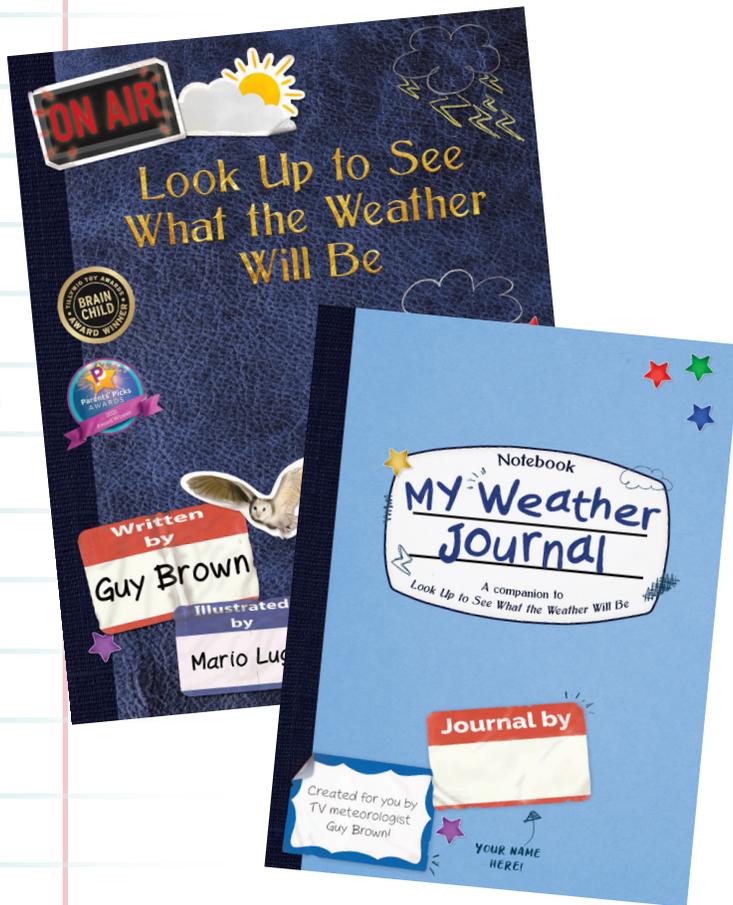


Look Up To See What The Weather Will Be

Teacher's Guide

Written and Designed by
Marlee Brooks



To be used with:

Look Up to See What the Weather Will Be

Written by Guy Brown

Illustrated by Mario Lugo

My Weather Journal

Written by Guy Brown

Created and Designed by Caitlin Burnham

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Introduction

Weather is an unstoppable force of nature that impacts what activities we take part in on any given day. It is in the news, on the radio, and an important part of conversations and classroom lesson plans.

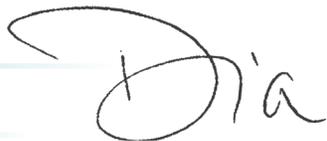
Even though weather is something that impacts everyone, the actual science behind it can be difficult to understand. Encouraging students to examine weather patterns fosters observational skills, promotes pattern recognition, and enables critical thinking skills. Additionally, teaching children about the weather allows them to engage with their environment in a safe and informed manner.

Look Up to See What the Weather Will Be introduces children to what weather forecasting is, how to watch and track changes in the sky, and how doing so helps us stay safe.

This guide serves as a companion to *Look Up to See What the Weather Will Be* and aids in the introduction and advancement of students' understanding of the science of weather and climate. Students will discover the effects of weather on different environments and the animals that live in and adapt to those climates. Each activity is designed to foster a unique connection between the information and a practical understanding of the concepts.

As readers make their way through the book, they will begin to be able to analyze and predict the weather. Follow this guide and see your class turn into amateur meteorologists in front of your eyes!

Happy reading!



Dia L. Michels
Owner and Publisher of Science Naturally

Resources

The weather is a piece of natural science that is always present and always important—determining when you can go to the pool, when your soccer game will be cancelled, and when you should wear a jacket. Most of us think about the weather every day, and we probably do not even realize it.

Since weather affects all living things, predicting and responding to changes in the weather is important to both humans and animals. Knowledge of weather patterns can empower people to prepare for extreme weather, natural disasters, or even just the occasional thunderstorm.

Even though weather is something that everyone knows and thinks about, the science of weather can be challenging to grasp, especially if you do not have access to supplementary educational resources. Fortunately, there are lots of wonderful tools to help educators and parents introduce weather concepts and vocabulary. Use a multi-media approach and check out the following resources to show your students that the weather is not so mysterious after all!

YouTube videos to introduce weather concepts:

“[How Do They Predict The Weather?](#)”

by ABC Science

“[Measuring Weather with Weather Tools](#)”

by Growing Learners

“[Weather Channels: Crash Course Kids](#)”

by Crash Course Kids

“[Weather vs. Climate: Crash Course](#)”

by Crash Course Kids

Website to interact with:

JetStream: An online weather school that provides comprehensible information on a wide array of topics such as clouds, global weather, thunderstorms, and tsunamis.

Books to foster curiosity:

What Will the Weather Be?

by Lynda DeWitt and Carolyn Croll

The Weather Detectives

by Mark Eubank and Mark A. Hicks

The Magic School Bus Chapter Books: Twister Trouble

by Anne Schreiber

Weather: Explore Nature with Fun Facts and Activities

by DK Children Publishing

Green City: How One Community Survived a Tornado and Rebuilt for a Sustainable Future

by Allan Drummond

Podcasts to listen to:

But Why: “What’s What with the Weather”

Tumble: “The Hurricane of the Future”

Brains On: “Weather Watching”

About the Author



Since the age of nine, Guy Brown was fascinated by the sky and knew that he wanted to be an expert at forecasting the weather. He studied Electronic Media/Film and Meteorology at Towson University in Maryland. Brown made his debut as a TV meteorologist in Cheyenne, Wyoming, and later worked for a local TV station in Madison, Wisconsin. You can find Guy forecasting the weather on-air today in the Minneapolis-St. Paul area of Minnesota. Guy enjoys volunteering at local elementary schools, where he shares his passion for meteorology with children. He also dabbles in acrylic painting, and is an active member of the National Weather Association and the National Association of Black Journalists.

About the Illustrator

Mario Lugo resides in São Paulo, Brazil. He was born in San German, Puerto Rico. Fluent in Portuguese, Spanish, and English, he loves to express himself through art. He has taken painting, drawing and computer science classes, but is largely self-taught. With his twin brother, Manuel, Mario relocated to São Paulo in 2019, where he established himself as an illustrator and tattoo artist. *Look Up to See What the Weather Will Be* is his first book.



Teacher's Guide Contributors

Science Naturally would like to thank the following people for their hard work, invaluable insight, and dedicated time in creating *Look Up to See What the Weather Will Be* and its accompanying Teacher's Guide:



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Before You Read

The activities in this section are primarily discussion-based and take place before students read *Look Up to See What the Weather Will Be*. These conversations will help students begin thinking about what weather is, how it affects our lives, and what we can learn from it.

Pre-Reading: Book Walk

A book walk is a pre-reading activity that aids in reading comprehension and builds curiosity and enthusiasm about the book. It prepares students to think about the important questions they should be asking as they read. For younger students, this book walk also helps develop their reading skills. They learn to use the illustrations to understand what the story means and make educated guesses about unfamiliar words.

Gather your students in a reading circle so that everyone has a clear view of the book. Make sure there is plenty of room for everyone to get involved in the discussion.

Tell your students that you will be reading a book called *Look Up to See What the Weather Will Be*. Discuss and ask them: What do you think this book will be about?

If you haven't reviewed the vocabulary terms, this is a great opportunity to do so with your students. Ask them questions. *What is meteorology? What role does the weather play in your life?*

Then, show them the book's cover and ask them new questions. Encourage them to be more specific than before. *Now what do you think it will be about? What is the man on the front cover doing? How do the images relate to weather?*

Start to flip through the book, page by page (or a few pages you selected in advance), without reading any of the words. Ask your students questions about the pictures they see. *What is going on here? What kinds of weather will they learn about during their reading? Do you see animals? If so, what kind, and why do you think animals are in a book about weather? Is there anything in the illustrations that you don't recognize?*

Give vague responses that don't give away the story. Say things like, "Are you sure about that?" or "That's possible!" or "What makes you think that?" This will plant the seed for an enthusiastic discussion while you read the book or when the reading is done.

Flip the book over and read the back cover, then start your usual read-aloud session.

Pre-Reading: Exploring Weather

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*

Subject: Meteorology

NGSS: 3-ESS2-2 Earth's Systems

Skills: Active reading, making inferences

Background

Weather is all around us all the time. It affects our lives in so many ways such as the food we eat, the clothes we wear, and the safest means of transportation. In order to prepare for both sunny days and inclement winter storms, we rely on meteorologists like Guy Brown to provide us with accurate and reliable forecasts of upcoming weather.

Guided Questions

Consider the following weather conditions:

Drought

Thunderstorm

Blizzard

Hurricane

How might each of these weather conditions affect humans and/or animals living in the area?

Focus on how crops and shelter are affected.

Have any of these weather conditions affected your life (e.g. canceling school or sporting events)?

How can you best prepare for these weather conditions?

Pre-Reading: Predicting Weather

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*

Subject: Meteorology

NGSS: K-ESS2-1 Earth's Systems

Skills: Observation, critical thinking

Background

You don't have to be a meteorologist to predict the weather. In *Look Up to See What the Weather Will Be*, Guy shares that citizen scientists—people who aren't official science professionals but still take an interest in research or scientific observation—share their weather predictions all the time. There are lots of ways you can create your own weather forecast based on clues from the sky.

Activity

1. Before your students read *Look Up to See What the Weather Will Be*, take a field trip outside to take note of the weather. While they may not know the official names of clouds, or words to describe weather, have students record other characteristics such as the color of the sky, the amount of clouds, the temperature, and the precipitation.
2. Based on their observations, students should attempt to predict the weather for the rest of the day. *Will it rain? Will it remain sunny? Should we anticipate a snow day tomorrow?*
3. Revisit students' answers during the Predict the Weather concluding activity found later in this Teacher's Guide to see if they can add any new elements to their weather forecast.

Discussion

Ask your students if they are excited to learn about weather and what they are most looking forward to. What do they hope to learn from this book?

The How and Why of Studying the Sky

Before beginning to predict the weather on their own, students must determine why they think learning about weather is important, what the historical context of weather forecasting is, and how weather impacts their daily lives and safety.

Throughout history, weather forecasting has been used for a variety of purposes, including hunting, farming, sailing, seasonal migration, etc. It is important that students learn about these historical practices as contributing factors to our current understanding and forecasting of weather.

Initiating conversations about the weather as a lived, observable experience can help students think critically about the science of forecasting. They can begin drawing personal connections and making predictions based on their own memories. Beyond this, thinking about the weather as something that directly affects our lives can help students be more aware of weather hazards and learn how predict, handle, or prevent dangerous situations.

Once they've completed this section, your students will have a firm understanding of the basic history of weather tracking, why weather forecasts are important, what the different types of severe weather can look like, how and where severe weather occurs, and its environmental impact.

Careers in Meteorology

Grades: 2-5

Subject: Meteorology

Skills: Researching and organizing

Materials: *Look Up to See What the Weather Will Be*, Careers in Meteorology handout, Compare and Contrast: Careers in Meteorology worksheet

NGSS: 5-ESS3-1 Earth and Human Activity

Background

Guy Brown, the author of *Look Up to See What the Weather Will Be*, is a TV meteorologist (also known as a weather anchor). Guy's job includes using special tools to analyze data, forecasting the weather, and then sharing his findings with a televised audience. But Guy's job is just one of many careers in meteorology. Some other careers include researcher, airline forecaster, and storm chaser. The full list of careers is on the next page.

Activity

1. Read *Look Up to See What the Weather Will Be* to your students, as well as the background information. Pass out the Careers in Meteorology handout to your students.
2. Have students choose and research two careers from handout. Tell them they should take notes on how the two careers are similar, and how they are different. Some categories to pay attention to are educational requirements, skills needed, and focus of research. You can pass out the Compare and Contrast worksheet.
3. Tell students to fill out the template to compare and contrast the two careers.

Discussion

Ask your students why they chose those two particular careers. What did they find that was similar between the two, and what was different? What did they like or dislike about both careers? Do they think either career is one they would want to pursue when they grow up?

Careers in Meteorology

Meteorologist - A meteorologist is a physical scientist who studies, observes, and forecasts the weather. Meteorologists are typically responsible for analyzing data from several sources to prepare forecasts, advisories, and warnings for severe weather conditions such as extreme heat indexes, flash floods, and winter storms. Meteorologists are also responsible for collecting data to provide weather guidance to government agencies; conducting research; and integrating new technologies into their forecasts.

Physical Scientist - Many jobs fall under the umbrella of “physical scientist” (including meteorologist). Their duties range from integrating new methods of science and technology into the forecasting process; monitoring earthquakes to predict tsunamis; monitoring solar activity to predict the potential impacts of solar flares; and working in management positions. Physical scientists are required to have at least a bachelor’s degree in the physical sciences, mathematics, or engineering.

Broadcaster - Broadcasters, or what we know as weather forecasters, use their meteorology expertise to create forecasts to share on television and on radio stations.

Researcher - Researchers study specific weather anomalies, changes, and patterns. They use their research to inform other meteorologists on weather models and predictions.

Military Forecaster - Military forecasters are constantly watching the sky to make sure aircraft takeoffs, air strikes, space launches, and more can be executed safely without weather interference.

Airline Forecaster - Airline forecasters work with air traffic controllers to determine the conditions for planes to land and take off, and while they are in the air.

Climatologist - Climatologists and meteorologists are very similar. The most important distinction between the two careers is that climatologists track weather patterns over a long period of time, rather than making short term forecasts or predictions. The long-term research that a climatologist does is then used to develop analysis of historical climate conditions in various regions and track any significant changes in climate which may impact weather patterns in a specific area.

Storm Chaser - Storm chasers are meteorologists with a closer, more personal relationship with tornadoes, hurricanes, thunderstorms, and other forms of severe weather. Employed by varying agencies, such as weather stations, research labs, or the government, storm chasers use computer software, climate reports, and other tools to track and get as close as possible to storms and natural disasters to study them.

Hydrologist - Hydrologists study and analyze the water on Earth and in the atmosphere, including monitoring precipitation amounts to predict flooding. Like meteorologists and climatologists, hydrologists spend a lot of time conducting research and collecting necessary data to inform local, state, and federal agencies about possible flooding events, as well as integrating new science and technology into the forecasting process.

Professor - Meteorologists with a Ph.D. tend to teach at colleges and universities that have physical science or meteorology programs to teach the next generation of meteorologists. Professors may also work with the government to facilitate research projects that support the collection of new data and the development of new technologies and forecasting methods.

Compare and Contrast: Careers in Meteorology

Name: _____ Date: _____

_____ and _____ are similar because...

_____ and _____ are different because...

Activity: Weather Writing

Grades: 2-5

Subject: Meteorology

Skills: Critical thinking, observation

Materials: *Look Up to See What the Weather Will Be*, notebook or journal

NGSS: K-ESS3-2 Earth and Human Activity

Background

Weather impacts our daily lives. Weather forecasters communicate to their audiences what the weather will be for that day or week, and this information can dictate what we do, where we go, and how we dress. Forecasters also tell people what to do in case of a weather-related emergency.

Activity

1. Read *Look Up to See What the Weather Will Be* to your class.
2. Ask students to pair up or get into small groups to discuss why they think weather forecasters are important. Ask them to discuss any weather-related experiences they can remember.
3. Once the students have had enough time to discuss with their partner or group members, ask them to write about their weather experience(s) in their notebook or journal. Ask them to describe the weather condition, what they or their family did to stay safe, how they heard about the weather event, etc.

Discussion

Ask the students if anyone would like to share what they wrote. After a few volunteers have shared their weather story, ask them how weather forecasters played a role in that event. Do they remember what the weather forecaster said and did they listen to them? Why was it important for them to listen to the weather forecaster?

Activity: Meteorology Timeline

Grades: 2-5

Subject: Meteorology

Skills: Identifying, organizing, critical thinking

Materials: *Look Up to See What the Weather Will Be*, Meteorology Timeline worksheet, answer key, small baggies

NGSS: K-ESS2-2 Earth's Systems

Background

People have been making meteorological discoveries and contributions for centuries. In fact, the earliest written discussions of weather, specifically cloud formations, date back to Ancient India (around 3,000 BC). Ancient farmers and sailors would primarily rely on the clouds and signals from nature around them to be better prepared. They listened to the animals, plants, and winds, and used their eyes, ears, nose, and sense of taste. This science helped give us some of the weather forecasting tools we have today, such as rain gauges.

Activity

1. Before you facilitate the activity, print one Meteorology Timeline sheet. Cut out the individual slips of paper for each student and place them in baggies. Each baggie should contain all of the cut slips from a single sheet.
2. Read *Look Up to See What the Weather Will Be* to your class.
3. Pass out a baggie filled with the slips of paper to each student. Ask them to analyze all of the meteorological discoveries/contributions in the bag, and then put them in chronological order.
4. After they have finished putting their order together, ask the students to walk around the classroom and look at how the other students ordered the discoveries/contributions. Ask them to return to their seats afterward for class discussion.

Discussion

Ask your students why they put the discoveries/contributions in the order that they put them in. Ask them if they think they are correct or close in their guesses, or if they think someone else in the class got it right. Recite to your students the correct order of events. Ask them how they think the world might be different if events had occurred in the order they created.

Information Adapted from: https://www.sciencelearn.org.nz/interactive_timeline/9-measuring-the-weather-a-timeline

Meteorology Timeline Worksheet

Ancient Indian writings are the first to include discussions about the weather, cloud formations and so on.

The Babylonians use cloud observations to make weather predictions.

The earliest weather vane we know about is built in Greece by the astronomer Andronicus and erected in honor of the Greek god Triton. It is in the shape of a man with the tail of a fish and measures between 4 and 8 feet long.

Several inventors, including Isaac Newton, work on the idea of measuring temperature.

Daniel Fahrenheit devises the first reliable temperature scale where ice melts at 32° , body temperature is 98.6° and water boils at 212° . This scale is still used in the USA today.

Carl Linnaeus reverses the Celsius scale as he suggests it makes better sense to show freezing at 0°C and boiling at 100°C . This scale is now the standard scale for everyday temperature recording throughout most of the world.

Clouds are given Latin names.

The first independent weather station is established when a stable kite is sent up in the air in England to make observations at altitude, using self-recording instruments.

Radar is used to generate precise weather predictions and storm and hurricane warnings as well as allowing for improved understandings of weather systems.

TIROS-1 spends 78 days recording and relaying thousands of weather images to NASA.

Meteorology Timeline Answer Key

3000 BCE

Ancient Indian writings are the first to include discussions about the weather, cloud formations and so on.

650 BCE

The Babylonians use cloud observations to make weather predictions.

48 BCE

The earliest weather vane we know about is built in Greece by the astronomer Andronicus and erected in honor of the Greek god Triton. It is in the shape of a man with the tail of a fish and measures between 4 and 8 feet long.

1593

Several inventors, including Isaac Newton, work on the idea of measuring temperature.

1724

Daniel Fahrenheit devises the first reliable temperature scale where ice melts at 32°, body temperature is 98.6° and water boils at 212°. This scale is still used in the USA today.

1744

Carl Linnaeus reverses the Celsius scale as he suggests it makes better sense to show freezing at 0°C and boiling at 100°C. This scale is now the standard scale for everyday temperature recording throughout most of the world.

1802

Clouds are given Latin names.

1847

The first independent weather station is established when a stable kite is sent up in the air in England to make observations at altitude, using self-recording instruments.

1940

Radar is used to generate precise weather predictions and storm and hurricane warnings as well as allowing for improved understandings of weather systems.

1960

TIROS-1 spends 78 days recording and relaying thousands of weather images to NASA.

Activity: Weather Report

Grades: 2-5

Subject: Meteorology

Skills: Researching, presenting

Materials: *Look Up to See What the Weather Will Be*, online resources, Weather Report worksheet

NGSS: K-ESS3-2 Earth and Human Activity

Background

It's very important for weather forecasters to predict when an extreme weather event is going to take place. This is because people can plan accordingly to keep themselves, their loved ones, and their communities safe. It is important to listen to weather forecasters during a weather-related emergency and do what they say. Here are some examples of extreme weather conditions/events:

Flood - rising water rushing over land; usually a result of heavy rain or the melting of several inches of snow, which causes rivers or lakes to overflow.

Tornado - an aggressive rotating column of air that extends from a thunderstorm to the ground. The winds can exceed 300 miles per hour (480 km/hr).

Thunderstorm - a storm that usually means wind, lightning, thunder, dense clouds, heavy rain, or hail.

Hurricane - a large and powerful storm in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea, with heavy rainfall and winds ranging between 74 miles per hour and 150 miles per hour (120 km/hr to 240 km/hr) or greater.

Activity

1. Read *Look Up to See What the Weather Will Be* to your class.
2. Assign each student a different weather condition/event. You can use those featured in the book and/or others if you prefer. Depending on class size, you can partner students up or have them work in groups. You may also select historic weather events for your students to research.
3. By using *Look Up to See What the Weather Will Be* and online resources, have your students fill out the Weather Report worksheet.

Discussion

Have your students present their findings to the rest of the class. This allows for your students to facilitate discussion themselves! Encourage your students to ask questions after each presentation. You can limit the questions as needed.

Weather Report

Name: _____ Date: _____

Weather Condition/Event: _____

Describe what happens during this weather condition/event:

Where does this usually take place? _____

What is the result of this weather condition/event? Think about the animals, people, and environment: _____

Fun Facts

Draw What it Looks Like

With These Tools in Sight, You Can Get the Forecast Right

The author of *Look Up to See What the Weather Will Be*, Guy Brown, is an on-air meteorologist in Minneapolis, Minnesota. He decided he wanted to be a weather forecaster when he was just nine years old, and now his goal is to discover and train the next generation of meteorologists.

The most important aspect of Guy's job is to help people prepare for their daily lives and provide them with the ability to plan for severe weather conditions. Guy and the rest of his weather research team do this by using a variety of tools like satellites, radar, barometers, thermometers, etc. to gather all of the information possible about the weather to help form accurate forecasts.

Without Guy and other meteorologists conducting this research, the community would not be able to predict weather events in the amount of detail and as far ahead in time as Guy can.

In this section, students will learn how to identify and use different weather tools and formulate a weather forecast, moving them one step closer to being amateur meteorologists.

Activity: Tools of the Trade

Grades: 2-5

Subject: Meteorology

Skills: Identifying, sorting, observation

Materials: *Look Up to See What the Weather Will Be*, Matching Tools of the Trade worksheet, answer key

NGSS: K-ESS3-2 Earth and Human Activity

Background

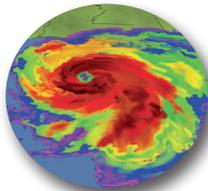
Looking up to the sky to observe the clouds and stars can be useful when predicting the weather, but using tools can result in a more accurate prediction. Weather forecasters use tools in order to forecast the weather as accurately as possible. Here are some of the tools they use:



Barometer



Tide Staff



Radar



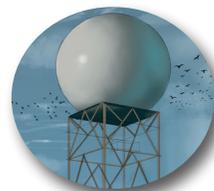
Ruler



Rain Gauge



Thermometer



Radar Tower

Activity

1. Go over the background information with the students and read *Look Up to See What the Weather Will Be*. Pay special attention to the kinds of tools Guy uses.
2. Pass out the Matching Tools of the Trade worksheet. This will instruct students to match an image of the tool with what it does.

Discussion

Go over the answers with your students. Ask them the following questions: Why might Guy use this particular tool? How does he use this tool? How does this tool help him and others?

Matching Tools of the Trade

Name: _____ Date _____

Instructions: Match the images of meteorologists tools to their descriptions.



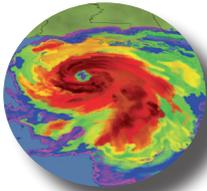
Barometer

Shows the intensity of the storm. Red is powerful and green is gentle.



Tide Staff

Measures the amount of snow that has fallen.



Radar Image

Measures the weight, or pressure, of the air.



Ruler

Measures how warm or cold the air is.



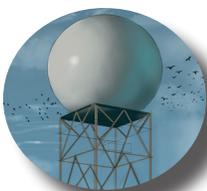
Rain Gauge

Measures the water level in the sea.



Thermometer

Measures the amount of rain that has fallen.

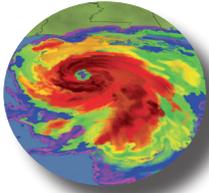


Radar Tower

Measures the strength of precipitation and wind by emitting radar waves.

Matching Tools of the Trade

Answer Key



Shows the intensity of the storm. Red is powerful and green is gentle.

Measures the amount of snow that has fallen.

Measures the weight, or pressure, of the air.

Measures how warm or cold the air is.

Measures the water level in the sea.

Measures the amount of rain that has fallen.

Measures the strength of precipitation and wind by emitting radar waves.

Activity: 7-Day Forecast

Grades: 2-5

Subject: Meteorology

Skills: Critical thinking, analysis, prediction

Materials: *Look Up to See What the Weather Will Be*, Help Guy Predict the 7-Day Forecast worksheet

NGSS: 3-ESS2-1 Earth's Systems

Background

A weather forecast is a description of what the weather is most likely to be in the near future. In order to plan out your week, like whether or not you can play outside or what you should wear, it's important to know what the weather has in store.

A forecast is generally prepared the same way regardless of the type of weather. Scientists gather data from ground-based and airborne tools, such as radar and satellites, to create a complete representation of current conditions called an analysis. The forecasters use the analysis as well as numerical models and years of experience in their area to determine how the conditions may change over time. Once they have completed this step, the weather forecaster is ready for the broadcast!

The seven-day forecast is generally prepared twice a day, at 4 a.m. and 4 p.m., but it is updated throughout the day as needed. On the other hand, hourly weather observations are updated at the top of every hour.

Activity

1. Go over the background information with your students and read *Look Up to See What the Weather Will Be*.
2. Pass out the Help Guy Predict the 7-Day Forecast worksheet to the students. Each day has “clues” as to what the weather will be like that day, and the students must take those into consideration when filling out the worksheet. They can work individually or together.

Discussion

Ask your students how they came up with their answers. What activities can they do each day and how should they dress each day? What helped them complete the worksheet, and what tools help meteorologists forecast the weather?

Information and activity adapted from: <https://www.learnesl.net/weather-forecast-report-sample-script-in-english/>

Help Guy Predict the 7-Day Forecast

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						
45°	40°	38°	38°	40°	45°	43°

“Hi everyone, Guy Brown and _____ here. You’ll want an umbrella, sunscreen, and rain
(your name here)

jacket this week. The week will start with _____ and _____ skies, but a chilly _____ degrees. You can expect a temperature drop and a few _____ in the sky on Tuesday, leading into a _____ day on Wednesday. Make sure you stay safe on Thursday as there is a _____ rolling in. You can expect a few inches of _____ to fall throughout the day. The _____ will start to peek through on _____, just in time for the weekend! We’ll be back to clear _____ by Saturday, with _____ picking up on Sunday.”

Activity: Design a Tool in Meteorology

Grades: 2-5

Subject: Meteorology

Skills: Active reading, identifying, analysis, problem solving

Materials: *Look Up to See What the Weather Will Be*, notebook/weather journal, Design a Tool in Meteorology worksheet

NGSS: K-2-ETS1-1 Engineering Design & 3-5-ETS1-2 Engineering Design

Background

Tools of all kinds have helped make life easier since the Early Stone Age nearly 2.6 million years ago. One of the earliest weather tools was the rain gauge. Ancient Greeks and Ancient Indians were the first people to use a container to record rainfall. Rain gauges are still used by meteorologists today, but they have evolved since they were first created. The standard rain gauge is 8 inches (203 mm) and includes the following components: a measuring stick, an overflow can, a collector funnel, and a measuring tube.

Science and technology have advanced for as long as people have been making tools, which means tools have advanced and developed too. The rain gauge is much more accurate today than it was when the Ancient Greeks and Ancient Indians first used it because scientists along the way worked to improve and innovate the tool.

Activity

1. Go over the background information with your students and read *Look Up to See What the Weather Will Be*. Pay special attention to the tools mentioned in the book.
2. Ask your students to brainstorm weather-related situations or problems, such as severe weather, in their notebook or on a blank piece of paper. They can do this individually or in groups.
3. After they've had enough time to brainstorm, pass out the Design a Tool in Meteorology worksheet on the next page and ask them to create a tool that would solve or create a better understanding of the weather situation/problem.

Discussion

Have your students share with the rest of the class the weather situation/problem they chose and the tool they designed to solve it or better understand it. Ask them to explain how the tool would help solve the problem. Is there a tool that already exists that also solves the problem? If so, how is theirs different and better at solving the problem?

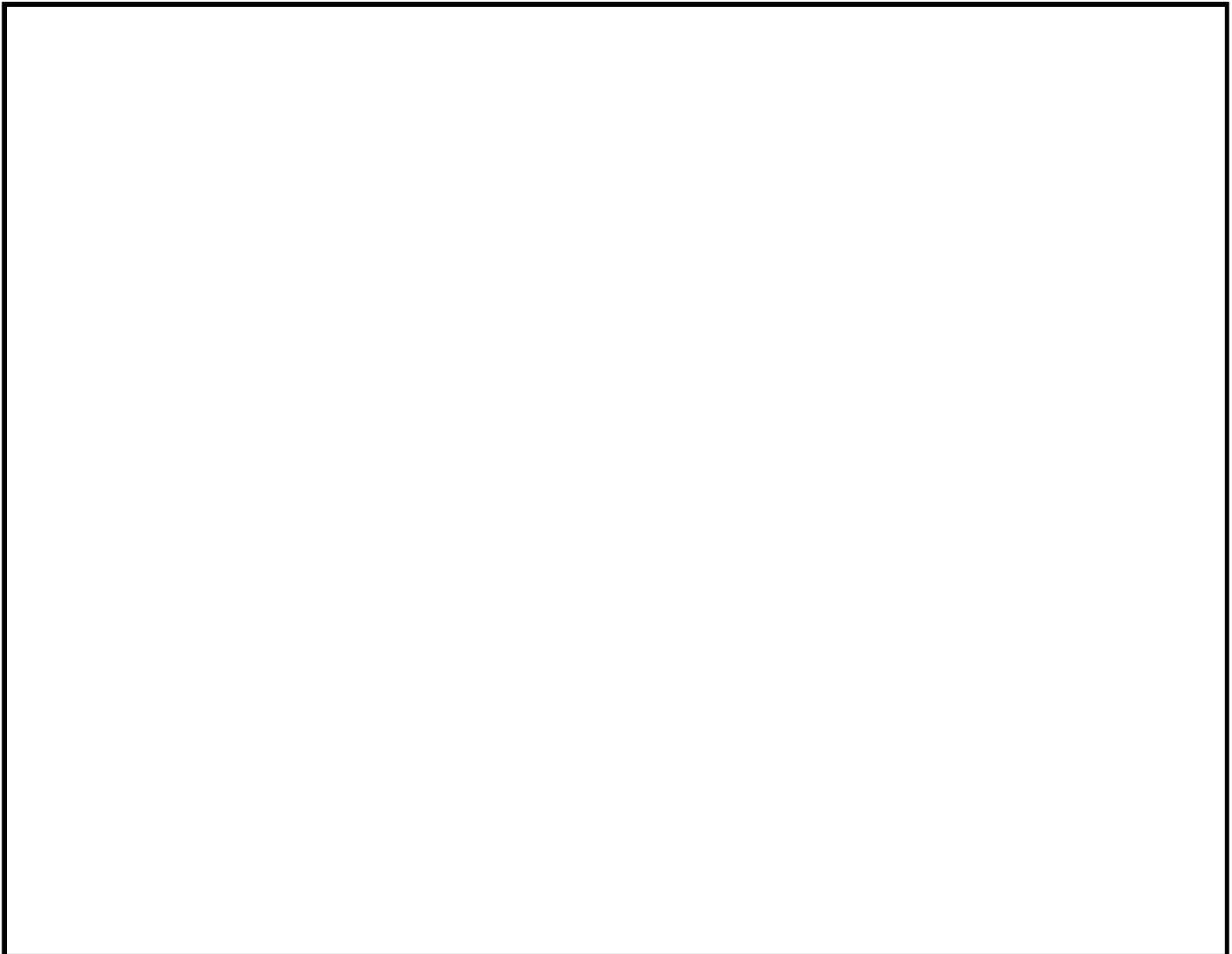
Design a Tool in Meteorology

Name: _____ Date _____

My weather situation or problem is: _____

This is how I will solve it: _____

My weather tool looks like this:



Animals Know When it's Time to Go

Over time, animals have evolved adaptations to sense temperature, wind, humidity, daylight, etc. in order to escape dangerous weather conditions. These adaptations allow animals to flee a dangerous event or migrate away from cold weather.

These adaptations are not necessarily only for severe weather events, but can also involve yearly migration patterns. For example, during colder months, geese migrate to warmer climates to wait out the cold weather. This weather is dangerous to them because of their lack of substantial amounts of fat or fur to keep them warm. The flock that migrates together does not keep any kind of physical record of the time of year, but rather allows their bodies to tell them when it is time to go. These patterns are essential for the survival of the species.

Some animals do not leave their environments, however, but wait out the winter in hibernation. Black bears, for example, get ready for their winter hibernation by eating as much as they can and building a thick layer of fat to last them through the winter. Then, the bears find a safe place and go into a deep “sleep” until the harshest parts of winter are over.

These strategies to escape dangerous weather situations are essential for any species. Once students complete this section, they will be able to identify a few key adaptations and explain why they are important for survival.

Activity: Owl Wings

Grades: 2-5

Subject: Meteorology, Zoology

Skills: Critical thinking, analysis, inference

Materials: *Look Up to See What the Weather Will Be*, different colored feathers, Crisco/vegetable oil, dirt, spray bottle, water

NGSS: 4-LS1-1 From Molecules to Organisms: Structures and Processes & 3-LS4-3 Biological Evolution: Unity and Diversity

Background

Some birds have a uropygial gland, or a preening gland, on their lower back that secretes oil to waterproof their feathers and protect their skin. Birds that have this gland will rub their heads and necks on the oil gland and spread the oil on the rest of their feathers. Some birds will also take dust baths to rid their feathers of any parasites and remove excess oil.

Barn owls don't use the preening gland and they don't dust bathe because this interferes with their soundless flight, which they rely on for hunting. As a result, barn owls cannot fly when it is raining because their feathers will be too heavy and they will not be able to hunt.

Activity

1. Go over the background information and read *Look Up to See What the Weather Will Be*.
2. Give each student two or three different-colored feathers. Instruct them to apply a thin layer of shortening or oil (Crisco or vegetable oil will do) to one feather until it is completely covered. Leave the other feather as it is.

Optional: if you are able to, cover a third feather in dust or dirt.

3. Once every student has coated their feather(s), ask them to lightly spray the oil feather with water. Then, ask them to lightly spray the uncoated feather with water. If you are using a feather coated in dust/dirt, spray this feather second.
4. Ask the students what they noticed when they sprayed water on each feather.

The feather that was covered in oil should repel the water, the feather that was not covered in anything should be wet from the water. The feather that was covered in dirt/dust should be damp.

Discussion

Ask your students why they think one feather repelled water and the other did not. Can birds that have the preening gland fly in rainy conditions, why or why not? What about birds that do not have this gland?

Information adapted from: <https://vcahospitals.com/know-your-pet/preening-or-uropygial-gland-in-birds>

Activity: Tornado Sequence of Events

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*, tornado images, answer key

Subject: Meteorology

Skills: Identifying, organizing, inference

NGSS: 4-LS1-2 From Molecules to Organisms: Structures and Processes

Background

Even though all tornadoes are different, there are four main developmental stages every tornado goes through.

Stage 1: Warm air pockets rise to a sufficient height and shallow cumulus clouds form. The warm air pockets may continue to rise if the surrounding air temperature decreases. This can result in stronger, rising air currents and cumulonimbus clouds (thunder clouds).

Stage 2: The thunderstorm can rotate when wind strength increases with height. Thunderstorms that contain consistent rotations are called “supercells.”

Stage 3: Descending currents of cold air within a supercell storm concentrate the storm and bring it downward. The rotation can become so strong that a column forms, and if that column of violently rotating air touches ground, it becomes a tornado.

Stage 4: The descending currents of cold air eventually cut off the supply of warm air by wrapping around the tornado. This causes it to narrow until it dissipates.

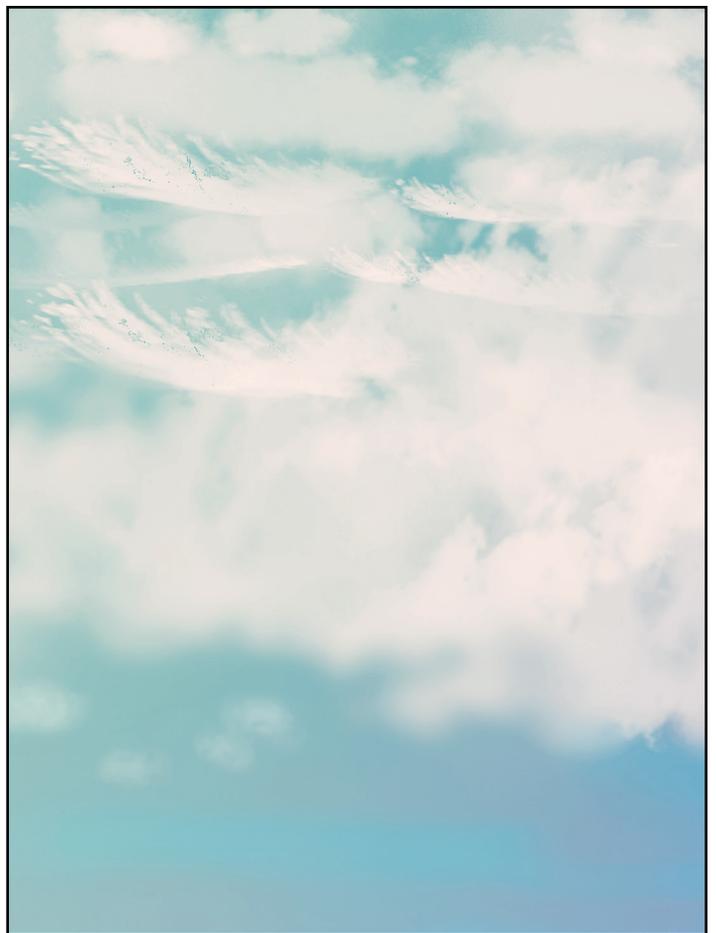
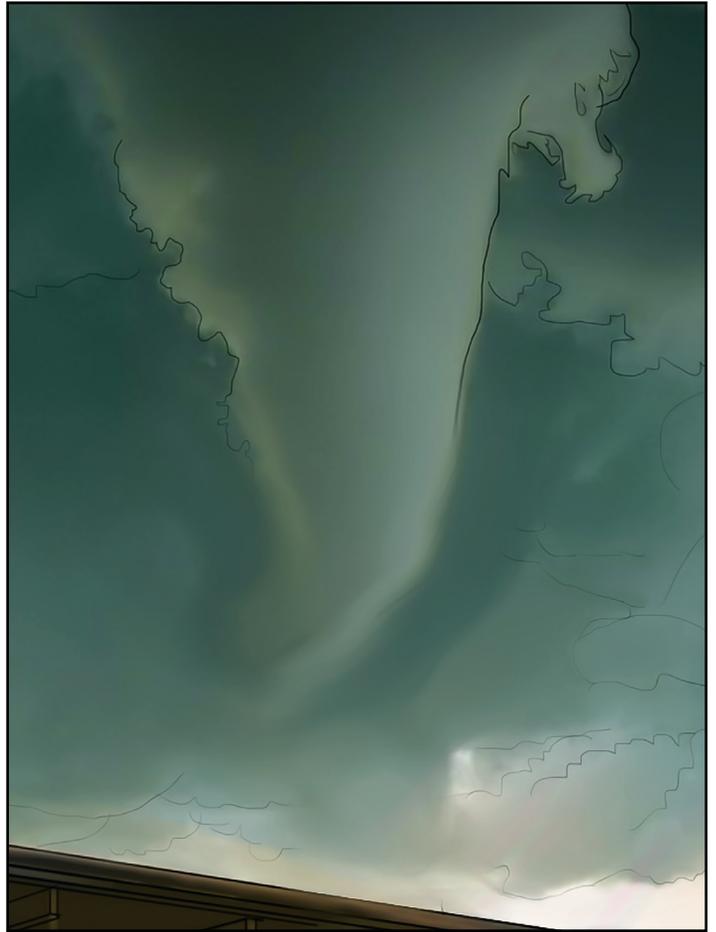
Activity

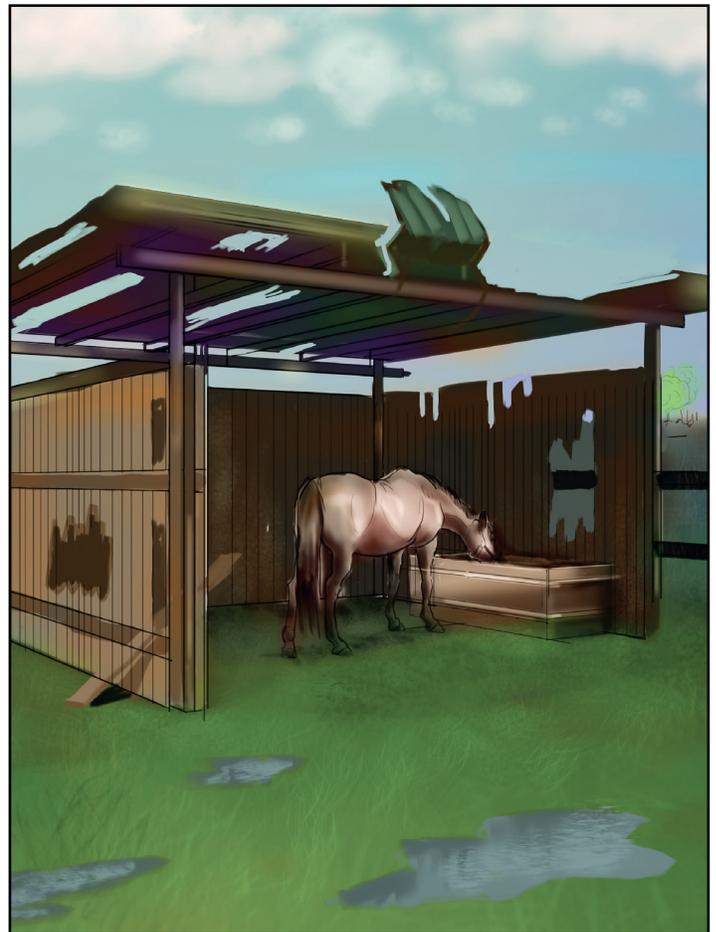
1. Before the activity starts, determine if you will conduct it with the entire class or divide your students into small groups. Print out sufficient copies of each image.
2. Go over the background information and read *Look Up to See What the Weather Will Be*.
3. Tell your students that they are recreating the timeline of a tornado. Give each student one image and be sure to tell them not to show anyone else.
4. Have each student come to the front of the class and describe their image to the best of their ability. Once they have all had their chance to describe their image, ask the students to work together to determine the order of events. They can ask each other questions and to elaborate as much as they want. The only rule is that they can not show anyone their image.
5. Once they think they know the order, ask them to stand in a circle or straight line next to each other. They can then show their images to the group and you, the teacher, can double check their work.

Discussion

Ask your students if they think they all worked well together and how the activity went overall. Ask them if they noticed any parallels between them working together as a group to the horse section of the book (possible answer: the students worked together like the horses worked together).

Information adapted from: <https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/tornadoes/how-are-tornadoes-formed>





Tornado Sequence of Events Answer Key

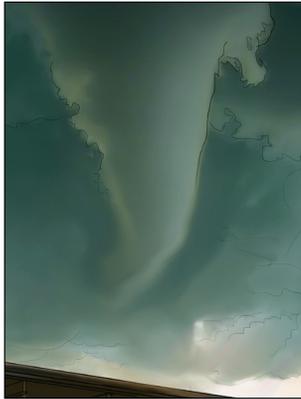
1.



5.



2.



6.



3.



7.



4.



8.



Activity: Bear Hibernation

Grades: 2-5

Subject: Meteorology, Zoology

Skills: Identifying, critical thinking

Materials: *Look Up to See What the Weather Will Be*, food cards, brown and green paper, masking tape, Bear Hibernation Student Summary Form

NGSS: 3-LS4-4 Biological Evolution: Unity and Diversity

Background

Hibernation is a state many mammals adopt during the wintertime where their bodies become dormant. Bears hibernate during the winter because their food sources are significantly limited compared to the spring and summertime. They stay in a cave during hibernation which keeps them safe and warm, and helps save their energy. They also don't eat, pee, or poop, and their heartbeat slows down dramatically. In autumn, bears eat up to 88 pounds a day so they have enough energy to sustain them during hibernation.

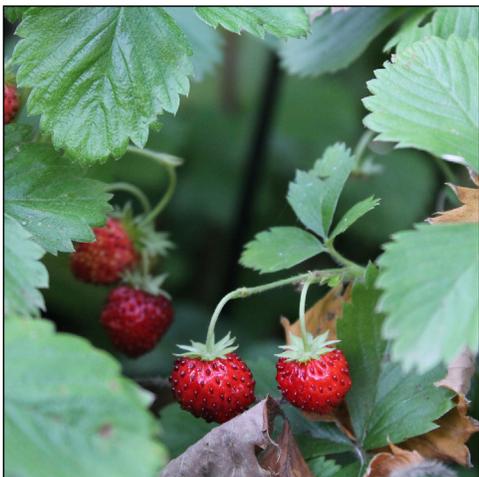
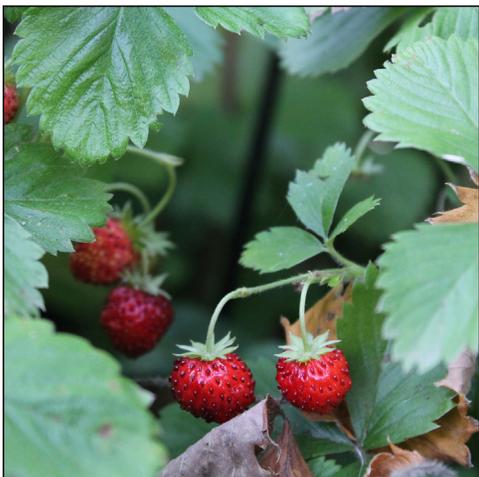
Activity

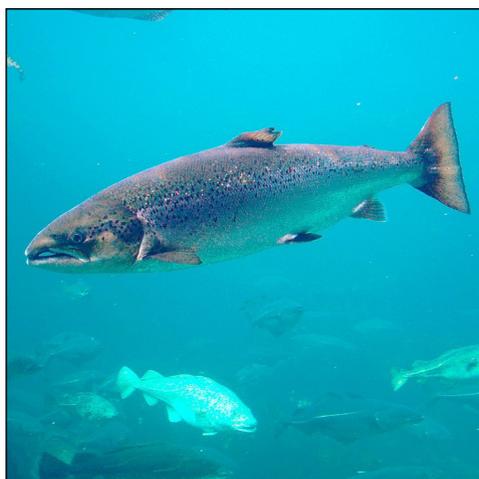
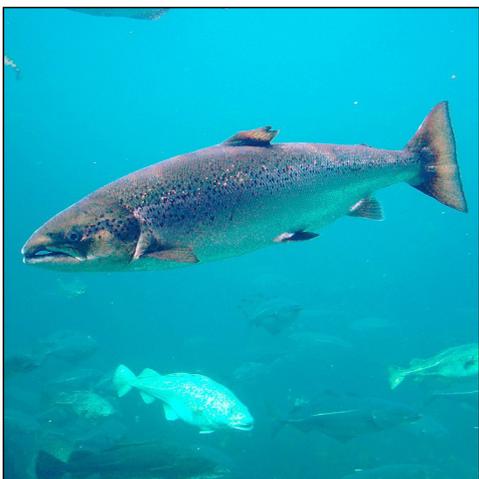
1. In preparation for this activity, print out 100 or 40 cards for every 10 students (depending on your time constraints, you can choose how many cards you want to work with) on brown or green paper. Laminate the cards.
 - a. The cards are broken down so each category accurately reflects the average annual diet of a bear.
2. After you have printed out and laminated your cards, scatter them throughout your area (outside if possible).
3. Wrap the first 10 students' hands with masking tape, sticky side out. Only tape the four fingers, not the thumbs. This simulates the bears sticky tongue.
4. The black bears (up to 10 students) start in a line around the game area perimeter. On your signal, they'll walk on all fours to gather their "food" by using their "paws." Their partners will walk alongside them, acting as biologists, and keep their food cards. The students will continue foraging until you give them the signal to stop.
5. Repeat for the next group of students.
6. Students count and record how many food cards and what types of food they gathered. Combine this information into the classroom summary.

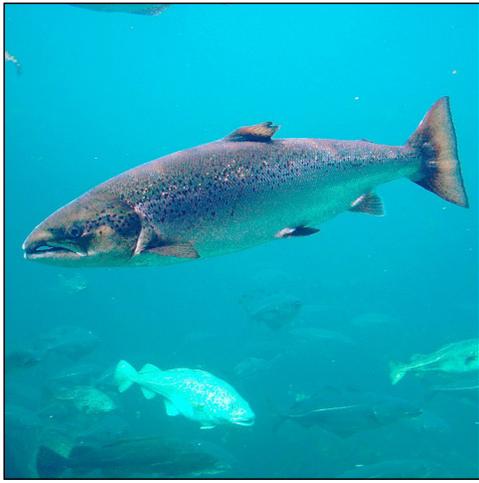
Discussion

Ask your students what food was eaten the most and the least, and why. What can they conclude about a bear's diet? Ask them what foods would help a bear the most as they prepare for hibernation.

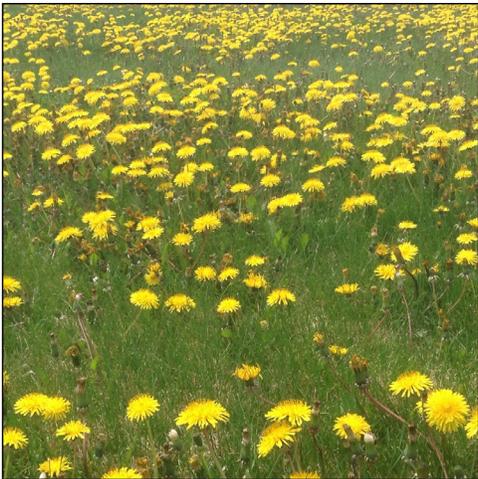
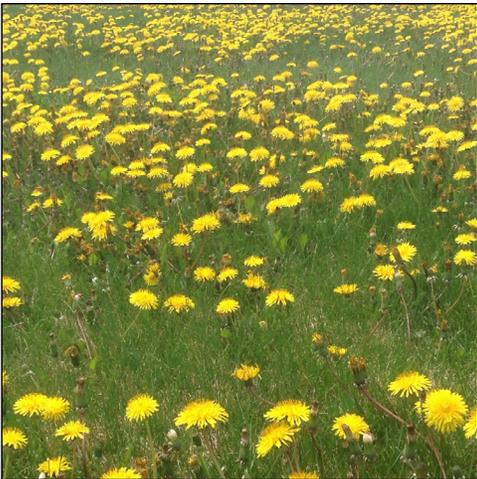
Activity adapted from: https://bear.org/wp-content/uploads/2011/01/Fat_Bear_Healthy_Bear.pdf



















Bear Hibernation Student Summary Form

Bear Name: _____ Biologist Name: _____

Name of Food	Keep Tallies for Each Foraged Card	Total
Nuts		
Berries		
Insects		
Plants		
Meat		

Bear Name: _____ Biologist Name: _____

Name of Food	Keep Tallies for Each Foraged Card	Total
Nuts		
Berries		
Insects		
Plants		
Meat		

Animals Aren't Strangers to the Weather's Big Dangers

Over time, animals have evolved and adapted to their environments and climates in many ways. These adaptations can be physical features, means of communication, or regulatory techniques, and each adaptation serves a purpose which enhances the survival of the species.

Sea lions have whiskers to help guide them while they're underwater or hunting in a thick fog. Sea lions can also regulate their temperature through a practice called "sailing." They roll onto their sides in the water and hold one flipper up to help cool down or warm up.

Camels live in the desert and have to withstand very hot temperatures and strong winds blowing around sand. In order to protect their eyes, camels have three sets of eyelids and two rows of eyelashes.

Elephants also live in dry environments, which is why their big ears help them hear storms coming from miles away. Because of their thick skin, elephants do not have to seek cover during these storms and can instead travel to watering holes or river beds as they fill with water.

Activity: Find the Sea Lion Pup

Grades: 2-5

Subject: Meteorology, Zoology

Skills: Active listening, identifying, sensing, analysis

Materials: *Look Up to See What the Weather Will Be*, several pairs of different soundmakers, blindfolds

NGSS: 3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics & 4-LS1-1 From Molecules to Organisms: Structures and Processes

Background

Sea lions live in colonies along the coast where dense fog can make it difficult to see. Sea lions rely on their other senses to navigate the beach where they live. They use their strong whiskers to sense where they are going underwater and their great hearing to find one another in the rookery (a group of sea lions). When a female sea lion is trying to find her pup, she uses a specific trumpeting vocalization and her pup responds with a specific bark. They go back and forth like this until they find one another.

Activity

1. Go over the background information and read *Look Up to See What the Weather Will Be*.
2. Divide students into two equal groups, and instruct the two groups to stand on opposite sides of the classroom. This can also be done outside, perhaps at the playground.
3. Ask each group to turn around so their backs are facing one another. Pass out a different soundmaker to each student in group one. Pass out the paired soundmakers to each student in group two. Each student should have a partner from the opposite group with the same noisemaker.
4. Pass out blindfolds to your students or have them close their eyes.
5. Have students move around the room to find their partner with the matching noise. If your class size is too large, you can split the groups in half. If you don't have sufficient noisemakers, assign students a word to shout out or other noise to make, such as clapping, snapping, or stomping.
6. Once the partners have found each other, they should stop making their noise. They can also take their blindfold off or open their eyes to watch the rest of the sea lions find their pups! You can do multiple round of this activity and switch it up by rotating the noises or noisemakers among your students.

Discussion

Ask your students how they found their partner. Was it difficult or easy? Which noises were the easiest to locate (low noises or high pitched noises)? Ask your students what they can conclude about how sea lions communicate with each other.

Activity: Camel Mask

Grades: 2-5

Subject: Meteorology

Skills: Close reading, identifying, inference, analysis

Materials: *Look Up to See What the Weather Will Be*, camel pictures, paper plates, crayons or markers, yarn, pom poms, hole punchers, pipe cleaners, popsicle sticks

NGSS: 3-LS3-2 Heredity: Inheritance and Variation of Traits & 4-LS1-1 From Molecules to Organisms: Structures and Processes

Background

While some animals escape certain weather dangers, other animals have adaptations that help them thrive in hazardous weather conditions. Adaptations are special skills or features animals have in order to thrive in the environment they live in. Camels, for example, live in the desert, which is a very dry and sandy environment where rain rarely falls and the temperatures are scorching. Here are some camel adaptations:

- Camels have a leathery mouth so they can eat twigs and leaves when they can't find grass or seeds to eat.
- Camels' humps store fat, not water, which they can survive off of for a long time.
- Camels have thick pads on their chests and knees to protect them from the hot sand when they lay down.
- Camels have three sets of eyelids, two rows of eyelashes, and they can close their nostrils to protect themselves from sandstorms.

Activity

1. Go over the background information and read *Look Up to See What the Weather Will Be*.
2. Show pictures of camels to your students. Point out specific physical characteristics of the camels' faces, namely the big rounded nose, large nostrils, eyes with long eyelashes and eyebrows. Pass out paper plates to each student.
3. Ask your students to draw eyes, eyebrows, lips, and a nose onto the paper plate. They can color the paper plates if they'd like. Ask them to glue yarn or pom poms where they drew the eyebrows to make them nice and bushy.
4. To make the eyelashes, the teacher should punch several holes in the paper plate, just above the eyes. If your students are older and you have enough hole punchers for them to share, they can punch their own holes.
5. Bend each pipe cleaner into a V-shape. Thread one pipe cleaner through two adjacent holes from the back. Twist the pipe cleaners so they stay put, and then twist 3-4 more times around each other.
6. Repeat for the remaining holes. If you punched 10 holes, you'll need 5 pipe cleaners.
7. Cut holes where the eyes would be so your students can see out of the mask.
8. Glue large popsicle sticks to the "chin" of the mask so the students can hold the mask to their faces.



Discussion

Ask your students why camels have such bushy eyebrows and long eyelashes. How do these adaptations help camels survive in the desert? Ask your students what other adaptations camels have. Ask your students what they think they would need to live in the desert.

Activity adapted from: <https://ncmepsunmercriculum.files.wordpress.com/2013/05/passport-lesson-4.pdf>

Activity: A Day at the Watering Hole

Grades: 2-5

Subject: Meteorology

Skills: Close reading, writing, presenting

Materials: *Look Up to See What the Weather Will Be*, A Day at the Watering Hole worksheet

NGSS: 3-LS3-2 Heredity: Inheritance and Variation of Traits & 4-LS1-1 From Molecules to Organisms: Structures and Processes

Background

Savannas are almost as dry as deserts. This can cause problems for the African elephants that live there because they drink up to 50 gallons (200 liters) of water a day! When rain approaches, elephants don't run away from it, they run *toward* it. Herds of elephants wait in watering holes until rain fills them up so they can drink the water, cool their skin, and even play in it by spraying each other.

Activity

1. Go over the background information and read *Look Up to See What the Weather Will Be*.
2. Pass out the worksheet on the next page. Students will write a story called "A Day at the Watering Hole" by using facts about elephants from the book. These facts are listed on the worksheet. They can use additional paper if necessary. Here is an example of the story:

One day, a herd of elephants gathered in an empty watering hole, waiting for the rainstorm. Elephants can hear storms approaching from miles away, so they head toward watering holes because they know the rain will fill it up. Water is important to all mammals, elephants too! They drink up to 50 gallons/200 liters of water a day. When it starts to rain, elephants don't seek shelter, instead they suck up water with their trunks to spray each other down. They also use their feet and tusks to dig for water. Elephants have very wrinkly skin, but calves' skin is tender, so they stand under their mothers for protection from the rain.

3. After your students have completed the activity, ask for volunteers to share their stories aloud.

Discussion

Ask your students what they learned about elephants from this activity. Do they have a favorite fact that they learned from the activity or from the book?

Guy Works All Day, Then it's Time to Play

Becoming a meteorologist is no easy feat! Guy describes years of practice and studying in order to become successful at his job. The most important trick he shares is to be observant and keep learning.

The activities in this section encourage students to use and engage with the information that they have learned so far. The activities Cloud Bingo and Ten Questions both require students to do more than remember information, they also have to be able to apply it to other situations. This is a staple of meteorology, because the weather is constantly changing. A meteorologist has to draw connections and make informed guesses in order to accurately predict the unique weather conditions each day holds.

As you encourage students to remember back to information from the beginning of the book, remind them that when they finish all of these activities they will be one step closer to becoming amateur meteorologists.

Activity: Color by Number Map

Grades: 2-5

Subject: Meteorology, biomes

Skills: Identifying, organizing

Materials: *Look Up to See What the Weather Will Be*, Color by Number Map, crayons/markers

NGSS: 3-ESS2-2 Earth's Systems & 4-ESS2-2 Earth's Systems

Background

Biomes are large communities of wildlife and vegetation that have adapted to a particular climate. There are five main types of biomes: tundra, grassland, forest, aquatic, and desert. Below are subcategories of biomes and their descriptions:

Rainforest - located near the equator, warm temperatures, and can average 200 inches of rain annually.

Savanna - concentrated rainfall for several months, followed by a period of drought.

Desert - very high temperatures and dry air, less than 12 inches of rain annually.

Temperate Forest - moderate temperatures and rainfall encourage a four-season climate which enables diverse tree growth.

Grassland - moderate rainfall, hot summers and cold winters, and not many trees.

Tundra - the coldest biome with limited vegetation and low precipitation.

Taiga Forest - long, dry winters and cool, wet summers, home to some vegetation and wildlife, and sees precipitation in the form of snowfall.

Alpine Tundra - very low winter temperatures and moderate summer temperatures due to the high elevation.

Activity

1. Go over the background information with your students and read *Look Up to See What the Weather Will Be*.
2. Pass out the Color by Number map of the world, found on the next page.
3. Before they color in the numbers, ask your students where they think the different biomes are on the map. Where are the deserts, grasslands, tundras, etc.?
4. Ask them to color in the map using the numbers and colors in the legend that correspond with the numbers on the map.

Discussion

Ask your students to reflect on what they said earlier. Were their guesses correct, and why did they guess what they did? Now that they've completed the biome map, ask them why the biomes are where they are. For example, why are the deserts closer to the equator than the tundras and why are the tundras on the north and south poles?

Color by Number Map



Legend

1	Rainforest	Grassland
2	Savanna	Tundra
3	Desert	Taiga Forest
4	Temperate Forest	Alpine Tundra

Activity: Ten Questions

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*

Subject: Meteorology

NGSS: K-ESS3-2 Earth and Human Activity

Skills: Critical thinking, inference, analysis

Background

The world of meteorology is vast and it encompasses lots of different things. Such as...

- Weather conditions (thunderstorms, hurricanes, blizzards)
- Environments/Biomes (tundras, grasslands, deserts)
- Seasons (winter, spring, summer, fall)
- Weather tools (radar, rain gauge, thermometer)

All of these topics and more are covered when studying weather, climate, and meteorology as a whole.

Activity

1. Have each student take a few minutes to choose one weather word. It can be any weather condition, environment, biome, weather tool, etc. Ask them to come up with two or three, in case another student uses their idea.
2. Ask your students to gather in a circle and pick a student to go first. This person will answer up to ten yes or no questions from the other students who are trying to guess the weather-related word the one student is thinking of.
3. When the guessers think they know what the word is, they should all agree on one single guess. After the guess, whether it was correct or not, the student who chose the word should reveal what it is. If the word was guessed correctly, the group wins. If not, the student who chose the word wins.
4. Repeat until all of the students have had a chance to answer the questions from the class.

Discussion

Ask your students why they chose the weather terms they did. Also ask them if they can draw any parallels from the activity they did to what Guy does everyday as a meteorologist. Answers: They asked questions which provided them with information that informed their guess. Emphasize to your students that what Guy does is much more involved than this, but they are on the right track.

Activity: Cloud Bingo

Grades: 2-5

Subject: Meteorology

Skills: Critical thinking, active listening, analysis

Materials: *Look Up to See What the Weather Will Be*, Cloud Bingo sheets, markers, glossary

NGSS: K-ESS3-2 Earth and Human Activity

Background

Below are some key weather words for your students to review before the game begins, but make sure they review the full glossary too!

Cloud- a large collection of very tiny droplets of water or ice crystals floating in the atmosphere.

Flood- rising water rushing over land. Usually a result of heavy rain or the melting of several inches of snow, which causes rivers and lakes to overflow.

Hurricane- a large and powerful storm in the Atlantic Ocean, Gulf of Mexico or Caribbean Sea, with heavy rainfall and winds ranging between 74 mph to 150 mph (120 km/hr to 240 km/hr) or greater.

Precipitation- any form of water from the atmosphere such as rain, snow, sleet, ice pellets, and hail.

Temperature- how hot or cold something is. Temperature is measured with a thermometer and recorded on the Celsius (C), Fahrenheit (F), or Kelvin (K) scales.

Weather- the state of the atmosphere regarding wind, temperature, moisture, cloudiness, and pressure, among other factors.

Activity

1. Go over the background with your students.
2. Hand out the bingo sheets to your students and ask them to pick a marker (they can draw a raindrop, a cloud, the sun, etc.)
3. Call out the definitions from the glossary to your students. The BINGO sheets have the glossary terms on them, so if the students have the term that matches the definition, they draw their marker on the corresponding box.
4. The students call out BINGO when they have 5 in a row. Ask them to read off the terms they have marked off. If they call out the correct terms, they win. If not, the round continues.
5. Repeat as many times as you'd like, but be sure to tell the students to pick different markers for each round.

Discussion

Ask your students if they feel comfortable with the glossary terms after the game. Which definitions are difficult for them to remember and which are easier to remember?

C L O U D

ECOSYSTEM	FOG	THUNDER- STORM	WEATHER FORECAST	DROUGHT
FLOOD	PRECIPI- TATION	CONDEN- SATION	LIGHTNING	TIDE
LOW PRESSURE	TORNADO	FREE	HIGH PRESSURE	TEMPER- ATURE
WEATHER	ATMO- SPHERE	HURRICANE	NOAA	OVERCAST
DOPPLER RADAR	CLOUD	WIND GUST	SNOW	WATER CYCLE

B I N G O

C L O U D

ATMO- SPHERE	HURRICANE	NOAA	TORNADO	DOPPLER RADAR
PRECIPI- TATION	TEMPER- ATURE	ECOSYSTEM	SNOW	TIDE
WEATHER FORECAST	LOW PRESSURE	FREE	OVERCAST	WEATHER
DROUGHT	WATER CYCLE	CLOUD	FLOOD	THUNDER- STORM
HIGH PRESSURE	WIND GUST	LIGHTNING	CONDEN- SATION	FOG

B I N G O

C L O U D

OVERCAST	WEATHER FORECAST	THUNDER-STORM	TEMPER-ATURE	SNOW
CONDEN-SATION	CLOUD	HIGH PRESSURE	HURRICANE	FLOOD
NOAA	LIGHTNING	FREE	TIDE	WEATHER
LOW PRESSURE	PRECIPI-TATION	DROUGHT	TORNADO	DOPPLER RADAR
WIND GUST	ECOSYSTEM	WATER CYCLE	ATMO-SPHERE	FOG

B I N G O

C L O U D

LIGHTNING	WEATHER FORECAST	TEMPER- ATURE	DROUGHT	WEATHER
HIGH PRESSURE	CLOUD	HURRICANE	WATER CYCLE	CONDEN- SATION
FLOOD	NOAA	FREE	SNOW	TIDE
DOPPLER RADAR	PRECIPI- TATION	OVERCAST	THUNDER- STORM	TORNADO
ATMO- SPHERE	ECOSYSTEM	WIND GUST	LOW PRESSURE	FOG

B I N G O

C L O U D

CONDEN- SATION	ATMO- SPHERE	LOW PRESSURE	FOG	WATER CYCLE
DROUGHT	ECOSYSTEM	TIDE	PRECIPI- TATION	WEATHER FORECAST
LIGHTNING	TORNADO	FREE	WEATHER	HIGH PRESSURE
CLOUD	SNOW	NOAA	DOPPLER RADAR	WIND GUST
HURRICANE	TEMPER- ATURE	FLOOD	OVERCAST	THUNDER- STORM

B I N G O

Don't Be Scared, Be Prepared

Severe weather conditions can be scary, especially for children who are learning about the dangers of weather for the first time. These natural phenomena can be extremely dangerous and that is why it is essential to be ready for every weather condition.

The activities in this section encourage students to use their observational skills and pattern recognition in order to identify potentially threatening situations. These skills will create informed and engaged citizens when a weather disaster strikes. After completing this section, students will be able to recognize severe weather conditions and will be prepared to react.

Activity: Safety Tips for Guy

Grades: 2-5

Subject: Meteorology

Skills: Critical thinking, close reading, analysis, inference

Materials: *Look Up to See What the Weather Will Be*, Safety Tips for Guy worksheet

NGSS: K-ESS3-2 Earth and Human Activity, 3-ESS3-1 Earth and Human Activity

Background

Severe weather, such as hurricanes or tornadoes, can occur suddenly and aggressively. It's important to be prepared for hazardous weather so you can keep yourself, your family, and your community safe. You can create a weather safety plan with your family by creating a weather survival kit, mapping out emergency exits and evacuation routes, and determining everyone's role when carrying out this plan.

Visit [weather.gov/sgf/disaster_preparedness](https://www.weather.gov/sgf/disaster_preparedness) for more information on how to best prepare for a weather emergency.

Activity

1. Go over the background information and read *Look Up to See What the Weather Will Be*. Be sure to point out the safety measures on pages 46 and 47.
2. Pass out the worksheet titled "Safety Tips for Guy" to your students. There are six weather conditions that Guy has found himself in. Underneath those images, the students write what Guy should do in those circumstances.
3. Go over the answers with your students after they have completed the worksheet.

Discussion

Ask students to raise their hand to give the answer for each image. If they get any answers wrong, ask if any other students know the correct answer and can help their classmate. Ask your students why they gave Guy the tips they did. Make sure they understand the proper protocols for the weather conditions listed on the sheet.

Safety Tips for Guy

Name: _____ Date: _____

Guy went on location in these weather conditions.
Help him stay safe by giving him safety tips in the banks below!



This is a _____.
Guy should _____
_____.



This is a _____.
Guy should _____
_____.



This is a _____.
Guy should _____
_____.



This is a _____.
Guy should _____
_____.



This is a _____.
Guy should _____
_____.



This is a _____.
Guy should _____
_____.

Answer Key

Guy went on location in these weather conditions.
Help him stay safe by giving him safety tips in the banks below!



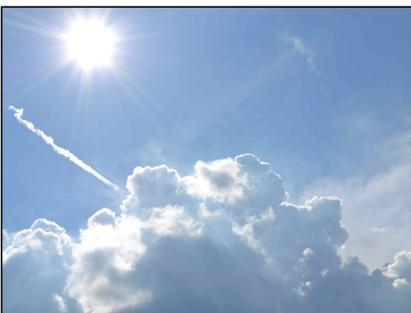
This is a **tornado**.

Guy should **go to the lowest floor possible, stay away from windows, and protect himself.**



This is a **thunderstorm**.

Guy should **go inside and stay away from windows.**



This is a **summer sun**.

Guy should **wear a hat, sunglasses, and sunscreen.**



This is a **hurricane**.

Guy should **go to the highest floor or evacuate the area.**



This is a **flood**.

Guy should **go to the highest floor/high ground and stay away from water.**



This is a **blizzard**.

Guy should **wear a coat, hat, gloves, and sturdy boots.**

Activity: Severe Weather Survival Kit

Grades: 2-5

Subject: Meteorology

Skills: Close reading, critical thinking, analysis, organization

Materials: *Look Up to See What the Weather Will Be*, backpack coloring worksheet, online resources, tape/glue, Emergency Supply Kit Discussion Questions

NGSS: 3-ESS3-1 Earth and Human Activity

Background

A weather survival kit is a bin or backpack full of essential items that can help people best prepare for when a weather disaster strikes. Below are some items that the National Weather Service suggests including in the survival kit:

1. Flashlights
2. Portable radio
3. Extra batteries
4. Matches
5. Three-day supply of food and water
6. Cash
7. Sanitary supplies
8. First-aid Kit
9. Extra clothes
10. Portable charger

Activity

1. Read the background information and *Look Up to See What the Weather Will Be* with your students.
2. Pass out the backpack coloring worksheet on the next page. Your students can color it in and cut it out. Tell them that this is their weather survival kit.
3. Ask your students to find images of items that should go into their backpack. You can have them share copies of *Look Up to See What the Weather Will Be* or have them visit www.weather.gov/owlie/emergencysupplieskit so they know what to include.
4. Once they find the images they need for their kit, they should print them, cut them out, and tape/glue the images to their backpack.
5. Divide the students into even groups for a group discussion.

Discussion

When your students are in groups, pass out the slips of paper on page 67. These questions will guide their conversation. Be sure to give each group ample time to discuss before coming together as a class.

After your students have finished their discussions, ask volunteers from the different groups to share what they discussed for each question. Use this time to make sure your students understand the importance of weather preparedness.



Emergency Supply Kit Discussion Questions

If our classroom were to have an emergency supply kit...

1. Where would we store it and why?
2. What items do you think are most important and why?
3. How would this kit be useful if our school was impacted by a flood, hurricane, tornado, etc.?

If our classroom were to have an emergency supply kit...

1. Where would we store it and why?
2. What items do you think are most important and why?
3. How would this kit be useful if our school was impacted by a flood, hurricane, tornado, etc.?

If our classroom were to have an emergency supply kit...

1. Where would we store it and why?
2. What items do you think are most important and why?
3. How would this kit be useful if our school was impacted by a flood, hurricane, tornado, etc.?

If our classroom were to have an emergency supply kit...

1. Where would we store it and why?
2. What items do you think are most important and why?
3. How would this kit be useful if our school was impacted by a flood, hurricane, tornado, etc.?

Activity: Severe Weather Trivia Quiz

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be* and Severe Trivia Weather Quiz

Subject: Meteorology

NGSS: K-ESS3-2 Earth and Human Activity

Skills: Analysis, critical thinking

Background

World records can be made in anything, including weather! Below are some of the weather world records:

- Highest recorded temperature on Earth: 134 degrees Fahrenheit (Death Valley, California, USA)
- Greatest rainfall in 48 hours: 8 feet 2 inches (Cherrapunji, India)
- Greatest snowfall in 12 months: 102 feet (Washington, USA)
- Longest lightning flash: 440.6 miles (north-eastern Argentina to southern Brazil to the Atlantic Ocean)

Activity

1. Read *Look Up to See What the Weather Will Be* and the background information with your students.
2. Pass out the pop quiz on the next page to your students and give them enough time to complete it.
3. Go over the answers with your class to see which student(s) answered the most questions correctly. You can give this student or students extra credit if you'd like.

Discussion

Ask your students why they chose the answers they did. This is a good opportunity to see if their thought process helped them predict answers they didn't know. Ask your students what their favorite weather fact from the quiz was. Also ask if they have one of their own weather facts they'd like to share with the class that's not on the quiz.

Activity adapted from: <https://play.howstuffworks.com/quiz/worlds-worst-weather-quiz>

Severe Weather Trivia Quiz

Name _____

Date _____

Directions: choose the option that best answers the question.

1. Where was the coldest temperature recorded?
 - a. Antarctica
 - b. United States
 - c. Norway
2. What was the lowest temperature recorded?
 - a. 0 degrees Fahrenheit
 - b. -120 degrees Fahrenheit
 - c. -128.6 degrees Fahrenheit
3. What country averages the most tornadoes per year?
 - a. Australia
 - b. United States
 - c. Brazil
4. In 1936, how big were the hailstones that struck during a severe storm in South Africa?
 - a. the size of baseballs
 - b. the size of coconuts
 - c. the size of golf balls
5. Which natural disaster can produce the strongest winds?
 - a. tornado
 - b. blizzard
 - c. hurricane
6. How often does lightning strike worldwide?
 - a. once a minute
 - b. 100 times a minute
 - c. 50-100 times per second
7. Which country receives the most precipitation annually?
 - a. Columbia
 - b. India
 - c. United Kingdom
8. How much rain does the Central Sahara Desert get a year?
 - a. 2-3 inches
 - b. less than an inch
 - c. more than 5 inches
9. Which city has the highest average wind speed?
 - a. Wellington, New Zealand
 - b. Chicago, United States
 - c. Dubai, United Arab Emirates
10. What was the highest temperature ever recorded at Death Valley in California?
 - a. 100 degrees Fahrenheit
 - b. 50 degrees Fahrenheit
 - c. 134 degrees Fahrenheit

Severe Weather Trivia Quiz

Answer Key

1. Where was the coldest temperature recorded?
 - a. **Antarctica**
 - b. United States
 - c. Norway
2. What was the lowest temperature recorded in the previous question?
 - a. 0 degrees Fahrenheit
 - b. -120 degrees Fahrenheit
 - c. **-128.6 degrees Fahrenheit**
3. What country averages the most tornadoes per year?
 - a. Australia
 - b. **USA**
 - c. Brazil
4. In 1936, how big were the hailstones that struck during a severe storm in South Africa?
 - a. the size of baseballs
 - b. **the size of coconuts**
 - c. the size of golf balls
5. Which natural disaster can produce the strongest winds?
 - a. **tornado**
 - b. blizzard
 - c. hurricane
6. How often does lightning strike worldwide?
 - a. once a minute
 - b. 100 times a minute
 - c. **50-100 times per second**
7. Which country receives the most precipitation annually?
 - a. **Columbia**
 - b. India
 - c. United Kingdom
8. How much rain does the Central Sahara Desert get a year?
 - a. 2-3 inches
 - b. **less than an inch**
 - c. more than 5 inches
9. Which city has the highest average wind speed?
 - a. **Wellington, New Zealand**
 - b. Chicago, United States
 - c. Dubai, United Arab Emirates
10. What was the highest temperature ever recorded at Death Valley in California?
 - a. 100 degrees Fahrenheit
 - b. 50 degrees Fahrenheit
 - c. **134 degrees Fahrenheit**

Not All Clouds Are the Same, Learn to Call Them by Name

Clouds will often tell you what the weather will be if you know what they mean. Guy says a simple glance at the clouds can tell him if a storm is brewing! After the activities in this section, your students will also be able to identify what clouds can tell them about the weather.

Cirrus clouds are thin and wispy. This cloud appears when it is sunny, but could potentially signal later warm or stormy weather conditions.

Altostratus clouds are flat and gray in color. These clouds signal that continuous rain or snow could be coming.

Cumulus clouds are white and fluffy. These clouds appear on sunny days and are perfect for finding different shapes in the sky!

Activity: Matching Clouds

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*, Matching Clouds worksheet

Subject: Meteorology

NGSS: 5-ESS2-1 Earth's Systems, 2-PS1-1 Matter and Its Interactions

Skills: Identifying, critical thinking, analysis

Background

Even though there are several cloud variations (more than 100!), there are ten basic types of clouds. Each type has a unique shape that is determined by the sun, the weather, and even the mountains. Some clouds bring heavy rain and thunder and others provide shade on a sunny day. Below is a list of the ten clouds and what they look like:

Cirrus - wispy and strand-like, very high in the sky

Altostratus - flat, high in the sky.

Cirrocumulus - wispy and puffy, very high in the sky

Stratocumulus - flat and puffy.

Cirrostratus - flat and wispy, very high in the sky

Nimbostratus - dark, thick, and blanket-like.

Alto cumulus - puffy and blob-like, high in the sky.

Cumulus - puffy and blob-like, in a group.

Stratus - flat, blanket-like.

Cumulonimbus - puffy, dark, and thick.

Activity

1. Read the background and *Look Up to See What the Weather Will Be* to your students.
2. Pass out the worksheet on the next page to your students. This worksheet asks students to match the cloud picture to the name of the cloud.
3. Your students can work together or individually.

Discussion

Ask your students if they think any of the clouds look similar. What about them is similar and how does this happen? Also ask them if some clouds look different and what factors make clouds look different.

Matching Clouds

Name: _____ Date: _____

Directions: Use the word bank below to match the cloud to its name.

Word Bank

Altostratus	Stratocumulus	Altostratus	Nimbostratus	Cumulonimbus
Cirrus	Cirrocumulus	Stratus	Cirrostratus	Cumulus



Matching Clouds

Answer Key

Word Bank

Alto cumulus	Strato cumulus	Alto stratus	Nimbo stratus	Cumulo nimbus
Cirrus	Cirro cumulus	Stratus	Cirro stratus	Cumulus



Cirrus



Cirrostratus



Nimbostratus



Alto cumulus



Cirrocumulus



Cumulus



Stratus



Strato cumulus



Altostratus



Cumulonimbus

Activity: Cloud Scramble

Grades: 2-5

Subject: Meteorology

Skills: Critical thinking, sorting, problem solving

Materials: *Look Up to See What the Weather Will Be*, Cloud Scramble worksheet

NGSS: 5-ESS2-1 Earth's Systems

Background

All clouds were given Latin names in 1802 that described their shape and height in the sky. Latin became the preferred scientific language during the Renaissance as science was developing all across Europe. A universal scientific language is beneficial because scientists all around the world can clearly communicate and understand scientific concepts. Below are the Latin root cloud names with their original meaning:

Root Name	Original Meaning
Cumulus	heap, pile
Stratus	layer, sheet
Cirrus	fiber, hair
Nimbus	rain, precipitation
Alto	high

Activity

1. Read the background information and *Look Up to See What the Weather Will Be* to your students.
2. Pass out the Cloud Scramble worksheet on the next page to your students. The ten cloud names are scrambled and the students have to unscramble them.
3. Tell the students to work individually to see how far they can get on their own. They can work together, in partners or in small groups, if you notice they are struggling.
4. Alternatively, you can turn this into a classroom competition. The first student or group of students to correctly finish the worksheet gets bonus points on the next test or extra credit, for example.
5. Once everyone has finished, go over the answers as a class.

Discussion

Ask your students if they noticed anything similar about the cloud names. What do the names mean? If more than one type of cloud shares a part of the word, what do those clouds have in common (i.e. ALTOcumulus and ALTOstratus)?

Information adapted from: https://www.sciencelearn.org.nz/interactive_timeline/9-measuring-the-weather-a-timeline

Cloud Scramble

Name: _____ Date: _____

Directions: Unscramble the cloud names below.

IRSRUC

LUCIROUUMSCR

RASTUCSORIRT

TOMULSUCUAL

STRATLOAUST

TROCULSATUUMS

IMSTRABTUONS

MUCUULS

TTSARSU

INBMULOMSCUU

Cloud Scramble

Answer Key

IRSRUC

CIRRUS

LUCIROUUMSCR

CIRROCUMULUS

RASTUCSORIRT

CIRROSTRATUS

TOMULSUCUAL

ALTOCUMULUS

STRATLOAUST

ALTOSTRATUS

TROCULSATUUMS

STRATOCUMULUS

IMSTRABTUONS

NIMBOSTRATUS

MUCUULS

CUMULUS

TTSARSU

STRATUS

INBMULOMSCUU

CUMULONIMBUS

Activity: Cotton Ball Clouds

Grades: 2-5

Subject: Meteorology

Skills: Identifying, critical thinking, organization

Materials: *Look Up to See What the Weather Will Be*, cotton balls, poster board, glue, gray marker, Cloud Height Chart

NGSS: 5-ESS2-1 Earth's Systems

Background

Different clouds bring different weather. Cumulus and stratocumulus clouds generally bring sunny and dry weather, while altostratus and nimbostratus bring rain or snow. Some clouds, like cirrocumulus or cirrostratus, warn people that snow, rain, or even hurricanes are coming soon.

These clouds also vary in height and what they are made of. Low clouds (stratocumulus, stratus, and nimbostratus) range from 0 feet to 6,500 feet, and are made of water droplets. Middle clouds (altocumulus and altostratus) range from 6,500 feet to 20,000 feet, and are made of icy crystals and water droplets. High clouds (cirrus, cirrocumulus, and cirrostratus) range from 20,000 feet to 35,000 feet, and are made of ice crystals. Towering clouds (cumulonimbus and cumulus) start low to the ground and grow to be very tall. They are made of water on the bottom and ice crystals on top.

Activity

1. Read the background information and *Look Up to See What the Weather Will Be* to your students.
2. Gather the materials necessary for the activity and divide them evenly among your students.
3. Instruct the students to draw a simple landscape on their poster. 90 percent of their poster should be a blank, blue sky.
4. Ask your students to make the ten different, specific clouds out of cotton balls and glue them on the poster at the right height. For some clouds, like cumulonimbus, they can use a gray marker to color the cotton ball.

For example: pull apart a cotton ball and roll them into small pellets to make cirrocumulus clouds. They would be glued at the top of the poster because they are 20,000-35,000 feet in the air.

5. Your students can use the Cloud Height Chart on pages 50 and 51 of *Look Up to See What the Weather Will Be* for reference.
6. Make sure the students label the clouds as they glue them down.

Discussion

Ask your students if they know what high clouds are made of and what low clouds are made of. What type of weather do the different clouds bring? If there are clouds in the sky, ask your students to identify the clouds and predict what weather those clouds will bring.

Concluding Activities

The activities in this section are primarily experimental and take place after students read *Look Up to See What the Weather Will Be*. These activities will use what students have learned from reading and prior activities to make their own observations, form their own forecasts, and prepare for potential weather disasters. After this section, your students will be fully informed amateur meteorologists!

Activity: Predict the Weather

Grades: 2-5

Materials: *Look Up to See What the Weather Will Be*, notebooks/weather journal

Subject: Meteorology

NGSS: K-ESS2-1 Earth's Systems

Skills: Inference, analysis, critical thinking

Background

It's important for scientists, including meteorologists, to continue to educate themselves. They use their previous knowledge to build upon what they recently learned to conduct experiments, develop tools, and make new discoveries. It's important for *everyone* to continue to educate themselves so they can build on what they already have learned and reflect on how far they have come.

Activity

1. Read *Look Up to See What the Weather Will Be* with your students. Make sure they have an understanding of what to look for when predicting the weather.
2. Ask your students to grab their notebooks and pen, and have them take notes on the sky. You can do this outside or have the students look out the window to observe the weather.
3. Give them 10-15 minutes to collect their observations and then use their observations to conclude what they think the weather will be.
4. While they are making their observations and conclusions, encourage them to call back on what they learned in the book or previous activities. They should be able to infer what weather may be coming based on the types of clouds that are in the sky, for example.

Discussion

Ask your students to compare their observations from before they read the book to now (after they read the book). What did they notice about their progress? What do they still want to learn about weather? What information will they still need to become meteorologists?

Activity: Build a Weather Station

Grades: 2-5

Subject: Meteorology

Skills: Identifying, critical thinking, organization, problem solving

Materials: *Look Up to See What the Weather Will Be*, materials listed for each activity

NGSS: 3-ESS2-1 Earth's Systems

Background

Every weather station has various tools to help meteorologists make the most accurate forecast they can. Some of these tools, like Doppler Radar, aren't that accessible for people who aren't meteorologists, but there are some tools that are very accessible. You can even make the following tools at home:

Wind Vane- indicates wind direction

Thermometer- measures temperature

Barometer- measures air pressure

Rain Gauge- measures precipitation

Activity

1. Read *Look Up to See What the Weather Will Be* and background with your students.

2. Follow the instructions below to create the components of a weather station: a wind vane, a barometer, a thermometer, and a rain gauge.

3. Wind Vane

3a. Materials: cardstock, markers, scissors, glue, one plastic straw, one pencil with a full eraser, a pin, clay, one 12 inch x 12 inch piece of cardboard, a compass.

3b. Instructions:

- Push the pin all the way through the center of the straw.
- Insert the pin into the pencil eraser (make sure to leave enough space for the straw to spin).
- On a piece of cardstock, draw two arrow shapes. Cut the two arrow shapes from the cardstock.
- Glue the shapes onto the sides of the straw (make sure that the arrows point in the same direction, so the wind vane can be read).
- Use the clay to secure the pencil to the piece of cardboard.
- Make sure your wind vane spins and stands up straight.

3c. How to use the wind vane:

- Use your compass to mark the four directions (North, South, East and West) on the cardboard.
- Let your wind vane blow in the wind and track which direction the vane points.
- Use your wind vane to observe and track wind direction over time.

4. Barometer

4a. Materials: one clean, empty two-liter bottle, one clear plastic cup, straws, markers, liquid food coloring, water.

4b. Instructions:

- Pour a couple inches of water into the cup and add a few drops of food coloring.
- Place the two liter bottle upside down in the cup (make sure that the neck of the bottle fits snugly in the cup, but the mouth of the bottle does not touch the bottom of the cup). The bottle should not be sealed with a cap.
- Insert a straw between the bottle and the cup to allow air into the cup (make sure the straw is not below the water line in the cup). The straw should not be inserted into the bottle.
- Use a marker to mark the water level on the side of the cup and the side of the bottle.

4c. How to use the barometer:

- Keep track of the water level inside the plastic cup.
 - If the weather is going to be clear, a higher air pressure will push down the water in the cup causing the level in the cup to be lower and the level in the bottle to be higher.
 - If a storm is approaching, the air pressure will drop causing the water level in the cup to rise as the level in the bottle gets lower.
- Use your barometer to observe and track air pressure over time.

5. Thermometer

5a. Materials: one clean empty bottle, measuring cup, $\frac{1}{2}$ cup of water, $\frac{1}{2}$ cup of rubbing alcohol, food coloring, one clear straw, modeling clay, and markers.

5b. Instructions:

- Pour the water into the bottle.
- Add the rubbing alcohol to the water in the bottle.
- Add a few drops of food coloring and mix.
- Place the straw in the bottle (make sure the end of the straw is submerged in the liquid, but is not touching the bottom of the bottle).
- Use the clay to secure the straw in place (make sure not to cover the top of the straw).

5c. How to use the thermometer:

- Place your thermometer in a warm place and wait for the liquid to rise.
- Use a marker to draw a line on the bottle to show where the liquid rose to in the straw and write the date.
- Use the thermometer in the same place at the same time each day and record the “temperatures”.
- After collecting data for a few days, compare the temperatures and make observations.

6. Rain Gauge

6a. Materials: one wide glass, a ruler, one graduated cylinder, strip of masking tape, water.

6b. Instructions:

- Using your ruler, pour roughly one inch of water into the wide glass (this jar is your “rain catcher”).
- Pour the water from the glass into your graduated cylinder (this is your rain gauge).
- Use masking tape to mark the water level on the rain gauge.

6c. How to use the rain gauge:

- Set your rain catcher in an area outside that will allow it to catch rain.
- After it rains, pour the water from your rain catcher into the rain gauge and use the pre-marked one inch line to determine the amount of rain in inches.
- Record your observations.

7. Use a cardboard box or a crate to hold the tools, and place outdoors to collect the data. The thermometer and barometer should be in a covered area.

Discussion

Divide your class into groups of four and assign each group a different week to collect data from the weather station. Each member should be responsible for recording the results from one tool throughout the week. Once every group has gone, have them present their findings. What changed from week to week? What stayed the same? Why did these changes occur and why did certain things change?

Activity adapted from: https://www.teachengineering.org/activities/view/cub_weather_lesson04_activity1

Activity adapted from: https://www.weather.gov/wx/coop_8inch

Activity: Weather TV Report

Grades: 2-5

Subject: Meteorology

Skills: Research, public speaking, writing

Materials: *Look Up to See What the Weather Will Be*, Weather Observations worksheet, Weather Forecast Script, On-Location Reporting Script

NGSS: K-ESS2-1 Earth's Systems

Background

The weather is different all over the world on any given day. Some locations may be experiencing sunny, cloudless skies and other locations may be experiencing a rainy, dreary day. No matter where someone may be, though, what people need to know to prepare for the day is the same. That's where meteorologists come in!

Meteorologists give a live forecast of the weather at least twice a day. Each forecast includes the expected high and low temperature, the chance of precipitation, and if the sky is cloudy or clear for that particular day. This vital information helps people plan their day, everything from what they're going to do to what they are going to wear.

Activity

1. Read *Look Up to See What the Weather Will Be* and the background with your students.
2. Pair your students together or have them choose their own partners. Ask your students to make observations about the weather by looking out the window or going outside. They can also go to weather.com to look up what the temperature is in their area. Ask them to write down their observations on the Weather Observations worksheet, found on the next page.
3. After they have completed the Weather Observations worksheet, pass out the Weather Forecast Script worksheet. They should use their weather observations to fill in the blanks on the script.
4. Collect the Weather Observations worksheet and the Weather Forecast Script to review.
5. In the same or different pairings, ask your students to pick a location anywhere in the world. Tell them to conduct the same research for that location and write down their findings on the On-Location Reporting Script.
6. After your students have finished filling this out, have them practice with their partner. Ask for volunteers to present their "live broadcast" to the class.

Discussion

Ask your students how their hometown observations and scripts differed from the scripts they wrote for their chosen location. What factors contribute to the differing weather? Also ask them if they enjoyed putting together a forecast script, and if they would like to pursue this as a career choice when they grow up.

Activity adapted from: <https://nature.discoveryplace.org/stay-at-home-science/create-your-own-to-weather-report>

Weather Observations

Name: _____ Date: _____

Directions: Write down your weather observations below. You can visit weather.com to look up the temperature, humidity, and much more in your area.

Temperature (High/Low): _____

Humidity: _____

Precipitation Percentage: _____

Wind: _____

Draw or describe the clouds in the sky in the space below.



Weather Forecast Script

Name: _____ Date: _____

Directions: Use your observations from the Weather Observation worksheet to fill in the Weather Forecast Script below.

FORECASTER 1: Hi everyone. My name is _____.
(forecaster 1)

FORECASTER 2: And I'm _____, reporting from _____.
(forecaster 2) (city, state)

FORECASTER 1: You can expect today to be _____, with a low of _____
(chilly, warm, hot, cold) (average low)
and a high of _____ with wind speeds up to _____ miles per hour.
(average high) (max speed)

FORECASTER 2: There is a _____ percent chance of _____ and the humidity is up to _____ percent.
(percentage) (type of precipitation)
(percentage)

FORECASTER 1: You can expect _____ for the rest of the day.
(clear skies, thunderstorms, cool temps.)

FORECASTER 2: So be sure to _____.
(describe how to prepare for this type of weather)

FORECASTER 1: This has been _____ and _____ with today's forecast.
(forecaster 1) (forecaster 2)

FORECASTER 2: Have a great day.

On-Location Reporting Script

Name: _____ Date: _____

Directions: Research a location of your choosing to fill in the blanks below. You can visit weather.com to find the information needed to complete the activity.

FORECASTER 1: Hi everyone. My name is _____.
(forecaster 1)

FORECASTER 2: And I'm _____, reporting live from _____ in
(forecaster 2) (location)

(city, state/country)

FORECASTER 1: It is _____ here today. As you can see, we are dressed
(chilly, warm, hot, cold, rainy, stormy)

for the weather.

FORECASTER 2: Right now, the temperature is _____. There are _____
(forecaster 1) (types of clouds/no clouds)

clouds in the sky, which calls for _____.
(type of weather clouds/no clouds brings)

FORECASTER 1: The wind speed is _____ and the humidity is up to _____.
(wind speed) (percentage)

FORECASTER 2: To prepare for this weather, make sure you _____.
(how to prepare for this type of weather)

Thanks for listening to the weather report.

FORECASTER 1: This has been _____ and _____. Back to you in the studio.
(forecaster 1) (forecaster 2)

Glossary

Atmosphere: layers of gases surrounding the Earth, held in place by Earth's gravity.

Cloud: a large collection of very tiny droplets of water or ice crystals floating in the atmosphere.

Condensation: the process where water vapor (water in gas form) cools and turns into liquid water.

Damp: a little wet, moistened.

Doppler Radar: a weather radar that is used to track the rate and direction of precipitation and wind.

Drought: an extended period of dry weather that can lead to a water shortage and damaged crops. Droughts can last for months.

Dusk: the time in the evening after sunset when daytime transitions to night.

Ecosystem: all of the living and nonliving things in a specific area where the organisms work together as a unit.

Flood: rising water rushing over land. Usually a result of heavy rain or the melting of several inches of snow, which causes rivers and lakes to overflow.

Fog: a cloud on the ground; mist or water droplets suspended in the air at the Earth's surface, which can be hard to see through.

High Pressure: a system of cold, dry air that typically brings sunny skies and a light breeze.

Hurricane: a large and powerful storm in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea, with heavy rainfall and winds ranging between 74 mph to 150 mph (120 km/hr to 240 km/hr) or greater.

Lightning: a blazing hot electrical spark generated by thunderstorms; it can strike from cloud to cloud or cloud to ground, and it travels at the speed of light, which is 670,000,000 mph (1,080,000,000 km/hr).

Low Pressure: a system of warm, wet air that brings storms and strong winds.

NOAA (The National Oceanic and Atmospheric Administration): an American scientific agency that focuses on the conditions of the oceans, major waterways, and the atmosphere.

Overcast: when thick clouds cover at least 90 percent of the sky, causing it to look dull and gray.

Precipitation: any form of water from the atmosphere such as rain, snow, sleet, ice pellets, and hail.

Snow: precipitation that is made of ice crystals. Snow can stick together to create snowflakes that fall from the sky.

Temperature: how hot or cold something is. Temperature is measured with a thermometer and recorded on the Celsius (C), Fahrenheit (F), or Kelvin (K) scales.

Thunderstorm: usually means wind, lightning, thunder, dense clouds, heavy rain or hail.

Tide: the constant rise or fall of Earth's oceans (and lakes, and even your cup of water, though it is very small) caused mainly by the gravitational pull of the moon.

Tornado: an aggressive rotating column of air that extends from a thunderstorm to the ground. The winds can exceed 300 mph (480 km/hr).

Water Cycle: the movement and changing state of water as it travels around Earth's oceans, atmosphere, and land. The states are liquid water, solid ice, and water vapor or gas.

Water Droplets: very small beads of water.

Waterlogged: soaked; full of water.

Weather: the state of the atmosphere regarding wind, temperature, moisture, cloudiness, and pressure, among other factors.

Weather Forecast: a description of what the weather is most likely to be in the near future.

Wind: the movement of large amounts of air in a specific direction.

Wind Gust: rapid wind speed changes.

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