words that describe how one experiences weather (hot, cold, wet, rustle, etc.). To expand, see if children can create their own words to describe a type of weather. Use chart paper and markers to document student language and discussion.

Use a KWL chart to document what students KNOW, WANT to know about weather. At the end of the lesson (and unit), you can share what you LEARNED about weather.

What do we KNOW?	What do we WANT to know?	What did we LEARN?
Rain is weather	What happens to all the rain?	
I wear lots of clothes in winter	How do animals stay warm?	



Weather Theater: Materials – Pictures of types of weather

Description: Show pictures of different types of weather, have the children try to act them out. Have each child come up with their own weather yoga and let him/her teach everyone else. Give the children ribbons and let them act out wind or falling snow. Give them drums and rattles and let them act out a rainstorm.

Read: *The Sun, the Wind and the Rain* by Lisa Westberg Peters

Sing: How’s the Weather Today? Tune and Words available here:
www.youtube.com/watch?v=rD6FRDd9Hew

SMALL GROUP LEARNING ACTIVITIES

3-D Weather Cutouts: Make 3-dimensional weather cutouts to hang around the classroom.

Materials: Newspaper, large white paper, paint, objects of different color/texture, glue.

Description: Cut out cloud and sun shapes. Make two of each shape and staple the two sides together, leave an opening, stuff with batting or newspaper, and then staple the opening closed. Paint the outside and glue on yellow/orange objects for the sun or white, fluffy objects for clouds. Hang your weather cutouts around the classroom! You can make it cloudy on one side and sunny on the other. Or, mix it up. Students can act out different weather “events” under the shapes.



Snowflake Cutouts

Materials: Coffee filters, scissors

Description: Fold filter into sixths, then have the children cut shapes out of the filter. Unfold and hang in the windows or around the classroom with your 3-D cutouts.

Meringue clouds

Materials: egg whites, dash of cream of tartar, oven, baking tray

Description: Crack eggs into a bowl and remove egg yolks. Beat egg whites until stiff adding cream of tartar as they thicken. Place small amounts of mixture onto a baking tray and bake at 300°F for 30 minutes. Use as clouds.

Talk about clouds as a collection of very tiny droplets of water that are light enough to float in the air. The tiny droplets join together and get bigger and heavier until they finally fall as rain or snow.

Suncatchers

Materials: thin cardboard or card stock, contact paper, tissue paper, and/or colored cellophane

Description: Cut an opening in the middle of the cardboard or card stock. Peel and stick a sheet of contact paper over the opening. Have the children stick squares of tissue paper or colored cellophane onto the contact paper. Thread a loop of yarn or string on the completed suncatcher and hang in the window.

Encourage children to observe them on cloudy and sunny days.

Build a Weather Forecast Station

Materials: Weather forecaster costume materials, felt board, felt pieces of weather, laminated weather forecast symbols (arrows in blue and red, maps, etc.), toy microphone

Description: If possible show children an actual weather report on a laptop or TV. Introduce the felt board with weather pictures and forecast symbols. Mount the board and costume items in the dramatic play area for free exploration.

Weather walks

Materials: Clipboard, journals, crayons

Description: Take a weather walk multiple times during the school year and record the weather. Make “weather journals” to bring on your walk. Sometimes visit the same spot; other times walk around and explore.

- Draw what is happening in the sky, the clothes they are wearing, weather-based activities they observe (building snowmen, splashing in puddles, shielding eyes from the sun).
- Look for evidence of weather (downed branches, puddles, erosion) and have them draw what they see.
- Make sure to date each entry and record the weather and temperature that day. The teacher can also keep notes on the clipboard to remind friends of what they observed during the previous outing.
- For a community connection, ask the children to take the journals home and record observations about the weather at home.
- Ask the children what the weather feels like – warm, cold, wet, windy, etc. Compare what they feel to the actual temperature or wind speed, etc.

Shadow Activities

To begin, ask children if they know what a shadow is. Invite them to describe what they already know about shadows. In order to learn more about what they know about shadows, you can ask them to describe their experiences with shadows. What does your shadow do when you move? Dance? Jump up and down?

Next, go outside and learn through play. Have each of them play with their shadows as well as with objects that make shadows. How many shadows can they find? After some time exploring, ask the children to gather around and observe one child as he/she plays with his/her shadow. Ask the same questions about how their shadow moves. Try to make shadow creatures! Can you make a four-armed person? How could you make



antlers, a different shaped body, or a tail using objects from outside? Can one child hide another child's shadow?

What is a shadow?

A darker area created by an object coming between a source of light and a surface.

Other fun shadow games:

- **Shadow Tag:** Play shadow tag in a grassy field on a sunny day. If you step on a shadow, you are "it". Is it easy or hard to catch up with someone's shadow? Take turns being "it".
- **Shadow Tracking:** You can track shadows of object or yourself. Have children stand in one place. Mark an "X" where they stand and have a partner trace their shadow with sidewalk chalk. Make your first shadow trace in the morning. Head out again in the middle of day. Stand on the "X" and trace the shadow again. Has it moved? You can also trace a static object in your schoolyard. A barrel, flagpole, fencepost.
- **Shadow Hand Puppets:** Turn down the lights in the room. With a bright lamp and blank wall, you can make hand shadow puppets. On a sunny day, you can even make them with sunlight coming through the window or outside. Some great resources and tips for different hand shadows are here: www.pinterest.com/robanw/hand-shadow-puppets/



Weather Tracking Tools

How do we track the weather?

What kinds of tools do we use to track the weather?

LARGE GROUP LEARNING ACTIVITIES

Weather Trackers

Ask students: Do you watch the weather? What is the weather like today? Make talking about weather and recording data part of your gathering circle time at the start of the day. Ask the children how they decided what to put on today or how their parents decided? How do you know what to wear so you are comfortable throughout the day? Ask the students what the weather was like yesterday? Is it the same as it is today or very different? Depending on the time of year, choose milestone events to ask them about the weather in the past, i.e., during winter break was the weather the same as it is today? Discuss how you will track weather every day. Develop charts for temperature, sun, rain, wind, etc. and collect the same information every day. Reflect with the students how it changes over the course of the school year.

Tools of the Trade

Materials: Pictures of weather tracking tools, thermometers, rain gauge, barometer, anemometer.

Description: Discuss and show the children different weather tools. See if they can guess what they are for. Give them ample time to explore the tools and use them outside, if possible.

Charting the Weather (Large Group and Outdoor Learning)

Materials: Thermometer, rain gauge (a simple glass jar with a ruler taped to it will do), chart paper, markers, Beaufort wind scale (<http://www.spc.noaa.gov/faq/tornado/beaufort.html>)

Description: Record the weather daily on large chart paper; include rain/snow fall, wind scale, weather type, and temperature. If possible, continue recording throughout the year. Look at the information for seasonal and yearly patterns and differences. Make note of any extreme weather events (hurricane, blizzard, heavy rains, etc.) on the charts. You may wish to use a different color marker for each month to help track the seasonal changes. Types of graphs that work well include bar graphs, line graphs, histograms, and picture graphs.

Read: *What will the Weather Be?* Lynda DeWitt

Discuss how scientists who study the weather are called meteorologists. They study patterns of weather over time to predict the weather. If you have set up a weather forecast station, you may choose to incorporate daily weather reports in the dramatic play area!

SMALL GROUP LEARNING ACTIVITIES

Cloud Shapes/Cloud Matching

Materials: Cloud pictures, laminator or contact paper, cardboard



Description: Cut-out several sets of cloud images and laminate them. Use the images to create bingo boards or simply use the images to play concentration or other matching games. Great cloud photos can be found at <http://www.weatherwizkids.com/weather-clouds.htm>

Read: *It Looked Like Spilt Milk* and make your own paint splotch clouds.

Cloud Splotches

Materials: *It looked like Spilt Milk*, white paint, blue paper, spoon

Description: After reading *It looked like Spilt Milk*, have the children spoon white paint into the middle of a blue piece of paper, then fold the paper in half. Open the paper to observe the shape. For added fun, have them describe that they think their cloud looks like.

WICKED COOL WEATHER TOOLS - build them inside and take them outside!

Pinwheels

Materials: cardstock or thin cardboard, scissors, markers, string, beads, or pencils and tacks

Description: Cut the cardstock into a square. Draw a line from each corner halfway to the center of the square. Have the children color the square and cut along the lines. Use a tack to poke a hole into the right corner of triangle and into the center of the square. Either tack the 4 corners into the center and press into the eraser of a pencil or thread yarn through the 4 points and the center and knot with beads on either side. The yarn pinwheels work well for hanging from trees or porches; the pencil pinwheels can be stuck into the ground. Either is fun to take outside for weather observation.

Windsocks

Materials: Sleeve of an old long sleeved shirt, needle and thread, string, wire, small rock

Directions: For diagram and detailed instructions, see: www.weatherwizkids.com/experiments-windsock

Weather Vanes

Materials: Straw, pencil, straight pin, cardstock or thin

cardboard, tape.

Directions: For detailed instructions on how to make this simple weather vane go to *Hands-On Nature*, pp. 289.

Experiment and observe how the weather vane behaves depending on the size of the shapes on the end of the vane as well as the speed of the wind. Can the students see how the vane changes depending on the direction of the wind?

Barometers: Barometers keep track of air pressure. When air pressure is high, that indicates fair weather. Low air pressure often indicates a storm.

Materials: Balloon, glass canning jar, rubber band, straw, paper

Directions: Cut the lip off the balloon. Stretch the balloon over the glass jar and secure it with the rubber band. Tape the straw across the balloon. Tape a paper to the wall, place the jar in front of the paper, and mark the height of the straw. As the air pressure changes, the straw should move up and down. Make note of the height and what weather is like during those "highs" and "lows". Test the accuracy your homemade barometer by comparing it to an actual barometer or data online.

Rain Gauge: Rain gauges help us to collect information on how much rain falls in a rainstorm.

Materials: plastic 1 liter soda bottle, 2-3 large stones or bricks, tape, marker, ruler

Directions: Cut the top off of the bottle. Turn the cut-off top upside down and place it, neck down, onto the bottle. Tape it to the two pieces of the bottle together. Use the ruler and permanent marker to create a measurement scale on the bottle. Find a good location outside away from any buildings or trees, etc. and place the bottle on the ground. Use the rocks or bricks to hold it in place so that it won't fall over. Now, wait for the next rain! After it rains, check to see how much rain fell at your school.



Discuss with students if the amount of rain is related to how long the storm lasted. If the rain happens during the school day, measure how long the rain storm was. Ask the students if they would describe the rain as heavy or light. Some of the most fun discussions can happen by comparing rainfall over the seasons. Let snow fall into your rain gauge. Measure the snow height. Bring it inside and watch it melt. Is the height of the water the same as the height of the snow?

OUTDOOR LEARNING ACTIVITIES

Air Catchers

Materials: yogurt container lids, vaseline

Directions: Ask students how they can tell it is windy. Explain that you're going to do an activity that will make the air more visible. Spread vasoline onto the yogurt container lids. Bring the lids outside—observe what happens! This is a great lead-in to Investigation #3 – How Does the Weather Affect the World Around Us?

Weather Watching Together

Lie down and look:

- Lie on your back and look up at the clouds
- What kinds of clouds do you see?
- What shapes do you see? Can you make up a cloud story?
- Are they clouds moving in one direction?

Watching the wind:

- What can you observe that tells you the direction of the wind?
- Fly kites! Make your own kites and fly them on a windy day.
- Blow bubbles in the wind. What direction do they fly on different days?



Weather in the World

How does weather affect the world around us?

Develop an awareness of how weather affects the world around us through observation.

LARGE GROUP LEARNING ACTIVITIES

Feel the Weather

Materials: fan, spray bottle, lamp

Description: Have the children sit with closed eyes, then walk around and have them “feel” a weather type, then describe or identify it. This activity can also be done outside while having the children talk about different types of weather they can feel.

Weather Detectives: Discuss with the children – How does weather affect our daily lives, whether it is snow, wind, rain, or heat? How does it affect what we can do? How we dress? How we play? How can we find evidence that a weather event has occurred? Where can we find evidence? – look up, down, around. What does it look like outside after a heavy rain or windstorm? How do different kinds of weather make you feel – rainy, sunny, snowy, windy? What is your favorite weather?

Wind Power

Materials: electric fan, butcher paper, selection of objects provided by teacher and students

Description: Place the butcher paper on top of a table. Place the fan at one end of the table. Have children select an object and make predictions about what will happen when the fan is turned on. Take turns placing the objects on the paper and turning on the fan. Mark how far each object moves across the paper. Ask the children to select objects they think will move the farthest, the fastest, or not at all.

Measuring Wind: Investigation #2 gave directions for making simple tools to observe the direction or speed of the wind. In addition there is a measurement system called the Beaufort wind force scale that can be used to measure wind speed based on your observations.

Here’s the scale as well as some background:

www.srh.noaa.gov/jetstream/ocean/beaufort_max.htm

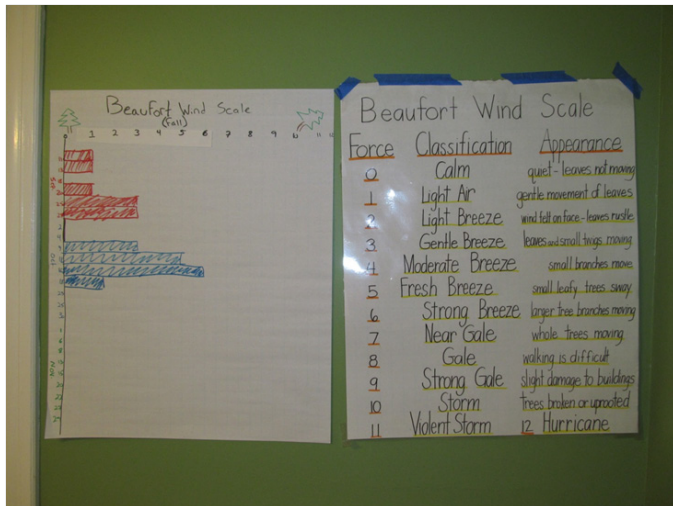
These links have some graphics that might be fun for the classroom:

<http://urbanflyventures.com/wp-content/uploads/2011/05/beaufort-scale-cartoon.gif>

http://urbanflyventures.com/wp-content/uploads/2011/05/beaufort_scale_tbp.gif



Here is an example of how young students can measure the wind by what they observe, using the Beaufort wind force scale:



Fresh vs. Sun-Dried

Materials: grapes and raisins, cranberries and craisins, chart paper and markers

Description: Explain that we're going to use our five senses to describe two different things. Give each student a raisin and say not to eat them yet.

Make a chart of descriptive words about raisins. Give each student a grape and say not to eat them yet. Make a chart of descriptive words about grapes.

Discuss what is similar and different on the two charts – as color, water content, texture, size, etc. Explain how raisins are made and how weather can cause that to happen to plants. Have a snack!

Rain paintings

Materials: Coffee filters, washable markers, spray bottle (if not raining), trays

Description: Cut the coffee filters into raindrop shapes or use the filters as they come. Have the children color the filters with washable markers. Set the filters on trays. Either set the tray out in a gentle rain or spray the filters with water. What happens if you set the tray out in a heavy rain? Experiment with different amounts of water. Allow the filters to dry and see what has happened to the colors. You can even track how long it takes your filters to dry on different days. It's always a good idea to repeat these

types of activities in different conditions – that's what helps us notice how the different weather affects the world around us!

Read: Books that describe how weather "feels" and how it affects people and places

- *Feel the Wind* by Arthur Dorros
- *The Wind Blew* by Pat Hutchins
- *The Sun, the Wind and the Rain* by Lisa Westberg Peters

SMALL GROUP LEARNING ACTIVITIES

Weather Dolls: This activity can be introduced in the large group and then be placed in the dramatic play area for small group learning.

Materials: Dolls with a variety of clothing including shorts, pants, coats, boots, hats, scarves, umbrellas, mittens, etc. This activity can also be done with "paper dolls" on the felt board.

Description: Have a station where children can dress dolls, stuffed animals, felt board people, or paper dolls in clothing for various weather types.

Cloud Categories (adapted from *Hands-On Nature*, page 290)

Materials: Laminated pictures of the three major categories of clouds – cumulus, cirrus, stratus.

Description: Use the cloud shapes and discuss the shape of each type of cloud. Have a pile of other cloud pictures with different shapes and work with the students to sort the cloud shapes in categories by type of cloud. Discuss how different cloud shapes give us clues about the weather.

Sounds From Wind

Materials: Sticks (1/2-inch diameter; 1-3 foot long), string or fishing line, objects to hang – old utensils, washers, metal disks, shells, beads, etc.

Description: Tie the objects on to the sticks so that they can be moved around and students can test different configurations to make new sounds. Hang the sticks where the students can hear them moving in the wind.



OUTDOOR LEARNING ACTIVITIES

Wind Sculpture

Materials: Old 1-liter plastic bottles, string, box cutter or X-Acto knife, paint, paper, colored pens

Description: Have children determine where they would like windows cut into the plastic soda bottle and draw rectangles where they choose. Use the box cutter or X-Acto knife to cut three sides of the rectangle to create flaps that will catch the wind. Children can decorate bottles with glitter, paper, paint, or whatever decorative materials you choose! Watch your sculpture spin!

START INSIDE AND FINISH OUTSIDE

Sun Tea

Materials: Fresh herbs or herbal tea, water, pitcher, cups

Description: Have children pick herbs if you have some in a school garden or get some herbs at the store. Add the herbs to a pitcher of water. Leave the pitcher of water in the sun for 20 to 30 minutes to allow the water to become flavored by the herbs and warmed by the sun. Discuss how the temperature and taste of the water differed before and after.

Cooking with the Sun

Materials: Pizza box, aluminium foil, box cutter or X-Acto knife, something easily melted such as marshmallows

Description: Line the inside of the pizza box completely with foil. Cut a square flap in the center of the lid of the box. Place some marshmallows inside. Put the solar oven in a warm sunny location with the flap at an angle that catches the rays of the sun and focuses them into the box. Enjoy your solar smores. More detailed instructions found here: www.nmsea.org/Curriculum/4_6/pizza_box_oven/pizza_box_ovens.htm

Moving in the Weather

Materials: Clipboard

Description: Talk about what weather is happening outside and discuss how that affects movement. Go out in rainy, snowy, windy, icy, muddy days. Have the children describe what it's like to move in those types of weather conditions. Is it easy, hard, slippery, crunchy, etc.? How does it affect their ability to play and explore?

Weather Trackers on the Move

Look up, down, all around:

- Take a walk and look for evidence of different types of weather – broken-off branches, downed limbs, puddles, “streams” in the dirt, etc.

Watching the Wind:

- Can you see in which direction the wind is blowing?
- What can you observe that tells you the direction of the wind?
- Can you tell the speed of the wind by observing how the wind is affecting objects around you?
- Compare your observation of wind speed to the Beaufort wind force scale.



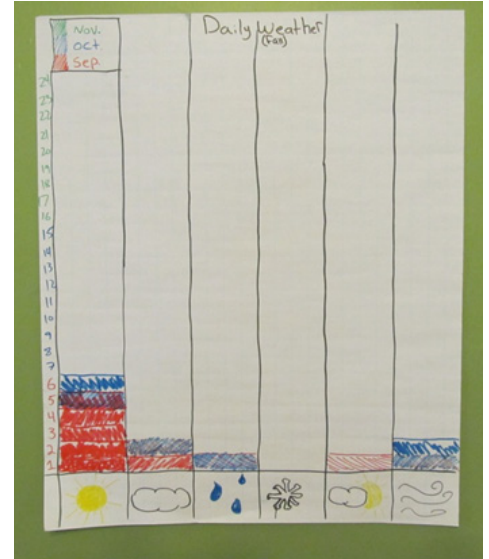
Seasonal Cycles

**How does weather change throughout the seasons?
What plants and animals do we see?**

LARGE GROUP LEARNING ACTIVITIES

Bring out any data, charts, or drawings that students have collected or made about the weather in earlier investigations. Ask the children if the weather has changed since the school year began? Are you wearing the same clothes that you wore in the summer or winter?

Record the daily temperature throughout the season. Graph the temperature in a line graph to show how it changes over time. Share with them how the line shows us the hot days and the cold days. Do they remember when the very hot or very cold days were? Ask the children to show you where the warmest or coolest days were, based on the height of the marks.



Generate a list of the signs of each season. What things, objects, sounds, animals, etc. do students think about when they imagine the different seasons?

Use the Weather Doll (Investigation #3) to help talk about what kinds of clothing are needed during the different seasons. Why do we need different clothing in different seasons?

Make a list of different aspects of weather that change by season and which stay the same, i.e. type of weather (sunny, cloudy, windy), temperature, amount of precipitation, type of precipitation (rain, snow, ice).

Four Seasons Tree

Materials: construction paper, laminate, stencils.

Description: Draw and laminate a tree silhouette, preferably a maple or oak shape. Have the children make buds, green leaves, flowers, fall-colored leaves, snow, to add to and remove from the tree throughout the seasons. You may choose to change your tree throughout the year based on what is happening outside OR you can fast forward the seasons with your four seasons tree. Make small trees for the children to bring home. Encourage them to change their tree at home throughout the seasons.

Read: *Snowy, Flowy, Blowy: A Twelve Months Rhyme* by Nancy Tafuri



SMALL GROUP LEARNING ACTIVITIES

Seasonal Collages

Materials: Construction paper, natural materials, drawings made by students, scissors, tape.

Description: Make seasonal collages using different objects to represent the seasons – cotton for winter, brown leaves for fall, sun drawings for summer, flowers for spring, etc. Let the students come up with representative objects or use the lists you generated as a large group.

Weather Math

Have students tally/count the number of days of each type of weather from your weather tracking activities.

Shadow Tracking – find a shadow in your school yard that has an easily identified characteristic – corner of a building, point of a tower, top of an evergreen tree, etc. Note where the shadow falls at a specific time of day throughout the year. Alternatively note how the shadow moves during the day.

Sugar on Snow

Materials: maple syrup, clean fresh snow, pot, stove
Description: Heat up the syrup to a high temperature in a pot on the stove. Put a thin layer of snow on a tray. Have the students describe the texture and consistency of the snow. Drip some of the hot maple syrup onto the snow. Have the students describe what happened and what is different about the snow.

OUTDOOR LEARNING ACTIVITIES

Weather Walk

Materials: Clipboard, journals, crayons

Description: Take a weekly or bimonthly walk with the children. Have them make “weather” journals to bring on the walks. Visit the same spot and notice how it changes over time – use drawings or descriptive words to record observations. Make sure to date each entry; note the weather and temperature for each visit. The teacher can also keep notes to remind students of what they observed during the previous outing. For an extension, have the children take the journals home and record observations about the weather at home.

Seasonal Investigations

Materials: Clipboard, journals, crayons, camera,

Description: Notice and observe seasonal changes and signs of the season in your schoolyard. Note the changes in your journals. Add to your list of seasonal signs during circle time.



Water, water everywhere

Where does water comes from? Where does it go?

The water cycle describes the continuous movement of water on, above, and below the surface of the earth. rain, snow, glaciers, fog, clouds, evaporation, condensation, rivers, lakes, streams, ground water, marshes, oceans, etc. are all part of the water cycle. All living things are also part of the water cycle because they use water during their life cycles.

LARGE GROUP LEARNING ACTIVITIES

Water Cycle Dance: Explain that water changes form but it can't be made or lost. Have the children pretend to be a puddle or lake by curling up on the floor. Then explain that the sun is shining on them and heating them up. Have them wiggle and move their hands up like evaporation. Then have them move around the room as water vapor. Finally, have them clump together (condensation) with friends as clouds and when too many of them get in a clump then have them fall to the ground as precipitation. While acting out the water cycle, the children can sing, "The Water Cycle Boogie".

SING: Water Cycle Boogie (*make up your own simple tune*)
Evaporation, condensation, precipitation.
The water cycle boogie goes up and down.
The water cycle boogie goes all around.

Water Cycle Model

Make a 3-D Water Cycle Model based on the dramatic play above.

Read: *A Drop of Water* by Gordon Morrison

Cloud in a Jar

Materials: Jar, ice, warm water

Description: Fill the jar about half full of hot water. Put a piece of black paper over the top of the jar. Put ice on top of the black paper. Observe what happens. The hot water should rise and hit the cold paper and create a cloud.

Make a Cloud (adapted from Small Wonders)

Materials: White sponges cut into cloud shape, spoons, cups of water, bucket

Description: Hang the sponges above a bucket. Have small groups of children add spoonfuls of water onto the cloud one at a time. Count the number of spoonfuls until the cloud begins to "rain."

The sponge is a model for a cloud. Clouds are water vapor—very light water molecules. As the water molecules get heavier, it rains. When the air temperature is cold, precipitation falls as snow instead of rain.



Rainstorm Theater: Explain to students that you are going to act out a rainstorm. Start by having them tap one finger on their palm or snap as the rain starts. Then have them tap with two fingers on their palm as the rain gets a little harder. As the rain gets harder have them clap their hands or tap on the floor. You can cycle through these as many times as you like. Have the students close their eyes while you make your rainstorm and imagine they are outside in the rain.

What is snow? Snow starts out as tiny water droplets in the clouds. When it's very cold outside, the water droplets freeze into crystals. The crystals grow bigger when other water droplets touch them and they freeze together until they become snowflakes. They float in the air at first and then when they get bigger and heavier they fall to the ground. Lots and lots and lots of snowflakes make snow! Show picture of snowflakes falling from cloud and getting bigger.

Read: *It's Snowing!* by Gail Gibbons

Snowflake Match-up Game

Materials: Laminated snowflake cards

Description: Give each child a snowflake card. Have them move around the room and find the person that has the same snowflake card. This might be tricky because some look very similar, but are not exactly the same. You will have to look closely to tell if it's a match. Once you find your match, yell "snowball!" and then sit down.

Snow Songs:

The Snow is on the Trees (Farmer in the Dell)

The snow is on the trees (point up)

The snow is on the ground (point down)

The snow is on the window (make window with hand)

The snow is all around (wave arms up over head)

The snow is very icy (shiver)

The snow is very bright (cover eyes with hands)

The snow is very slippery (slide one hand over the other)

The snow is very white!

Dance Like Snowflakes (Frere Jacques)

Dance like snowflakes

Dance like snowflakes

In the air

In the air

Whirling, twirling snowflakes

Whirling, twirling snowflakes

Here and there

Here and there

SMALL GROUP LEARNING ACTIVITIES

Dropper Doodles

Materials: Eyedropper, wax paper, tin foil, paper towels, straws, newspaper, cardstock, markers

Description: Offer children the materials and let them experiment with water and the way it moves across or absorbs into different materials. Can they make wind to make it travel faster? Can they track the movement of the water with water-soluble markers on paper? Notice the properties of water through play. Put it all on a tray – what happens when it moves "downhill?"

Take learning outside: Notice some of the same ways that water interacts in nature – traveling downhill, on different surfaces – dirt, leaves, sidewalks.

Epsom Salt Painting

Materials: Epsom salt, hot water, paintbrush, thick paper

Description: Mix equal parts Epsom salt in hot water until all of the salt is dissolved. Have the children brush the mixture into poems, pictures, or drawings. When the water dries, it will crystallize like frost.

Water Cycle in the Water Table

Materials: Pipettes, sponges, watering cans, spray bottles, water table

Description: After a discussion of the water cycle, open up the water table with the above items. Give children time to make it rain, let the water be absorbed (and reabsorbed) by the sponges. If desired, the activity can be expanded to include tubes and



containers for allowing water to move from streams to ponds/lakes.

START INSIDE, TAKE IT OUTSIDE

Condensation Experiments

Materials: Plastic wrap, jar, rubber band, coin or small object

Description: Explain that you're going to create rain inside a jar. Place the saran wrap over a jar or container and put a rubber band around it. Put a coin or other small object in the middle of the saran wrap. Leave the jar in a sunny area. Have the children predict what they think will happen. Observe to see what actually happens.

Ice Sculptures and Structures

Materials: Different shaped ice cube trays, different shaped plastic containers, small balloons, water, food coloring.

Description: Use the containers to make a variety of shapes and forms to use inside and out.

- Place water in trays or containers. Add colors to some of your containers and trays to make sculptures more colorful.
- Fill balloons with water and add a few drops of food coloring. Freeze outside if it's cold enough. Note how long it takes to freeze.
- Ask students to predict if it's a good day to make ice cubes outside. Bring your cubes and blocks outside for building and creating. Watch them melt on sunny days to make beautiful landscape color forms.
- Place a weighted cup in a cake pan or other round pan. Fill the pan with water and add colors as desired. Freeze, remove the cup, take the ice form out of the pan, and hang your ice sun catcher outside.

OUTDOOR LEARNING ACTIVITIES

Water Cycle Walks

After a heavy rain or even while raining, take a walk and notice where the water collects in puddles and where it forms streams. Who might use the

puddles? Follow the streams. Where do the streams begin? Bring a small ball or marble and drop it at the beginning of the stream. Does it follow the same path? Can you find the end of the stream? What do you observe there? What do you notice about the soil and rocks in and around the stream? Check the rain gauge during this investigation. Note the levels in your journals and record them on your rain chart.

Water Cycle Landscape Theater: Have children move through the water cycle outside by combining the dramatic play activities—Water Cycle Theater, Rainstorm Theater, Water Molecules, Dancing Like a Stream, etc.

Snow Sticks: Use a ruler or yardstick or make your own "snow stick." Mark a scale on your stick so you can measure how much snow falls during a snowstorm. Does the snow stay the same height over the time? Track how long the snow stays. On what days does it melt faster? Compare the melting rate with your daily temperature chart.

READ: *The Snowy Day* by Ezra Jack Keats

Water Art

Materials: Paintbrushes, small pieces of slate or chalkboard, buckets of water

Description: Invite the students to paint with water on their own slate or small chalkboard. How long before their painting evaporates? Does it evaporate more quickly in the sun or shade? On what kinds of days does your water art stay around longer? If you don't have small slate boards, try a light-colored sidewalk!

Comparing Snow: Does snow always feel the same? Sometimes snow is wet, sticky, and heavy. Sometimes it is dry, fluffy, and light. This is because on warmer days the crystals are a bit melted and wet. On very cold days, the crystals freeze solid and dry. Which kind of snow is best for making snowballs?



How does the weather affect plants and animals?

Plant life cycles have to be adjusted to the seasons. Plants grow and flower in the spring and summer, and produce seeds in the summer and fall, and then die off or go dormant in the winter. Similar to plants, animals in Massachusetts need to adapt to the wide temperature variations in our climate. Animals survive the winter through one of 3 strategies – dormancy, migration, staying active or resistance.

LARGE GROUP LEARNING ACTIVITIES

Spring: Everything wakes up. Trees, plants, and animals start to get busy.

Materials: Small, pale green leaf cutouts or light-green scarves

Description: Have each child ‘be a tree.’ Using whole body movements, their toes become the roots; body is the trunk; arms are the branches; fingers are holding the leaves. Small, pale green leaves are passed out to each child. The children will hold the new spring leaves in their fingers and “eat the sun” – an introduction to photosynthesis.

Discuss: A tree is a habitat – a home for plants and animals. Who lives in trees? List all the animals/plants that the group mentions. Have each child think of something different. What is an animal? A creature that eats something!

What are animals doing in spring?

- Singing! Play frog songs. Have the children become a frog symphony.
- Dancing/moving about to find food, mates, “impress” other animals. Robins move about to find food, turkey vultures twirl in the sky, turkeys strut to show off, etc.

Summer: Family Time

Animals are taking care of their babies; plants are producing flowers that will become seeds.

Materials: Larger, green leaf cutouts or green scarves, picture of flowers with their fruit on the back

Description: Large green “leaves” are passed out to the “trees.” Yum, more surface areas to “eat the sun.” Pass around pictures of flowers with their fruit pictures on the back of the card.

Discuss: Trees are homes for baby animals such as birds and squirrels. What other animals might be active in the forest at this time of year?

Fall: Get ready! The Cold is Coming! Time to get your cold weather clothes on.

Materials: Red, orange, brown, yellow leaves, pine needles, seeds, feathers



Description: Pass out orange, brown, yellow, red leaves to the “trees.” It’s time to think about cold weather – you might freeze if you stay green. Pass out pine needles as well so that each “tree” has pine needles and flat “leaves.” Have the students drop their deciduous leaves since they will freeze in cold weather. Have the students study the pine needles – why wouldn’t they freeze?

Pass around seeds. This is the time of year when plants drop their seeds so they are ready to grow in the spring. Look at different seeds and think about how they are ready to survive the cold winter.

Pass around feathers. How do feathers help birds besides enabling them to fly? What do other animals need to do to get ready for winter? Talk about animals that grow thicker fur or store extra layers of fat. Some animals go to sleep for the winter and some go where it is warmer. Ask the children what they do to get ready for winter? Do they have any relatives that “migrate?”

Winter: Brrrr. It’s all about Survival! How do you survive in the cold?

Materials: Pine needles

Description: Have half of the ‘trees’ hold up their needles and the other half holds up empty “branches”.

Discuss what it looks like outside – are some of the trees outside “taking a rest” or “dormant”? What do the animals do? Some take a vacation (migrate) – have students swirl away to Florida as a turkey vulture. Some animals like winter and deal with the cold by growing thicker fur like the raccoon or skunk. Like us, they go in their dens to warm up during stormy, winter weather. Some animals go into a deep sleep (hibernate) like the woodchuck or brumate like the box turtle.

Reflect together on the life of the trees through the year. Design a bulletin board with the children about the trees through the seasons. As you explore outside, add new plants and animals to the seasons.

Read: *The Busy Tree* by Jennifer Ward

What Season Is It?

Materials: Pictures of a deciduous tree (maple, oak, etc) during every season. Have photos of the whole tree as well as close-ups of the limbs, buds, leaves... depending on the season.

Description: Ask the students to guess which season each tree represents. How did they know which season? Discuss how trees adapt to the changing seasons just like we do. Bring out this activity throughout the year and follow it up with close observation of a tree in your school yard.

Water for Plants

Materials: Celery stalks, cups of water, food coloring

Description: Have the children help to put a stalk of celery and food coloring in a cup with lots of water, very little water, or a medium amount of water. A few days later observe what happened to the leaves of the celery. Some will have wilted due to lack of water and some will still be growing. How are plants affected when we have lots of rain? How are they affected when we don’t get rain for a long time?

Winter Twigs – Be a Tree Fantasy

(from *Hands-On Nature*, page 163)

Coping with the Cold

(Excerpt from *Project Seasons*, pages 145-148)

Landmark Migration Game

Materials: Large construction paper shapes placed around the room

Directions: Tape large construction shapes at various places around the school or room. Talk about what the name of each shape is for a math connection. Explain to the children that they are going to pretend to be birds migrating south for the winter. Remind them to use walking feet. Tell them a certain shape to migrate to and choose one child to lead the flock to that landmark. Afterwards have the children create maps with sticker shapes of the path to follow on a piece of paper.



The Long Trip

Materials: Backpack filled with items people take along when traveling – food, jacket, photo of family (to indicate traveling with people vs traveling alone), map, compass

Description: Migration is a journey that animals take at a certain time each year or a certain time in their adult lives. Migrations have patterns, which generally happen over and over again. What are some patterns in our lives? What are things that we do over and over? The animals that we see migrating most often are birds. Try flying like different birds that migrate. Stand up and stretch out your wings. First fly like Canada geese that have to flap their wings continuously while they fly. Other birds flap a few times and then glide; flap and glide over and over. Finally, be like hawks that only flap every once in a while and mostly soar the entire way. Stretch your wings out and soar through the air. How does an animal “pack” for its trip? Take out the backpack. Ask the students to pretend they are taking a trip. What sorts of things would be bring? **Food:** We can take some with us or buy it while we’re traveling. Animals can’t go to the store so they “store” it by eating lots and lots before the trip starts. So gobble up lots of food to get ready for your journey. Some eat during the trip too, like we do. **Warm clothes:** Can an animal bring a jacket? No, but its stored fat can help keep it warm. Do you go on trips by yourself or with your family? Migrating animals usually travel in a group for protection and even warmth. Ask the children where they would like to “migrate” to today on their outdoor explorations.

Read: *Over and Under the Snow* by Kate Messner
The Busy Little Squirrel by Nancy Tafuri

SMALL GROUP LEARNING ACTIVITIES

What’s Up Bud? Make clippings and dissect buds of different trees and shrubs. You can cut down the center to reveal what’s inside or gently peel back the scales.

Insulation Experiments

Materials: half liter soda bottles, insulating materials – felt, wool, cotton, fleece, etc

Description: Explain that you’re going to see what happens to the temperature of water if you leave it inside a variety of materials over time. Take the temperature of the water at the beginning. Have the children predict which material will keep the water warm the longest. Put the bottles wrapped in a variety of materials outside. Check them every 5-10 minutes and take the temperature to see how much it has changed. Make a chart of the changes in temperatures and compare the results for each bottle.

Flying South

Materials: index cards with a variety of ways in which to move from place to place

Description: Explain that as birds migrate a variety of events can occur and that you’re going to act them out. Have a stack of cards with the following events that could happen to a bird during migration:

- Find a bush with many berries run forward for ten seconds.
- Get lost in the fog spin around 3 times.
- Mountain is in your way. Stop for 5 seconds.
- Winter storm. Roost in a tree for 6 seconds.
- Find a field with lots of tasty bugs. Skip forward 5 times.

Eventually reach a place which you consider to be south and have a snack and a rest.

OUTDOOR LEARNING ACTIVITIES

Squirrel it Away

Materials: acorns or pinecones or any small manipulative

Description: Have the children sit in a circle and have them pretend to be squirrels. Give them each a few “nuts” to go and hide all in the same place and then return to where they are sitting. You then pretend to be a hungry raccoon that is searching for food and find most of the nuts that had been hidden. Have the children go look where they had hidden their nuts to see if they are still there.



Repeat the activity but have the children each hide their nut in a separate place. Again pretend to be a hungry raccoon and find a few of the places. Have the children go see how many were eaten. Compare this number to the number you had the first time.

Gray squirrels hide one nut at a time so fewer are eaten by other animals, but they have to remember where they hid them. Red squirrels hide their nuts all together, but then they have to defend them so other animals won't eat them.

Bursting Buds: Find a tree close to your school that you can visit regularly. Visit in winter to notice the buds. Remind the students that the spring leaves are tightly packed in the bud and protected until spring arrives. Flag the tree so you can visit it regularly until the buds swell and open, revealing the new leaves.

Twig Treats: Look for evidence of deer and rabbit browsing on shrubs in your school yard.

Dressing for the Weather: Make observations about what we are wearing when we go outside.

Signs of the Season: Look for signs of seasonally related behavior from animals – storing food, migrating, burrows, nests, etc.



CHILDREN'S BIBLIOGRAPHY

RESOURCES: WEATHER

Title	Author	Description
<i>What Will the Weather Be?</i>	Lynda DeWitt	A good introduction to weather words and concepts to open a class discussion.
<i>Snowy, Flowy, Blowy: A Twelve Months Rhyme</i>	Nancy Tafuri	A book in verse about weather from month to month.
<i>Flip the Flaps: Weather</i>	Mike Goldsmith	A book to answer common questions that children have about weather.
<i>The Sun, the Wind and the Rain</i>	Lisa Westberg Peters	A child builds a mountain out of sand and learns how weather affects mountains.
<i>Oh Can You Say What's the Weather Today?</i>	Tish Rabe	A "Cat in the Hat" adventure about weather phenomena.
<i>Wild Weather Soup</i>	Caroline Formby	An early literacy book about Winifred Weathervane.
<i>The Falling Raindrop</i>	Neil Johnson Joel Chin	Through the story of a rain drop, learn the science of the water cycle.
<i>Thunder Cake</i>	Patricia Polacco	By making Thunder cake, a grandmother helps her granddaughter face her fear of an impending storm.
<i>When Rain Falls</i>	Melissa Stewart	We go inside, but what do all of the different animals do when it rains and storms?
<i>A Drop of Water</i>	Gordon Morrison	A drop of water from a child's fingertip – where does it go and what does this mean for all living things?
<i>Come On, Rain!</i>	Karen Hesse	The renewing experience of a downpour after a summer heat wave.
<i>Shadows and Reflections</i>	Tana Hoban	An imaginative, wordless book of photographs of shadows and reflections.
<i>My Shadow</i>	Robert Louis Stevenson	A traditional favorite about a child playing with his shadow.
<i>Shadow</i>	Suzy Lee	Creative illustrations celebrate imagination and the shadows created with the click of a lightbulb.
<i>Shadow Chasers</i>	Elly MacKay	Shadows play as the evening paints the summer sky.



<i>It looked Like Spilt Milk</i>	Charles G. Shaw	Like clouds, white shapes silhouetted on a blue background keep children creatively guessing.
<i>Little Cloud and Lady Wind</i>	Toni Morrison and Slade Morrison	A retelling of a classic story of independence and working together.
<i>Little Cloud</i>	Eric Carle	Little Cloud likes making shapes on his own, but also with other clouds. Inspires cloud gazing!
<i>The Cloud Book</i>	Tomie dePaola	Introduces common types of clouds and the kinds of weather associated with them.
<i>I Am Water</i>	Jean Marzollo	A celebration of the beauty and usefulness of water.
<i>All the Water in the World</i>	George Ella Lyon	A fantastic read-aloud book about the water cycle, with beautiful illustrations.
<i>Snow</i>	Melvin and Gilda Berger	A great scholastic book about snow.
<i>The Snowy Day</i>	Ezra Jack Keats	A classic story about a child's day exploring snow in the city and coming back home.
<i>White Snow, Bright Snow</i>	Alvin Tresselt	The wonder and delight of snowfall.
<i>Katy and the Big Snow</i>	Virginia Lee Burton	Katy is a strong tractor who pushes the snowplow in the winter, making it possible for all of the townspeople to do their jobs.
<i>In the Snow: Who's Been Here?</i>	Lindsay Barrett George	It's quiet on a hike through the snow, but animal signs are everywhere. Help find them!
<i>Snow</i>	Cynthia Rylant	A book about children loving snow and all of the fun they have playing in it.
<i>Sun Bread</i>	Elisa Kleven	Using sun to make bread brings everyone in town together. Includes a recipe for making your own sun bread.
<i>Why the Sun and the Moon Live in the Sky</i>	Elphinstone Dayrell	Sun and his wife, the moon, lived on Earth and built a large house so that the water people could visit. But so many poured in that they were forced to move to the sky.



<i>Aunt Minnie and the Twister</i>	Mary Skillings Prigger	Aunt Minnie and her nine nieces and nephews stay busy all year long. When a twister comes and turns everything topsy-turvy, she knows just what to do.
<i>Feel the Wind</i>	Arthur Dorros	Where do you feel and see the wind? Read about the ways wind affects the world around us.
<i>When the Wind Stops</i>	Charlotte Zolotow	When a little boy asks this question at the end of a happy day, his mother explains that the wind does not stop – it blows away to make the trees dance somewhere else.
<i>Bag in the Wind</i>	Ted Kooser	A poetic book about the journey of a plastic bag from a landfill through the lives of the townspeople it passes by.
<i>The Wind Blew</i>	Pat Hutchins	As the wind blows it takes everything with it – an umbrella, a balloon, some scarves.
<i>The Busy Tree</i>	Jennifer Ward	Rhyming text about the activities in a tree including chipmunks nibbling acorns, a spider spinning a web, and leaves “breathing out air.”
<i>Over and Under the Snow</i>	Kate Messner	Underneath the white surface of the snow, animals live through winter in a variety of ways.
<i>The Busy Little Squirrel</i>	Nancy Tafuri	Squirrel busies himself getting ready for winter; collecting nuts and berries and readying his nest for the cold winter ahead.

