

Weather Wonders

A 5-day science adventure for kids



Explore, read, play, invent, build, and learn —
all about climate and weather



Brought to you by Reading Rockets, with support from the Park Foundation



Weather Wonders

A book-based adventure about climate and weather

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Welcome to Weather Wonders

The best way to get kids learning is to build on their curiosity and interests. The Weather Wonders program is kid-centered, with an emphasis on inquiry and creativity.

We've designed the program to be user-friendly and adaptable. Use the materials each day for five days in a row, or once a week for five weeks (or any other way you like) to add hands-on learning to your summer programming.

Day 1: Weather, Seasons, and Climate

Day 2: Atmospheric Science

Day 3: Extreme Weather

Day 4: STEAM-y Weather

Day 5: Weather Brings Us Together

Weather Wonders: Introduction

Getting yourself ready

- **Each day has an emphasis on one or more topics related to weather.** You'll find an introduction to the concepts covered and recommended books for each day, as well as a list of questions to guide explorations and activities.
- **Start by gathering books from your library** using the booklists here in the toolkit.
- **Choose both fiction and nonfiction books** from the lists provided.
- **Read them through before you read them to the kids**, so you know what happens and can spot any unfamiliar words or concepts you'll need to explain. Also, look for **places to ask questions** while you're reading to engage listeners.
- Think about which other parts of the program you'd like to do after reading the books. An activity is always a good idea, and you may also want to include writing, exploring related websites, videos and apps, and heading outside, too.
- **Get connected to NOAA guest speakers and field trips in your area:** <https://www.noaa.gov/education/noaa-in-your-backyard> or invite the National Weather Service to visit virtually with your program: <https://www.weather.gov/education/school-out-reach>. Check too with your local college or university to see if they have a meteorology department or what weather-related exhibits a local science or children's museum might have. Or reach out to your local TV news station about a field trip or other opportunities to meet a meteorologist or weather broadcaster.



Learning with the kids

- **Introduce the theme** for the day and ask kids what they know about it. (See “Activating background knowledge” on page 4.)
- **Read one or more of the books aloud and ask questions.** Listen carefully to the kids' answers. By reading to them and asking questions, you'll get them thinking about the topic, and what they want to learn. You'll also increase their understanding and excitement.

Weather Wonders: Introduction

- **Read another book and repeat.**
- **Choose a hands-on activity** to let kids explore the theme. By doing an activity, the kids get to use the concepts and new words they have learned.
- **Look for a local connection.** How can you connect the ideas in the books or the activities with the kids' personal experience? Think about walks in the rain, visiting a meteorologist, checking on the effects of weather on animal habitats or gardens.
- **Keep asking questions** and listening carefully to the children's answers.
- **Encourage kids to write** about what they are learning or curious about by using one of the writing prompts in this toolkit, and by keeping a **Weather Journal** for observations, drawings, questions, and creative writing activities.
- **Provide access to books about the topic** for kids to look at on their own.
- **Share digital media with kids** (websites, apps, videos, and podcasts) that they can use to learn more about the topic and give kids time to try them out.
- **Take a field trip** to one of the recommended locations to further explore your topic for the day or theme for the week. Activities for each day will include a **Weather Walk** with special attention to observing and predicting weather and understanding climate.

You can choose any of the activities in this toolkit, all of them, or just one or two, but we recommend that you **always Start With a Book.**



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Review and teach new words

When you are pre-reading your books or looking at activities, websites, apps, or field trips, look out for words kids might not know. Take time to talk about those words and tell kids what they mean. You can provide images, video, and real objects to help them build an understanding of unfamiliar words. You can even act words out! You can do this before you read, before you do an activity, or while you are reading or trying a hands-on activity.

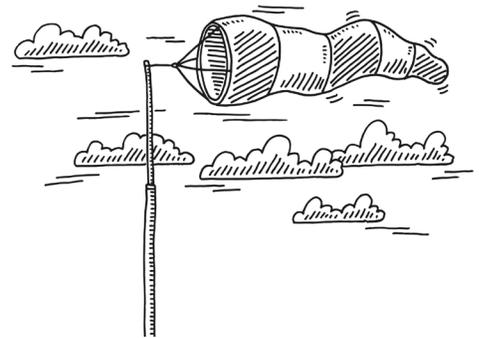
If words or concepts are being repeated, ask kids if they remember what they mean and how they might be used the same way or differently in this new context.

The glossary of **Weather Words** on pages 146-151 can help you define terms that kids might not be familiar with.

Activating background knowledge

Ask kids what they know about weather as you begin this program:

- What is the difference between weather and climate?
- How and why does weather change?
- Why is knowing about weather important to us in our everyday lives?
- How does weather impact our world and how people live?
- What do you wonder about weather?



Connecting the days and concepts

Children will learn more readily and remember more if you review all five days of materials in advance and decide which books and activities you want to use. Connecting the ideas and activities day to day will help them create a big picture.

At the beginning of the day, ask them, “*What did we talk about yesterday?*” Then tie their answers to the focus for the day.

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You may choose to use all the days or you may select specific days for your program. You may select different activities; however, the **daily Weather Walk** is critical in helping children connect ideas with their everyday environment.

Setting up an **Weather Station** — providing kids with or having them build their own weather instruments — will provide opportunities for observation and reflection as well as help develop their interest in science, math, and engineering.

Use the **Weather Movement** activity to get kids' blood and oxygen flowing and ready to listen and learn. Sitting still and silent is not a developmentally appropriate expectation for most young children. Weather Movement can help you transition between activities, or work as an energizer to reduce restlessness while reinforcing content.

Ultimately, children will develop a deeper understanding if they connect the different ideas from each day.

Climate check!

Each day includes an activity focused on climate and how it is changing. It explores concepts around climate, climate change, and action. Kids explore climate and weather, what is happening with climate at home and around the world, the role of technology in combating climate change, and how to take action in their own community. These are the climate check topics:



Day 1: Climate vs. weather

Day 2: The greenhouse effect

Day 3: Preparing for the effects of climate change

Day 4: Climate and technology

Day 5: Weather energy

Planning the daily Weather Walk

We experience weather every day, but how often do we truly observe it? A quick glance at a weather app, the newspaper, or a look out the window is often all the attention the weather usually gets as we get dressed and plan to head out for our day. Only when big weather events are happening do we really pay attention. Snow day? Heat wave? Hurricane or high winds? NOW, the weather has your attention. Especially if you are planning an outside activity like a soccer game, picnic, or field trip.



Making weather watching a daily experience provides opportunities to practice observation and data recording skills, facilitates real-world interaction with the environment and STEM, and supports kids' connection to their own communities and the larger world. Weather watching also demonstrates, in a very concrete way, how nature, science, technology, and curiosity/exploration are part of our everyday lives.

Though a Weather Walk is recommended daily, if you have the opportunity, take kids outside more than once during the day to observe how the weather changes!

What you'll need for the daily Weather Walk:

- A place to walk and observe the weather
- Weather Journals or notebooks and colored pencils for each child
- Gear appropriate for the weather — sunscreen, hats, umbrellas, etc. (optional)
- Weather instruments and resources like weather apps, websites, or news channels

Including a daily Weather Walk in your Weather Wonders program is a way to anchor the topic and key concepts in daily activities and provide a framework for further exploration and discussion. Watching the weather at home makes it personal. Following the weather from a location someplace else in the world provides contrast and context. Choose a place with a different climate or hemisphere, or pick someplace rural if you live in an urban environment, and vice versa. Do kids have family in other parts of the world? Are they interested in a place in the current events spotlight?

To help keep your weather data consistent, plan for Weather Walk observations to take place every day, at the same time, and in the same location. While suggestions for Weather Walk activities will vary, count on always incorporating these components in each Weather Walk:

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Daily Data Collection

- Start with the senses. Have kids write in their Weather Journal what they see, feel, hear, touch, and even taste (rain drops or snow flakes).
- Check a thermometer and record the temperature. If you like, measure the temperature in the sunshine and the shade. If you have made other weather instruments, like a weather vane, barometer, anemometer, hygrometer, and rain gauge, check those, too. Have kids record all data, along with the date and time, in their Weather Journal.

Sky Sketch

- When you are out on your Weather Walk, give kids time to look up at the sky (but not directly at the sun)! Have them especially look carefully at clouds, sketch them, and describe them in their own words in their Weather Journals. As kids sketch, help them understand that they don't ever have to draw beautiful "perfect" pictures — the Sky Sketch is to document their observations and draw what they think is important to remember.
- Based on their observation and sketch, have them write predictions about what the sky will look like the next day.
- Encourage them to look for changes in their Sky Sketches and recurring patterns, and note those in their Weather Journals.



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World Weather Wise

- Check local weather using a favorite weather app or online site, the newspaper, or a local TV or radio station. Invite kids to make note in their Weather Journal of what these resources report and compare it with their Daily Data Collection.
- Together, use a map to choose a location somewhere else in the world. Talk together about what they know about this place and have them predict how the weather there compared with their own. Ask them to note these things in their Weather Journal:

If they think the temperature in this location will be warmer or colder than where they are? Why?

What type of precipitation is expected there? Why?

If wind speeds are higher or lower and why.

- Check the current weather conditions of this online. Have kids record that, too, in their Weather Journal and check their predictions.

Get outside — in all weather

We often avoid going outside when the weather isn't what we'd like it to be. Maybe it's raining, snowing, hot, or windy. Except for extreme situations, like heat advisories, lightning storms, or severe wind chill, most weather conditions, while maybe wet or messy, are safe. Make an effort to get kids outside in all kinds of weather. Experiencing the elements in person is a powerful experience, and can dispel misconceptions about the great outdoors.

The right clothing and gear make a big difference, so check to make sure kids have shoes and coats appropriate for the conditions before taking the group out. Gloves and hats are important to protect extremities or protect from the sun. If possible, encourage them to bring a spare, dry set of clothes (especially socks!) and have towels available for wet days. Warm or cool drinks enjoyed after your outdoor adventure provide the perfect opportunity to share their observations.

Beyond going outside to check the weather, create other opportunities to get outside. Take a walk in the rain and splash in some puddles. Chase leaves or fly a kite on a windy day. Go sledding or make snow angels. Go for a hike or a swim. Have a picnic. Go birdwatching. Look at the clouds. Rake leaves, grow a veggie or flower garden, or shovel snow. Nothing beats real-world experiences!

Weather Wonders: Introduction

Weather journal

Journaling gives kids the opportunity to use drawing and writing together to show their observations, document their discoveries, pose questions, note their ideas, and learn to see and hear more. Keeping a Weather Journal is a great way to get your Weather Wonders' participants outdoors to explore and record their responses to and reflections about science and the natural world — and keep track of what they're learning. Get kids started on their journals with information that will help them keep track of what they wonder, identify weather phenomena, and provide them with some of the words they'll need to record their observations.

Supplies

- Blank spiral notebook or sketchbook (or fold 10 sheets of paper in half and staple along the fold to create a booklet)
- Weather Wonders journal cover (optional, see Appendix)
- Weather Wonders weather log (optional, see Appendix)
- Writing tools
- Drawing materials

Let kids know that their journals can look however they want them to look! Kids can freely draw, write, or add photographs. It can be a place to brainstorm, keep notes and vocabulary words, make lists, sketch, or write poems. Tell them it is their place to write and draw their observations, thoughts, questions, and ideas, and as Weather Wonder, they will have a chance to make all kinds of observations and explore things that grab their curiosity.



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Talk with kids about how scientists keep notes and journals of their observations, data, and experiments. Writers keep journals of their observations and feelings about people and places. As Weather Wonders, ask them how they think they could use a journal.

Since part of the Weather Wonders experience is collecting weather data, help kids keep it organized with a consistent, standardized way of recording their observations. Provide the Weather Log template (in the Appendix) or point out what they need to note, which should always include the date, time, and location, and could also include:

Temperature: _____

Sky (description): _____

Wind (description): _____

Wind direction: _____

Wind speed: _____

Atmospheric pressure: _____

Humidity: _____

Precipitation type: (at data collection time): _____

Precipitation amount (in last 24 hours): _____

Get kids thinking more about how to use their Weather Journals

Keeping a prompt or series of journal prompts can help kids who are feeling stuck. Share these sentence starters:

- I see ...
- I hear ...
- I wonder ...
- I was surprised by ...
- I feel ...
- Today's weather was...
- Today's weather made me feel ...
- This drawing shows today's weather ...

Weather Wonders: Introduction



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