

Family Unit Study:
Weather

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FAMILY UNIT STUDY: WEATHER

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FAMILY UNIT STUDIES

Welcome Home!

Thank you so much for choosing a How Wee Learn Family Unit Study. This unit study has been created with care by me, a homeschooling Mom and former teacher. These unit studies have worked so beautifully with my own family I knew they must be shared. My time in the classroom, certification as a Reading Specialist, and 18 years as a mom has given me a unique perspective on what children truly 'need to know'.

What is a Unit Study?

A unit study focuses on critical thinking and problem solving, allowing children to dive deep into fascinating topics and engage in meaningful learning.

When a child is engaged in what he or she is learning, that learning sticks. And when a child is engaged and *fascinated* in what he or she is learning, learning is amazingly fun for the whole family! Say goodbye to those power struggles.

Each unit study is broken down into ten topics with manageable, bite-sized amounts of incredible information. Each of these ten topics include a hands on activity, a math or literacy enrichment question, a YouTube video, book suggestion, interesting fact and discussion question.

What are the components of a Unit Study?

HANDS ON ACTIVITY

Each of the ten topic includes a hands on activity that brings the information shared and discussed to life! This allows children to really engage in and solidify their learning. The hands on activities use items you likely have already. If you do not have an item, think creatively about what you do have on hand and adapt. No buttons? I bet beads could work. No pipecleaners? Maybe you have some yarn!

MATH ENRICHMENT WORD PROBLEM

Each unit study includes five math word problems covering the five math strands: Number Sense, Geometry, Measurement, Patterning and Data Management/Probability. The word problem introduces your child to each of these areas with the belief of quality over quantity. This is not a full

math curriculum of course, but an enrichment opportunity and chance to be exposed to some real world math.

As you go through a question, consider how you might change it slightly to ask a follow up question. Perhaps you could ask, "What would happen if there were 6 birds instead of 5?" Or you might get out some manipulatives and help your child dive into deeper learning about the geometry topic introduced.

LITERACY ENRICHMENT ACTIVITY

When a child is learning about a fascinating topic, there are so many natural opportunities to tie in literacy development. Reading, researching, recording information, labeling, and note taking will all happen very naturally.

On top of this, each unit study includes five literacy enrichment activities modified to three levels so they are fitting for the whole family. Creating poems, public speaking, practicing letter formation, and literacy scavenger hunts are all fun ways literacy learning is brought to life with these unit studies.

CURATED YOUTUBE VIDEO

Each of the ten topics includes a carefully curated YouTube video. Dive into some fun and easy learning with experts in the field, entertaining stories, and inspiring tales, all selected to highlight key learning concepts. Enjoy some time snuggled on the couch learning with popcorn and a movie!

BOOK SUGGESTION

The book suggestions for each topic are just that— suggestions. Any books at all on the unit study theme are strongly encouraged. Immersing our



children in a literacy rich environment and offering plenty of time to dive into research, pictures, and stories is key for child-led learning.

INTERESTING FACT

Did you know that elephants suck their trunks much like babies suck their thumbs? Or that a human has the same number of neck bones as a giraffe? Interesting facts are a wonderful way to spark a child's interest and imagination, which is why every topic includes an interesting fact.

DISCUSSION QUESTION

Asking the right questions and having meaningful discussions is a wonderful way to meet your child at his or her current level of understanding and to help your child grow his or her learning and thinking about topics. So much can be learned through one meaningful discussion!

How do I use a Unit Study?

These unit studies are completely flexible and can be used however you wish. For those who would like a few suggestions, I will outline two possible ways you might choose to use these unit studies.

OPTION 1: FOCUSED UNIT STUDY

Your family might choose to focus on one unit study over a two day period.

Day 1	<ul style="list-style-type: none"> • Introduce the topic with the curated YouTube video • Have an amazing discussion using the discussion question as a prompt • Research more about the topic with the suggested book or a book of your choice • Read the interesting fact together
Day 2	<ul style="list-style-type: none"> • Dive into the hands on activity for some deep learning • Complete the math or literacy enrichment question
Day 3+	<ul style="list-style-type: none"> • Core skill work in reading, writing and math at your child's individual level • Go on a family outing • Extracurricular activities • Start another topic!

OPTION 2: BLENDED UNIT STUDY

Alternatively, your family might choose to blend the unit study with your core skill learning over a three day period.

Day 1	<p>Morning:</p> <ul style="list-style-type: none"> • Core skill work in reading, writing and math at your child's individual level <p>Afternoon:</p> <ul style="list-style-type: none"> • Introduce the topic with the curated YouTube video • Have an amazing discussion using the discussion question as a prompt
Day 2	<p>Morning:</p> <ul style="list-style-type: none"> • Core skill work in reading, writing and math at your child's individual level <p>Afternoon:</p> <ul style="list-style-type: none"> • Research more about the topic with the suggested book or a book of your choice • Read the interesting fact together • Complete the math or literacy enrichment question
Day 3	<p>Morning:</p> <ul style="list-style-type: none"> • Core skill work in reading, writing and math at your child's individual level <p>Afternoon:</p> <ul style="list-style-type: none"> • Dive into the hands on activity for some deep learning
Day 4+	<ul style="list-style-type: none"> • Core skill work in reading, writing and math at your child's individual level • Family outings • Extracurricular activities • Start another topic!

There is no right or wrong way to dive into this unit study. When learning is this exciting, you simply cannot go wrong!

I hope you and your family love this unit study! If you have any questions at all, wish to purchase more unit studies, or if I can be of assistance, please visit www.howweelearn.com/family-homeschooling-unit-studies or email me at sarah@howweelearn.com.

xo
Sarah



TOPIC 1

Climate

Climate means the usual conditions of the temperature, wind, rainfall, and other meteorological elements in an area on Earth. Climate is like weather, but over a long period of time. There are five main climate zones: Tropical, Dry, Temperate, Continental and Polar. Let's explore...

Spark Curiosity



Did you know? Humans can adapt to a climate other than the one they are used to. This process, called acclimatization, takes about two weeks (a little less for heat and a little more for cold).



Think about your favorite fruits. What kind of climate do you think they grow in? What climates do your favorite animals live in?

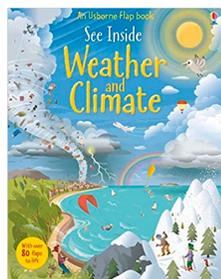
Resource Suggestions



What's the difference between weather and climate?

NASA Climate Change

Learn about the difference between weather and climate, and how climate changes can be tracked from space.



See Inside Weather and Climate

Katie Daynes

An interactive overview of all things weather, including a visit to climates around the world.

HANDS ON ACTIVITY

- "Planning a Garden" on page 7

Math Enrichment Word Problem

Have blocks, stones, or other manipulatives available for these math problems. Be flexible and change up the numbers to make these problems the right challenge for your children. Extend on the problems and ask follow up questions if your child is enjoying these challenges!

- ☆ There are 5 main climate types on Earth. How many more climate types would be needed for there to be 20 climate types?
- ☆☆ If there were 50 people divided evenly between the 5 climate types, how many people would be in each climate? What if there were 100 people?
- ☆☆☆ About 4,000,000 people live in the polar climate. Say the place value of each digit in that number (ones, tens, hundreds, etc). If you could add a 1 to any place value to make that number as big as possible, where would you add it? Where would you add it to make the smallest difference possible?



HANDS ON ACTIVITY

Planning a Garden

Types of Learning: Research Skills, Planning and Organizational Skills, Critical Thinking, Problem Solving, Fine Motor Skills

WHAT'S HAPPENING?

The growing season is the period of time each year when it is warm enough for plants to grow. The timing and length of the growing season determine what types of plants can grow in an area.

For example, near the poles the growing season is very short. The temperature may rise above freezing for only a couple of months each year. Because of the cold temperatures and short growing season, trees and other slow-growing plants are unable to survive. The growing season gets longer from the poles to the equator. Near the equator, plants can grow year-round if they have enough moisture. A huge diversity of plants can grow in hot, wet climates.

Adapted from CK-12.

[Check it out here for more interesting facts about climate and plant growth.](#)

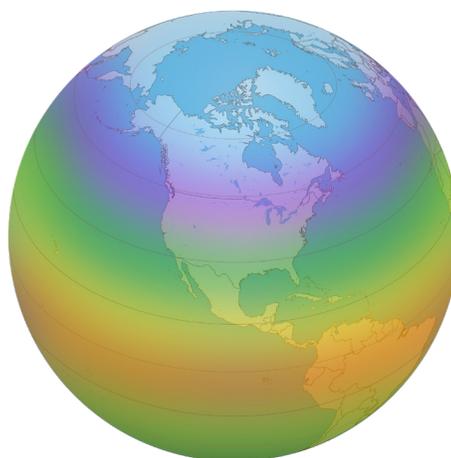
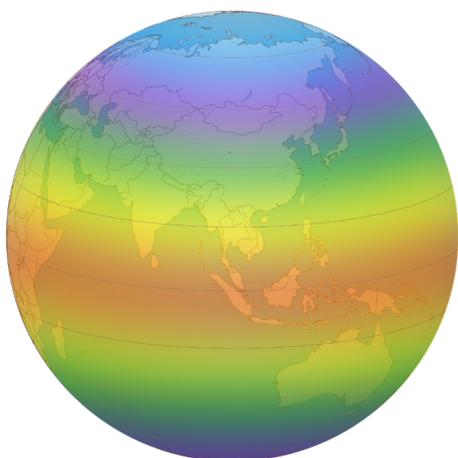
Materials

- Pencil
- Piece of paper
- Research materials

Directions

Climate is important for many reasons, one of which is farming and gardening.

1. Research your climate and find out what fruits and vegetables grow well where you live.
2. Plan a garden of your own on a piece of paper, choosing appropriate fruits and vegetables for your climate.



- Tropical
- Dry
- Temperate
- Continental
- Polar



TOPIC 2

Temperature

Temperature is a measurement of how hot or cold something is. We can measure temperature using a thermometer in degrees on the Fahrenheit, Celsius, and Kelvin scales. When we measure temperature, we are really measuring how fast the atoms of a substance are moving. Let's explore...

Spark Curiosity



Did you know? The world's hottest temperature in the last 100 years was recorded in August of 2020 in Death Valley, California. It was 129.9 degrees Fahrenheit (54.4 degrees Celsius). The coldest temperature ever recorded from the ground was in Antarctica in 1983, -128.6 degrees Fahrenheit (-89.2 degrees Celsius).



What kinds of temperatures feel best to your body? What temperature do you need it to be to do your favorite outdoor activities?

Resource Suggestions



Temperature KIPEDU

See a comparison of Celsius and Fahrenheit temperature readings and discuss what different temperatures feel like and what we can do in them.



What Is Temperature? Robin Johnson

Explore the concept of temperature, learn how it is measured, and discuss how it affects our daily lives.

HANDS ON ACTIVITY

- "Tracking the Weather" on page 9
- "My Weather Journal" on page 26

Literacy Enrichment Activity

- ☆ The temperature outside is measured in Celsius or Fahrenheit. Those are two very odd looking words! Practice writing these words yourself, or trace over the words your grown up has written for you. Call out the letters as you print them.
- ☆☆ Celsius is a scale of temperature that starts with a soft "c", making it the sound of an "s". What other words start with a soft "c"? Hint: When "c" is in front of an i, y, or e it is typically a soft "c".
- ☆☆ The word Fahrenheit has a silent "h" in the middle of it! How many words can you brainstorm that have silent letters? (But don't count silent "e" words!)



HANDS ON ACTIVITY

Tracking the Weather

Types of Learning: Gathering Data, Research Skills, Documentation, Fine Motor Skills, Measurement

WHAT'S HAPPENING?

Temperature is how hot or cold something is. Our bodies can feel the difference between something which is hot and something which is cold.

To measure temperature more accurately, a **thermometer** can be used. Thermometers use a temperature scale to record how hot or cold something is. The scale used in most of the world is in degrees **Celsius**, sometimes called “centigrade”. In the USA and some other countries and locations, degrees **Fahrenheit** are more often used, while scientists mostly use **kelvins** to measure temperature because it never goes below zero.

Temperature is important in weather and climate. It is related to the amount of heat energy in the air. Isotherm maps are used to show how temperature is different across an area. Temperature will be different during different times of day, different seasons and in different places. It is affected by how much heat reaches the place from the sun's rays, how high the place is above the sea level, and how much heat is brought to the place by the movement of winds and ocean currents.

Adapted from Kiddle.

[Check it out here for more interesting facts about temperature.](#)

Materials

- Thermometer
- Pencil

Directions



“My Weather Journal” on page 26

1. Place a thermometer outside in a covered area and check the temperature three times a day for a week. It is best to check it first thing in the morning, at noon, and at bedtime to get varied results.
2. Using the My Weather Journal printable, record the temperature and describe the weather at that time. Does it feel cold? Hot? Is it snowing? Is it raining? Is it windy?
3. Review your findings to see if you can find any connections between the temperature and how it affects the weather.

You can do this activity throughout the year as the seasons change!





TOPIC 3

The Water Cycle

All water moves around Earth in different states. Water can be found in liquid form in rivers, lakes, ponds, and puddles and it can be found in a frozen state in ice and snow. Water also exists as vapor, which is a gas, in the atmosphere. Water flows from one state to another in a cycle. Let's explore...

Spark Curiosity



Did you know? Even volcanic steam is part of the water cycle, as it travels up and forms clouds.



What are your favorite ways to play in water outside? What parts of the water cycle are involved in making them possible? For example, playing in the rain, splashing in creeks, or sledding.

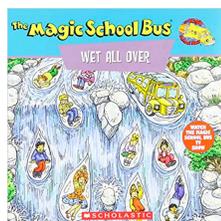
Resource Suggestions



Where Does Water Come From?

SciShow Kids

Watch an introduction to the concept of the water cycle.



The Magic School Bus Wet All Over

Pat Relf

Ms Frizzle and her class take a wild ride through the water cycle.

HANDS ON ACTIVITY

- "The Water Cycle in a Bag" on page 11

Math Enrichment Word Problem

Have blocks, stones, or other manipulatives available for these math problems. Be flexible and change up the numbers to make these problems the right challenge for your children. Extend on the problems and ask follow up questions if your child is enjoying these challenges!

- ☆ The water cycle flows in a circle. Walk around your house and find as many circles as you can. Next, see how many other shapes you can find.
- ☆☆ If your small lake was a perfect rectangle that was 10 feet long and 30 feet wide and you wanted to cover this whole lake so it kept the heat in and didn't evaporate, what size would you need this 'lake cover' to be?
- ☆☆☆ You need to find out how big the lake is outside, so you know how much water it holds. You know the lake is 10 feet long, 30 feet wide, and 5 feet deep. What is the volume of this lake?



HANDS ON ACTIVITY

The Water Cycle in a Bag

Types of Learning: Science, Following Instructions, Learning About Our Natural World

WHAT'S HAPPENING?

Since the Earth has a limited amount of water, it has to change around and around in something called the water cycle.

In your Ziploc bag, you'll notice that when the water warms in the sunlight, it **evaporates** into vapor. As the vapor cools, it begins to change back into liquid (**condenses**), just like a cloud.

When enough water has condensed, the air can't hold it anymore and the water falls back to the bottom of the bag as **precipitation**.

In the real water cycle, rain, sleet or snow might land in a body of water like a river or ocean, but it also might fall on land. In this case, it soaks into the soil and either becomes ground water or it runs over the soil and falls into rivers, oceans or lakes.

Adapted from Playdough to Plato.

[Check it out here for more interesting facts about the water cycle.](#)

Materials

- Ziploc bag
- Black permanent marker
- Tape
- Water
- Blue food colouring (optional)

Directions

This activity is so simple to set up and demonstrates the water cycle in action!

1. Take a Ziploc bag and draw a simple water cycle with black permanent marker on it (a wavy line for a lake at the bottom, an arrow pointing up to a sun shining at the top, and an arrow pointing back down to the 'lake' at the bottom).
2. Add about an inch of water to the bag and a few drops of blue food colouring (optional).
3. Tape it to a very sunny window and watch the water cycle in action!





TOPIC 4

Clouds

Clouds are formed when warm air containing water vapor rises then cools. When warm air cools, the water vapor in the air turns into tiny water droplets or ice crystals. When enough of these water droplets or ice crystals form together, they make a cloud. Let's explore...

Spark Curiosity



Did you know? A large cloud can weigh hundreds of tons! But it is still less dense than the air beneath it, allowing it to float.



I wonder how long it takes for storm clouds to form? What affects how long it takes?

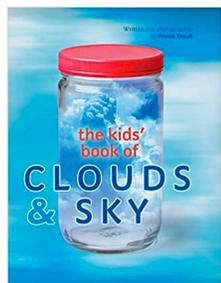
Resource Suggestions



What Are Clouds Made Of?

SciShow Kids

See how clouds form and what the main types look like.



The Kids' Book of Clouds & Sky

Frank Staub

From cloud types to rainbows, this question and answer book covers a wide range of elements of the sky.

HANDS ON ACTIVITY

- "Cotton Ball Clouds" on page 13
- "My Cloud Information Booklet" on page 28

Literacy Enrichment Activity

- ☆ Using the My Cloud Information Booklet printable, create a rhyme about one type of cloud. For example, "When Cumulus clouds are puffy and white, I know the weather will be alright!" Support your child with this by brainstorming some simple rhyming words together that could be used to describe clouds.
- ☆☆ After brainstorming some rhyming words about clouds and reading through the My Cloud Information Booklet printable, create a simple rhyme about two different types of clouds.
- ☆☆☆ After brainstorming some rhyming words about clouds and reading through the My Cloud Information Booklet printable, create a simple rhyme for each of the four types of clouds.



HANDS ON ACTIVITY

Cotton Ball Clouds

Types of Learning: Sensory Experience, Art, Classifying and Sorting

WHAT'S HAPPENING?

Cirrus clouds are the thin, wispy clouds seen high in the sky. They are thin because they are made of ice crystals instead of water droplets. A blue sky and a few cirrus clouds high in the sky usually means it is going to be a nice day.

Cumulus clouds are the puffy clouds that are usually scattered throughout the sky. Cumulus clouds can be white or gray. White fluffy clouds means no rain, but when they form into dark clouds, it is going to rain.

Stratus clouds look like a thick blanket covering the sky. These clouds are a sure sign of rain if it is warm, and snow if it is cold. Stratus clouds form when the weather has been cold and warm moist air blows in.

The word **nimbus** means a cloud that already has rain or snow falling from it. These clouds are dark and seen during a thunderstorm. They can be a combination of two clouds, like a cumulonimbus, which means a puffy black cloud with rain falling out or it, or a stratonimbus, which is a dark blanket with rain falling out of it.

Adapted from Sciencing.

[Check it out here for more interesting facts about clouds.](#)

Materials

- Cotton balls
- Glue

Directions



"My Cloud Information Booklet" on page 28

1. Print off the My Cloud Information Booklet printable showing the four major types of clouds: **cirrus**, **stratus**, **cumulus**, and **nimbus**.
2. Using cotton balls and glue, cover each of the cloud templates. Some cotton balls will need to be stretched long and thin before gluing, and others will stay puffy.





TOPIC 5

Forces and Winds

The sun warms up the Earth, but some places and landforms get more sun than others, which makes some places warmer than others. As the air gets warmer, it weighs less than the cold air making it rise up. Cold air then comes in to replace this warm air, causing wind! Let's explore...

Spark Curiosity



Did you know? Some of our electricity comes from the wind! Wind moves huge turbines, which turn electric generators.



Kites are one way to enjoy the wind. I wonder what other fun activities need help from the wind?

Resource Suggestions



What Causes the Wind?

funsciencedemos
Watch a small scale demonstration of how air temperature creates wind.



Feel the Wind

Arthur Dorros
We can't see the air, but we can feel it when it moves! Learn all about moving air and how to make your own weather vane.

HANDS ON ACTIVITY

- "DIY Pinwheel" on page 15

Math Enrichment Word Problem

Have blocks, stones, or other manipulatives available for these math problems. Be flexible and change up the numbers to make these problems the right challenge for your children. Extend on the problems and ask follow up questions if your child is enjoying these challenges!

- ★ It is a very windy day so you head outside to fly a kite! You let the string out 2 feet. The wind catches it and pulls another 10 feet of string out of your roll! How much string is out of your roll now? You release another 3 feet of string. How much string is out of your roll now?

- ☆☆ It is a very windy day so you head outside to fly a kite! You know that there is a wire 50 feet above you that you don't want your kite to get tangled in. You release 10 feet of string, then 5 feet of string, then 20 feet of string, then 10 more feet of string. Have you released too much or will your kite fly safely under the wire?

- ☆☆☆ It is a very windy day so you head outside to fly a kite! The wind catches your kite right away and you release 70 feet of string in the air! It then dips, so you reel back in 10 feet. It dips again so you reel in an additional 8 feet. A big gust comes so you release the string and it is carried an additional 20 feet into the sky! How long is the string now?



HANDS ON ACTIVITY

DIY Pinwheel

Types of Learning: Sequential Thinking, Fine Motor Skills, Scissor Skills, Learning About Wind Power

WHAT'S HAPPENING?

Most pinwheels have the blades arranged so that when wind blows straight at them, they spin counterclockwise. This is because the blades' "cups" are made so that the oncoming air is captured and pushes the blades in this direction. When wind is blown into the cups, the pinwheel spins well.

So, if you are using a typical pinwheel, turn it so that the front side is facing your right and blow into the side of the blades. The blades will spin quickly **counterclockwise** if you blow on the bottom half (into the cups) but will spin slowly **clockwise** if you blow on the top half (against the backs of the cups).

Similarly, if the pinwheel's front side is facing your left and you blow into the side of the blades, they will spin quickly **counterclockwise** if you blow on the top half (into the cups) but will spin slowly **clockwise** if you blow on the bottom half (against the backs of the cups).

Adapted from Scientific American.

[Check it out here for more interesting facts about pinwheels and turbines!](#)

Materials

- Piece of paper
- Scissors
- Pencil
- Pushpin

Directions

Pinwheels are a wonderful way for us to see the wind. We can feel it on our skin, but when we see how it can cause objects to spin or move, we can gain a real understanding of the power wind can have. Making a pinwheel is nice and easy!

1. To begin, you will need a piece of paper, scissors, a pencil and a pushpin.
2. Take your paper and cut it into a square. Fold this square corner to corner both ways, making an X in your square.
3. In the very middle of the X draw a circle about the size of a quarter.
4. Now, cut your X lines, starting at each corner and stopping at the circle.
5. You now have four triangles. Fold in the left side of each triangle into the circle and secure them with a pushpin into the pencil. Make sure the pushpin is not pushed in too far so the pinwheel can spin.
6. And there you have it! Your very own pinwheel to harness the energy of the wind.





TOPIC 6

Thunder and Lightning

We've all heard and seen it, but what really is thunder and lightning? Lightning is a spark of electricity produced from a thunderstorm. Frozen water in thunderclouds bump together, building up static charge in the cloud, and pretty soon—zap! Lightning strikes! And thunder? Well that's just the sound caused by lightning. Let's explore...

Spark Curiosity



Did you know? Lightning often travels for miles before striking the ground, even striking outside the storm in some cases.



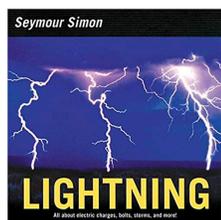
I wonder why some places on Earth get lots of thunderstorms and some have hardly any?

Resource Suggestions



Sprites, Jets, and Glowing Balls: The Science of Lightning
SciShow

A more detailed look at the physics of lightning, for older learners.



Lightning
Seymour Simon

Get an up-close look at lightning with bright photos and detailed information.

HANDS ON ACTIVITY

- “A Shocking Experiment” on page 17

Literacy Enrichment Activity

- ☆ Lightning is what our eyes see and thunder is what our ears hear when there is a storm. What do our eyes see and our ears hear when we are at the beach on a sunny day? Draw a picture of this and label it.
- ☆☆ Lightning is what we see and thunder is what we hear when there is a storm. Do a writing activity for five minutes, looking around and listening, writing down everything that you see and hear.
- ☆☆☆ There are many different ways to describe a thunderstorm. Use the most descriptive writing you can to write a paragraph about a big thunderstorm. You might choose to describe what the lightning looked like and how the thunder sounded.



HANDS ON ACTIVITY

A Shocking Experiment

Types of Learning: Science is AWESOME!

WHAT'S HAPPENING?

When an object becomes **electrically charged**, it can be either **positive** or **negative**. If an object has a lot of electrons, it is negatively charged; if it does not have many electrons, it has a positive charge. Whether an object tends to gain or lose electrons depends on the type of material it's made of.

When a charged object (such as the charged Styrofoam plate) touches the aluminum pie tin, the charge (or electrons) easily moves through the aluminum, creating a spark.

Adapted from Scientific American.

[Check it out here for a more in depth explanation of how electrons move, as well as instructions for making an electroscope.](#)

Materials

- Aluminum pie pan
- Pushpin
- Pencil with an eraser on the end
- Styrofoam container
- Wool sock or cloth
- Fork

Directions

1. Stick the pushpin through the middle of the aluminum pie pan. Stick your pencil on the inside of the pie pan so the eraser is stuck into the pushpin. You now have an aluminum pie pan with a handle!
2. Next, take your Styrofoam container and rub it all over very quickly with your wool item. You will need to rub it very quickly, really pressing down, for a full minute.
3. Now place the aluminum pie pan onto the 'charged' Styrofoam container and touch the aluminum pie pan with a fork. You should see a spark!
4. If you are feeling brave, touch the pie pan with your finger instead of the fork and you will FEEL the shock!

It works best if you try this experiment in a dark room, like a bathroom with the door shut and the lights turned off.





TOPIC 7

Tornadoes

Tornadoes form when there is a sudden change of weather—more specifically, when warm, wet air collides with cool, dry air. The warm air rises through the cold air, almost creating a vacuum. When this air reaches the ground, it becomes a tornado. Let's explore...

Spark Curiosity



Did you know? Tornadoes are visible because the low pressure inside them helps form a cloud. Besides the water vapor of the cloud, some tornadoes pick up enough dust and debris to change their appearance as well.



I wonder how meteorologists predict tornadoes? Why is it so hard to do?

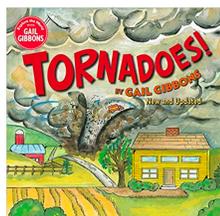
Resource Suggestions



Watch The Birth of a Tornado

National Geographic

Ride along with a crew of storm chasers and watch the birth of a tornado.



Tornadoes!

Gail Gibbons

Detailed illustrations and clear text give life to 50 fascinating facts about tornadoes.

HANDS ON ACTIVITY

- “Bottle Tornado” on page 19

Math Enrichment Word Problem

Have blocks, stones, or other manipulatives available for these math problems. Be flexible and change up the numbers to make these problems the right challenge for your children. Extend on the problems and ask follow up questions if your child is enjoying these challenges!

- ☆ A tornado heads through a big forest and knocks down trees in a pattern: red maple, spruce, oak tree, oak tree, red maple, spruce, oak tree, oak tree. Draw this pattern and extend it to show what comes next.
- ☆☆ A tornado followed a pattern while knocking down telephone poles that went: knock down one, leave one, knock down two, leave two, knock down three, leave three. Draw this pattern and extend it. Would the 15th telephone pole be knocked down?
- ☆☆☆ A tornado followed an unusual growing pattern as it headed out into the country. It picked up one hay bale, then two hay bales, then four hay bales, then eight hay bales. Extend this pattern. How many hay bales would be picked up next? What about on the tenth ‘pick up’?



HANDS ON ACTIVITY

Bottle Tornado

Types of Learning: Following Instructions, Science, Hand Dexterity

WHAT'S HAPPENING?

When you rotate the bottles in a horizontal circle, the water in the upper bottle starts rotating as well. As the water rotates, forces called **centripetal forces** pull the water toward the center of the bottle. At the same time, **gravity** pulls the water toward the drain hole. As the water drains into the lower bottle, a **vortex** forms. The vortex in your "bottle tornado" is caused by horizontal spin (provided by you) and gravity. A real tornado in the atmosphere is caused by a combination of wind shear, changes in atmospheric pressure, and centrifugal force.

Adapted from NOAA.

[Check it out here for more interesting facts about tornadoes!](#)

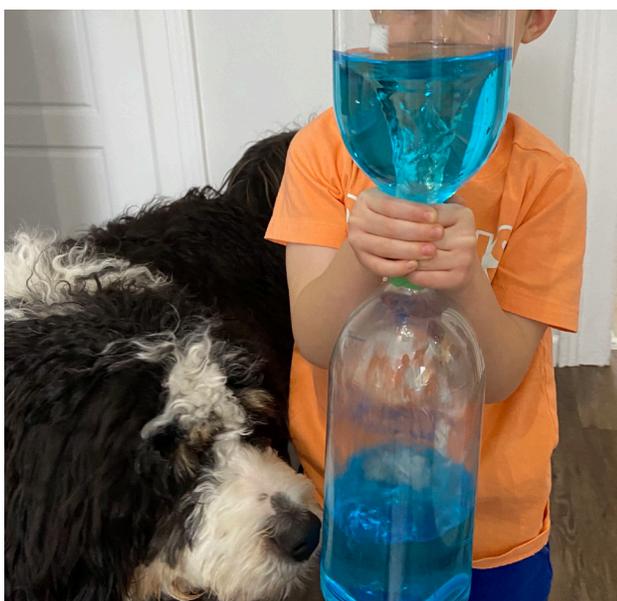
Materials

- Two plastic bottles the same size
- Water
- Food colouring
- Lighter (and an adult to use it)
- Duct tape

Directions

Note: This activity is nice and simple but will require **adult supervision and assistance**.

1. Begin by filling one of your water bottles $\frac{3}{4}$ of the way full with water. Add a drop or two of food colouring, any colour you wish.
2. Now have your grown up use the lighter to heat up the mouth of the plastic bottle, melting it slightly.
3. Once it has been slightly melted, place the mouth of the second plastic bottle on top, pushing it into the melted one so they are secured together.
4. Wrap duct tape around this seal as well. We want the seal to be air and water tight.
5. Allow the bottles to cool completely.
6. Once cool, flip the bottles so the water is in the top bottle. Move the bottles in a circle so the water spirals around and around and watch a tornado form!
7. You can do this activity again and again by simply flipping the water to the top bottle and swirling it around and around until a funnel forms.





TOPIC 8

Hurricanes

A hurricane is a huge storm that forms by gathering heat and energy from warm ocean water. Hurricanes rotate around an 'eye' in the center of the storm. The eye of the storm is calm and quiet, while the surrounding wind and weather can be very fast and damaging. Let's explore...

Spark Curiosity



Did you know? Hurricanes can actually help heal parts of the ocean by breaking up the patches of bacteria that cause red tide, as well as oxygenating the water so other life can return to those areas.



I wonder how long the eye of a hurricane stays over one spot? What might cause that time to change?

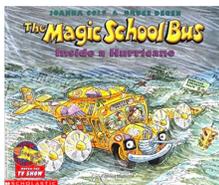
Resource Suggestions



Explore Tornadoes & Hurricanes

funsciencedemos

Learn about the differences between hurricanes and tornadoes with a hands-on demonstration.



The Magic School Bus Inside A Hurricane

Joanna Cole

Ms Frizzle and her class fly through the clouds, learn all about hurricanes, and even visit a tornado.

HANDS ON ACTIVITY

- "Hurricane in a Bowl" on page 21

Literacy Enrichment Activity

- ☆ Hurricanes can blow and move things all around! Write your child's name letters on sticky notes and scatter them throughout a room. Have your child find the letters and put them in the correct order.
- ☆☆ Write a word family ending on a piece of paper (like __at or __in). Write letters on sticky notes and be a hurricane, scattering the letters around a room. Have your child collect the sticky notes, place them one by one at the beginning of the word family and read the word to see if it forms a real word.
- ☆☆ Have your child write some new words they have learned in this unit study on sticky notes, one letter per sticky note. Scatter these sticky notes around a room like a hurricane and have your child collect the letters and put them in the correct order.



HANDS ON ACTIVITY

Hurricane in a Bowl

Types of Learning: Science, Following Instructions, Forces

WHAT'S HAPPENING?

A hurricane starts out as an area of low pressure. Low pressure systems move counterclockwise in the northern hemisphere, and clockwise in the southern hemisphere. We represent the swirling low pressure system by stirring the water around in the bowl.

Hurricanes grow with the key ingredients of **lift**, **instability** and **moisture**, which are abundant over warm ocean waters. Warm air rises, creating more instability in our atmosphere. If winds pick up to 74 mph (119 km/h) or higher, it is classified as a hurricane.

The center of the spinning represents the “**eye**” of the hurricane. While the eye is actually the calmest part of the storm, the outer edge, or “**eyewall**” is where some of the strongest circulation and most damaging winds are found. We can feel that by hanging the paperclip in the water and moving it from the eye to the eyewall.

Notice how the color spreads out and creates bands around the middle part of the circulation. These are called **rainbands**. Even if you drop food coloring into the center of the bowl of spinning water, that the water spreads to the outer edge.

Adapted from NCB4i.

[Check it out here for more interesting facts about hurricanes!](#)

Materials

- Glass bowl
- Water
- Spoon
- Food colouring
- String
- Paperclip

Directions

1. Fill a glass bowl with water.
2. Stir the water with a spoon so the water swirls around in a circle.
3. Add a few drops of food colouring to the middle of the swirl and watch as the coloured swirls move from the ‘eye of the storm’ to the outside of the bowl.
4. Attach a piece of string to a paperclip and hang the paper clip in the ‘eye of the storm’. Notice how it hardly moves.
5. Move the paperclip from the center toward the side of the bowl and notice the strong movement.





TOPIC 9

Snow

Clouds are full of moisture and water particles. When it is very cold, those water particles turn to ice particles and can start to stick together. When they get heavy enough, they fall from the clouds as snow. Every snowflake is unique, symmetrical, and takes on a hexagonal (six-sided) shape. Let's explore...

Spark Curiosity



Did you know? Snow can feel different depending on how wet it is. Very dry snow can't be packed together into snowballs or snowmen. The wetness of the snow depends on the temperature of the air and ground as the snow falls.



I wonder how many individual snowflakes it takes to make one snowball?

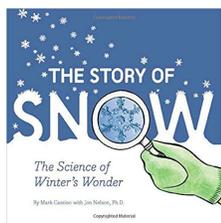
Resource Suggestions



The Science of Snowflakes

It's Okay To Be Smart

The fascinating science of how snowflakes form. Designed for older learners.



The Story of Snow: The

Science of Winter's Wonder

Jon Nelson Ph.D., Mark Cassino

Dive into the science of this chilly weather wonder.

HANDS ON ACTIVITY

- "Symmetrical Snowflakes" on page 23

Math Enrichment Word Problem

Have blocks, stones, or other manipulatives available for these math problems. Be flexible and change up the numbers to make these problems the right challenge for your children. Extend on the problems and ask follow up questions if your child is enjoying these challenges!

- ★ The weather forecast predicts a 50% chance of snow on Tuesday. What does this mean?
- ★★ The weather forecast predicts a 25% chance of snow on Wednesday. What are the chances of it not snowing on Wednesday?
- ★★★ The weather forecast predicts an 18% chance of snow on Thursday and a 12% chance of rain. What are the odds it will snow or rain on Thursday? What are the odds it will not snow or rain on Thursday?



HANDS ON ACTIVITY

Symmetrical Snowflakes

Types of Learning: Symmetry, Fine Motor Skills, Art

WHAT'S HAPPENING?

The intricate shape of a single arm of a snowflake is determined by the **atmospheric conditions** experienced by entire ice crystal as it falls. A crystal might begin to grow arms in one manner, and then minutes or even seconds later, slight changes in the surrounding temperature or humidity causes the crystal to grow in another way. Although the six-sided shape is always maintained, the ice crystal (and its six arms) may branch off in new directions. Because each arm experiences the same atmospheric conditions, the arms look identical.

Adapted from National Oceanic and Atmospheric Administration (NOAA).

[Check it out here for more interesting facts about snowflakes.](#)

Materials

- Q-tips
- Handheld mirror

Directions

Since every snowflake is **unique, symmetrical**, and takes on a **hexagonal** (six-sided) shape, snowflakes make beautiful math art! Create some snowflakes using Q-tips.

1. Make half of a snowflake (three sides) using Q-tips. These can be cut to various lengths to make the snowflakes quite complex and beautiful.
2. Place a handheld mirror on the line of symmetry to reveal the other half of your symmetrical snowflake!





TOPIC 10

Weather Forecasting

Meteorologists are scientists who use tools to gather information about the atmosphere, temperature, humidity, and wind to predict future weather. One of these tools, called a weather vane, shows us the wind direction. Let's explore...

Spark Curiosity



Did you know? The science of weather prediction has made huge improvements in recent history. We have 5-day track predictions for hurricanes, versus 3-day predictions a decade ago. We also have 15-minute tornado warnings now versus an average 3-minute prediction two decades ago.



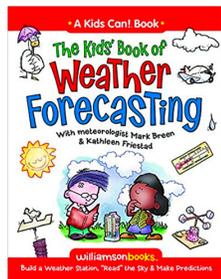
I wonder what changes and developments will help meteorologists in the near future? What might make their jobs more difficult?

Resource Suggestions



How Do We Know When It Will Rain?
SciShow Kids

Watch the basics on how forecasts are made.



The Kids' Book of Weather Forecasting
Mark Breen

Kids learn the skills of meteorology in this fun and interactive book.

HANDS ON ACTIVITY

- "DIY Weather Vane" on page 25
- "My Wind Tracker" on page 27

Literacy Enrichment Activity

- ☆ Practice your public speaking and become a meteorologist! Look outside and decide what you think the weather will be like later today. Practice a sentence you are going to say on your weather forecast. Stand up and say this sentence loud and clear as if you were on TV.
- ☆☆ Practice your public speaking by pretending you are a meteorologist. Look outside and decide what you think the weather will be like later today. Write down your prediction and practice saying it outloud. Once you have it memorized, present your forecast to your family.
- ☆☆☆☆ Pretend you are a meteorologist! Use your knowledge about weather to make predictions about what the weather will be like later today. Write down a paragraph explaining what the weather might be like and why you believe that to be so. Memorize this and present your forecast to your family.



HANDS ON ACTIVITY

DIY Weather Vane

Types of Learning: Creating, Problem Solving, Documentation, Research, Collecting Data

WHAT'S HAPPENING?

When wind hits the weather vane, it pushes on the larger surface—in our case, the end of the straw with the square. As a result, the other end of the straw points into the oncoming wind. You can then say, with confidence, that a wind is “**westerly**” if the arrow end of the straw is pointing to the west, “**easterly**” if it’s pointing east, etc.

Usually weather vanes are used alongside a barometer. However, there are a few general assessments that can be made using a weather vane by itself:

Northern Hemisphere	Southern Hemisphere
Northerly: cold weather	Northerly: warm weather
Southerly: warm weather	Southerly: cold weather
Easterly: precipitation	Easterly: clearing
Westerly: clearing	Westerly: precipitation

Adapted from Steve Spangler Science.

[Check it out here for more interesting facts about weather vanes and Meteorologists!](#)

Materials

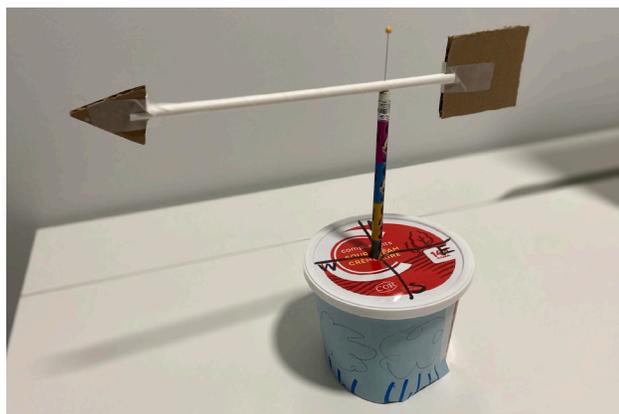
- Paint or markers
- Small plastic container with lid
- Playdough
- Pencil with an eraser
- Pushpin
- A straw
- Cardboard
- Tape or glue

Directions



“My Wind Tracker” on page 27

1. Decorate a small plastic container. Draw a compass rose on the lid, labelling North, South, East, and West.
2. Fill the bottom of the container with playdough so it is heavy enough that it will not blow away.
3. Cut a small “X” in the middle of the compass rose on the lid. Insert a pencil, securing it in place with the playdough, eraser end up.
4. Cut a triangle and square out of cardboard (make the square is larger than the triangle). Tape or glue them to each end of the straw.
5. Pin the straw to the top of the eraser. This will take a bit of playing to find where to pin the straw so it balances. The end with the square will be heavier, requiring the pin to be slightly closer to the square in order to balance.
6. Pop your weather vane outside, lining up your compass rose with the cardinal directions.
7. Use the My Wind Tracker printable to document the direction the wind is blowing each morning for a week. Record your findings, then colour in the bar graph to see which direction the wind blew most often.





TOPIC: TEMPERATURE

My Weather Journal

Record the temperature and describe the weather for one week.
Is it hot? Cold? Raining? Snowing? Do you notice any patterns?

22°C Today is warm
and a little bit windy!

	Morning	Afternoon	Evening
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			

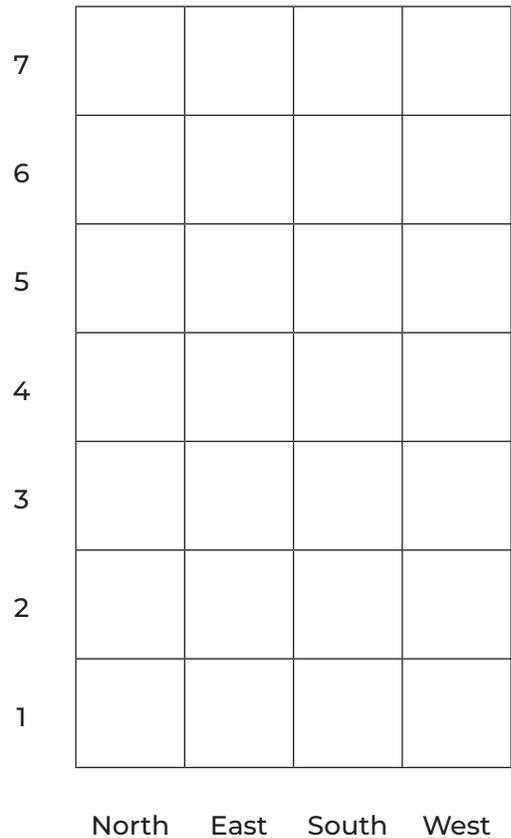
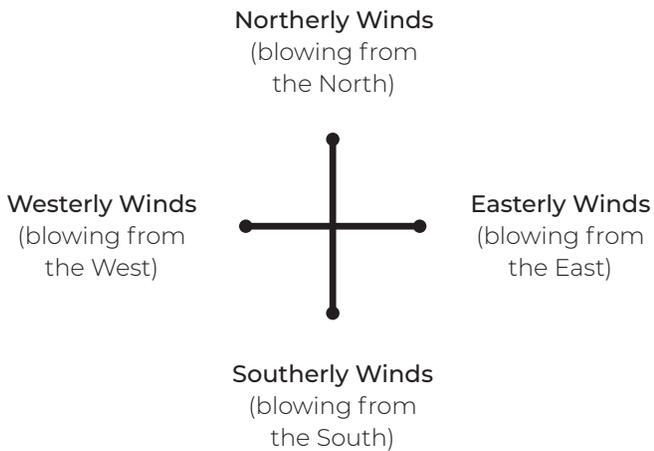


TOPIC: WEATHER FORECASTING

My Wind Tracker

Track the wind direction every morning for one week using your weather vane and record your findings. At the end of the week, fill in the bar graph to see which direction the wind blew most often.

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7



What does the wind direction mean?

Northern Hemisphere

Northerly: cold weather
 Southerly: warm weather
 Easterly: precipitation
 Westerly: clearing

Southern Hemisphere

Northerly: warm weather
 Southerly: cold weather
 Easterly: clearing
 Westerly: precipitation

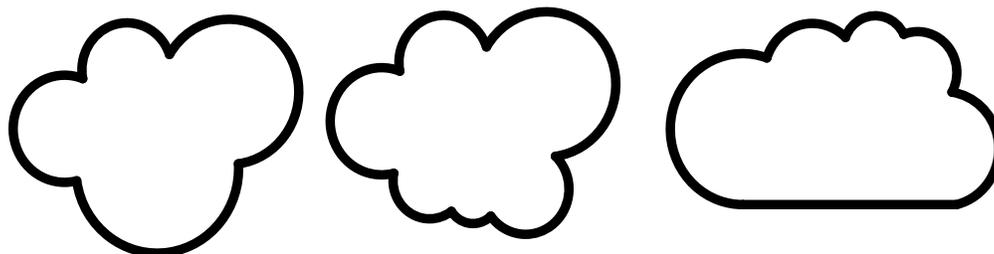


TOPIC: CLOUDS

My Cloud Information Booklet

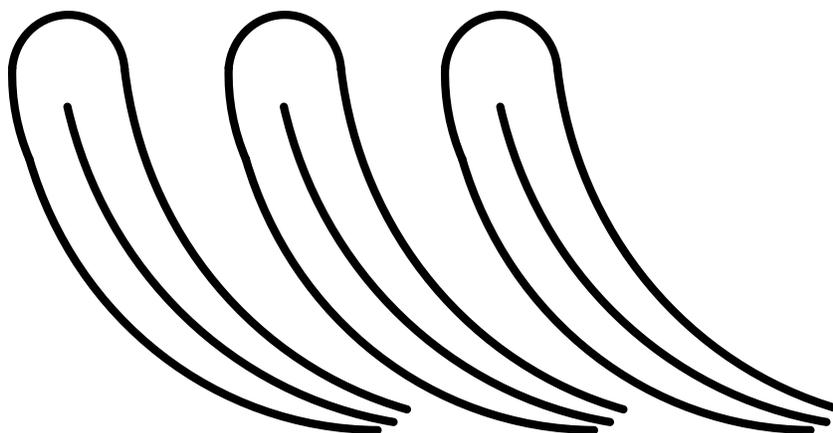
Cumulus Clouds

Cumulus clouds are the **puffy** clouds that are usually **scattered throughout the sky**. In Latin, the word cumulus means pile. Just like when we say “accumulate,” it means things pile up. This type of cloud is formed when warm air rises carrying water vapor with it by evaporation. Cumulus clouds can be white or gray. White fluffy clouds means no rain, but when they form into dark or gray clouds, it is going to rain.



Cirrus Clouds

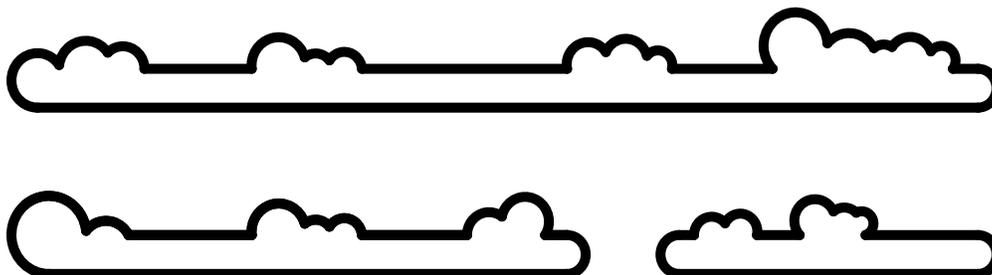
Cirrus clouds are the **thin, wispy** clouds seen **high in the sky**. They look as if someone took a cloud and stretched it, pulling pieces off. They are thin because they are made of ice crystals instead of water droplets. A blue sky and a few cirrus clouds high in the sky, usually means it is going to be a nice day.





Stratus Clouds

Stratus clouds look like a **huge thick blanket covering the sky**. These clouds are a sure sign of rain if it is warm and snow if it is cold. If stratus clouds are near the ground, they form fog. These clouds form when the weather has been cold and warm moist air blows in. The amount of moisture in the air and the difference between warm and cold air determines the thickness of the cloud or fog.



Nimbus Clouds

The word nimbus means a cloud that **already has rain or snow falling from it**. These clouds are dark and seen during a thunderstorm along with thunder and lightning. They can be a combination of two clouds, like a cumulonimbus, which means a puffy black cloud with rain falling out of it, or a stratonimbus, which is a dark blanket with rain falling out of it.

