

Appendices

Water basics

Facts about water and rivers

Books about water and rivers

Water words

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Reading Rockets tip sheets

Water Basics

Basic facts about water

- There is a finite amount of water on the earth and it moves around through the water cycle.
- Water exists on earth in three states: solid as ice, gas as vapor, fog, or mist, and liquid as water.
- The way water behaves changes with the seasons (rain, snow, hail, flooding, drought).
- People, plants, and animals need water to live.



Water Words

Absorption

The process of being soaked up.

Clouds

A mass of water vapor that floats in the sky. Different cloud types form at different altitudes and temperatures. 3 common cloud types: **Cirrus**: thin, wispy and feathery cloud. **Cumulus**: fluffy white cloud with a flat bottom. **Stratus**: wide, thick low-lying gray cloud.

Condensation

When gas cools and changes to a liquid, for example, when warm steam touches a cold window.

Drought

A long period with little or no rain.

Evaporation

When a liquid heats up and changes to gas.

Flood

An overflow of water onto land that is normally dry.

Fog

A thick mass, like a cloud, made up of tiny water drops floating in the air near the ground.

Hail

Frozen rain, or small balls of ice that fall from the sky.

Ice

Water in a frozen, solid state.

Precipitation

Water falling in the form of rain, snow, or hail.

Rain

Drops of water that form in the clouds and fall from the sky.

Snow

Soft, white flakes of ice that fall from the sky. Snow is formed when water in the upper air freezes into crystals.

Sublimation

When ice changes to gas, skipping the liquid state.

Surface tension

The "sticking together" of water molecules on the top surface. It explains why insects can walk on water!

Transpiration

When plants give off moisture into the air.

Vapor

Tiny drops of water in the air; the gas form of water. Clouds are made of water vapor.

Water

A clear thin liquid that has no color or taste when it is pure. It falls from clouds as rain and enters rivers, lakes, and oceans. All animals and people need water in order to live.

Water cycle

The continuous, natural circulation of the earth's water through evaporation, condensation, precipitation, and collection in lakes, streams, rivers, and oceans.

The water cycle

The water cycle is the continuous, natural circulation of the earth's water through evaporation, condensation, precipitation, and collection in lakes, streams, rivers, and oceans.





Children's Books

Fiction

- *Bringing the Rain to Kapiti Plain* by Verna Aardema (Gr 2-3)
- *Come on Rain!* by Karen Hesse (Gr K-2)
- *Hurricane* by David Wiesner (Gr 1-3)
- *Hurricane!* by Jonathan London (Gr 1-3)
- *It Looked Like Spilt Milk* by Charles G. Shaw (Gr 1-5)
- *Rain* by Manya Stojic (Gr 1-2)
- *Rain Rain Rivers* by Uri Shulevitz (Gr K-2)
- *The Snowy Day* by Ezra Jack Keats (Gr 1-2)
- *Waiting Out the Storm* by Joann Early Macken (Gr 1-2)
- *Walter Was Worried* by Laura Vaccaro Seeger (Gr 1-5)
- *Water Boy* by David McPhail (Gr 1-3)

Poetry

- *All the Water in the World* by George Ella Lyon and Katherine Tillotson (Gr K-3)
- *I Know the River Loves Me / Yo se que el rio me ama* by Maya Christina Gonzalez (Gr 1-3)
- *Water Dance* by Thomas Locker (Gr K-2)
- *Watersong* by Tim McCanna (Gr K-1)
- *Weather Poems for All Seasons* by Lee Bennet Hopkins (Gr K-2)

Nonfiction

- *Clouds* by Anne Rockwell (Gr K-3)
- *DK Eyewitness: Water* by John Woodward (Gr 3-5)
- *A Drop of Water* by Walter Wick (Gr 3-5)
- *Hurricanes* by Gail Gibbons (Gr 1-3)
- *I Get Wet* by Vicki Cobb (Gr K-2)
- *The Magic School Bus Inside A Hurricane* by Joanna Cole (Gr 1-3)
- *National Geographic Kids: Water* by Melissa Stewart (Gr 1-5)
- *One Well: The Story of Water on Earth* by Rochelle Strauss (Gr 3-5)
- *Rivers of Sunlight* by Molly Bang and Penny Chisholm (Gr 2-5)
- *Water Is Water: A Book About the Water Cycle* by Miranda Paul (Gr 1-5)



Activities: Water, Ice, and Steam

Introduction

Introduce kids to the three states that water can be in: liquid, solid (ice), and gas (steam or vapor).

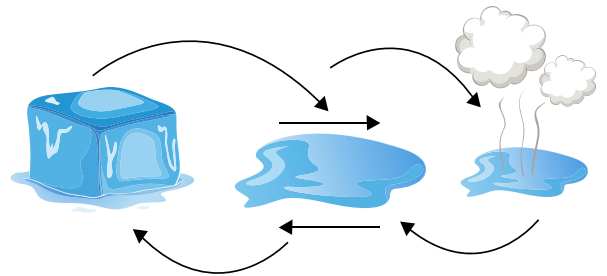
Supplies

- Electric skillet with lid
 - Ice cubes
 - Water
 - Large metal spoons
 - Clear cup or glass
 - Shaving cream
 - Blue food coloring
-

Get kids thinking ...

Start by asking a couple of questions:

- What does ice or snow feel like?
 - What does water feel like?
 - What does steam or vapor feel like?
 - What makes water change its state, from liquid to solid to gas?
 - What happens to ice when you take it out of the freezer?
-



Let's get started!

Show the kids the ice cubes. Let them touch the ice. Ask them to describe how the ice feels and what it looks like. Put the ice in electric skillet. If you have time, let the ice melt on its own. If not, turn on the skillet to low and let the ice melt.

Once the ice has melted, ask the kids what they have observed. How has the ice changed? What state is the ice in now? (liquid) What shape is it? Ask the kids to predict what would happen if you put the water in the freezer. What would happen if you turned up the heat?

Turn up the heat on the skillet and bring the water to a simmer, so that the kids can see the water turning into steam. Be careful to kids away from the hot skillet and steam.



Activities: Water, Ice, and Steam

(continued from previous page)

Ask the kids what they have observed about the water. How has it changed? What state is it in now? What shape is it?

Ask the kids to predict what would happen if you turned off the heat. Ask the kids to predict what would happen if the steam met with very cold air.

If you have a lid, put it on the skillet and let the steam collect and condense on the inside. After a few minutes, lift up the lid and show the kids what the steam is doing.

Ask them what they think is happening. What do they observe? How has the steam changed? What state is the steam in now? (liquid) What shape is it? What are the drops of water doing?

Introduce water words

Talk about these words and what they mean: evaporation, condensation, precipitation, and for extra fun: sublimation (ice to gas state, skipping the water stage) and transpiration (water vapor produced by plants through photosynthesis).

A spoonful of cloud

Have kids breathe on the back of a big metal spoon. What happens? They should see a tiny cloud of water vapor on the spoon! Explain that this is how real clouds form — when warm, moist air and cool air come together.

Shaving cream clouds

- Fill a clear plastic cup with water and top with shaving cream (this is your cloud)
- Add a few drops of blue food coloring to the top of the shaving cream
- Watch as the blue dye (this is the rain) sinks through the cloud to fall as rain in the water

Ask the kids what happened — why did the food coloring drops (the rain) fall through the shaving cream (cloud)? Explain that when water vapor cools, it collects in clouds, and eventually gets heavy enough that it falls. Water collects because it's molecules like to be close together (surface tension), and that's why it makes drops, pools and larger bodies of water.



Activities: Water, Ice, and Steam

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Make a human thunderstorm

Say: "As a group, right in this room, we are going to create a rainstorm. We will make the rainstorm using our hands and feet. Watch my hands, then follow and do the same thing."

This group exercise can be a great warm up before each day of River Rangers activities!

- Rub hands together (wind)
- Snap fingers (sprinkling rain)
- Clap hands (heavier rain)
- Slap thighs (pouring rain)
- Stomp feet and continue slapping thighs (thunder and heavy rain)
- Slap thighs (thunder stopped)
- Clap hands (rain is slowing)
- Snap fingers (rain is down to a sprinkle)
- Rub hands (sun is coming out and a fresh breeze is blowing)
- Hands on lap (silence after a storm)

Watch the human thunderstorm in action

<https://www.youtube.com/watch?v=VOU5gAFV9v8>





Activities: Water, Ice and Steam

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More water cycle activities

Water Cycle in a Bowl (PBS)

<http://www.pbs.org/parents/adventures-in-learning/2015/07/water-cycle-activity/>

Water Cycle in a Plastic Bag (1001 Gardens)

<https://www.1001gardens.org/2015/08/diy-tutorial-fog-water-rain-create-your-own-water-cycle-in-a-plastic-bag/>

Paint with Water and Disappearing Handprints (PBS Plum Landing)

https://pbskids.org/plumlanding/educators/activities/pdf/evaporation_station_fam.pdf

Evaporation Station Video (PBS Plum Landing)

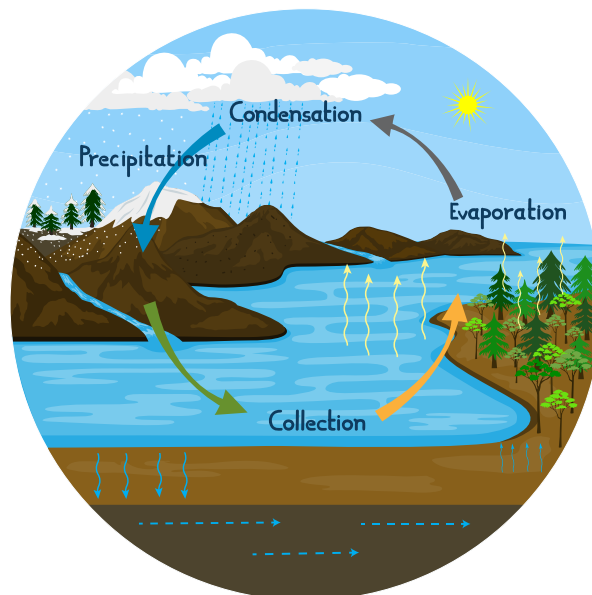
<https://www.pbslearningmedia.org/resource/plum14.sci.life.evapstat/evaporation-station/#.WuiDg5ch3cs>

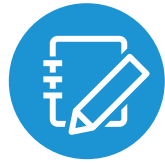
Tornado in a Bottle (Wiki How)

<https://www.wikihow.com/Make-a-Tornado-in-a-Bottle>

Make Rain in a Jar (Learn, Play, Imagine)

<http://www.learnplayimagine.com/2013/03/how-does-it-rain.html>





Writing

Writing prompt

Think about how water makes you feel — when you take a bath or shower, play in the rain, run through a sprinkler, wade in a cold stream or swim in a pool, lake, or the ocean. Write a short descriptive paragraph that expresses the sights, sounds, smells, tastes, and feeling on your skin.

Hurricane names

You might already know that hurricanes are given first names to identify them. The names are decided on by the World Meteorological Organization. Why do you think that scientists name hurricanes? Can you think of any big hurricanes by name?

In this exercise, you'll **brainstorm a list of creative hurricane names**. Be ready to talk about why you chose those names!



Kid-friendly websites and apps

Websites

The Blue Traveler: A Trip Through the Water Cycle (Project WET)

<http://www.discoverwater.org/blue-traveler/>

Climate Kids (NASA)

<https://climatekids.nasa.gov/>

Precipitation Education (NASA)

<https://pmm.nasa.gov/education/>

The Water Cycle (National Oceanic and Atmospheric Administration)

<https://oceanoday.noaa.gov/watercycle/>

Science Trek: Water (Idaho Public Television)

<http://idahoptv.org/sciencetrek/topics/water/>

Water (BrainPOP)

<https://www.brainpop.com/science/earthsystem/water/>

Water Science School (U.S. Geological Survey)

<https://water.usgs.gov/edu/>

Water Cycle Poster and Interactive Diagram (U.S. Geological Survey)

<https://water.usgs.gov/edu/watercycle-kids.htm>

Educational apps

Weather by Tinybop \$

<https://www.commonsemmedia.org/app-reviews/weather-by-tinybop>

Globe Observer

<https://www.commonsemmedia.org/app-reviews/globe-observer>



Facts About Water and Rivers

There's just as much water on Earth now as when our planet was formed.

The amount of water on Earth is constant, but is constantly moving around and changing states.

Water is the only molecule that exists as a solid, liquid, and gas (water vapor) at everyday pressures and temperatures.

97% of water on Earth is in the oceans.

Water covers 70% of the Earth's surface.

Only 3% of our water is freshwater. About 70% of that is locked in ice caps and glaciers. The remaining 30% is stored in groundwater.



Facts About Water and Rivers

Only 0.3% of our freshwater is above ground
(in bodies of water such as lakes, rivers, and swamps).

Wettest place on Earth: Mt. Waialeale, Hawaii.
It gets 38 feet of rain every year.

Driest place on Earth: Iquique, Chile,
where there was no rain for 14 years

Longest river in the world:
The Nile in NE Africa, more than 4,200 miles long
(the distance from Alaska to Florida)

Longest river in the U.S.:
The Missouri River (the Mississippi is second)

Deepest river in the world:
the Congo in Africa, more than 720 feet deep



Facts About Water and Rivers

More than 1 million tons:
How much sediment the Mississippi River carries
to its delta each day

9 days: how long an evaporated water molecule
typically floats in the sky before falling back
to Earth as rain or snow

1 hour: the average lifespan of a cloud

A jellyfish is 95% water. A baby is 78% water.
(And when you grow up, you'll be about 60% water.)

Our heart and brain are nearly 75% water.

22 of the world's largest cities are on estuaries,
including New York City and Buenos Aires.



Facts About Water and Rivers

1 oyster can filter 4 milk jugs of water in an hour.
They clean water by filtering out algae and particles.

400 billion gallons:
amount of water used in the U.S. each day.
Nearly half of our water use is for power generation.

A family of four in the U.S.
uses about 400 gallons of water in a single day.
That's enough water to fill 10 bathtubs.

A family of four in sub-Saharan Africa uses about
8 to 20 gallons of water per day.

Drip, drip, drip. A faucet that leaks a single drop
each second wastes almost 70 bathtubs
full of water per year.



Facts About Water and Rivers

9 gallons: the water footprint of one hour
of surfing the web

330 gallons: the water footprint of one slice of pizza

400 gallons: how much water is used for
a 10-minute shower

748 million people had no access to
clean drinking water (2012 data). That's more than
twice the population of the U.S.

90% of household water in Africa is collected by girls.
A quarter of their day is spent on this task.



Books About Water and Rivers

Fiction

- *Bartholomew and the Oobleck* by Dr. Seuss (Gr 1-3)
- *Bringing the Rain to Kapiti Plain* by Verna Aardema (Gr 2-3)
- *The Boats on the River* by Marjorie Flack (Gr K-2)
- *The Boxcar Children: Houseboat Mystery* by Gertrude Chandler Warner (Gr 1-5 listening, Gr 3-5 reading)
- *Cloudy With a Chance of Meatballs* by Judi Barrett (Gr 1-3)
- *Come on Rain!* by Karen Hesse (Gr K-2)
- *A Country Far Away* by Nigel Gray (Gr 1-2)
- *The Dam Keeper (graphic novel)* by Robert Kondo (Gr 3-5)
- *Everglades* by Jean Craighead George (Gr K-3)
- *Flotsam* by David Wiesner (Gr 1-3)
- *Flush* by Carl Hiaasen (Gr 4-5)
- *Grandfather's Dream* by Holly Keller (Gr 4-5)
- *Have You Seen My Duckling* by Nancy Tafuri (Gr K-1)
- *Heat Wave* by Eileen Spinelli (Gr 1-3)
- *Hurricane* by David Wiesner (Gr 1-3)
- *Hurricane!* by Jonathan London (Gr 1-3)
- *It Looked Like Spilt Milk* by Charles G. Shaw (Gr 1-5)
- *Kumak's River: A Tale from the Far North* by Michael Bania (Gr K-2)
- *Letting Swift River Go* by Jane Yolen (Gr 1-3)
- *Luz Makes a Splash* by Claudia Davila (Gr 3-5)
- *McElligott's Pool* by Dr. Seuss (Gr 1-3)
- *Minn of the Mississippi* by Holling C. Holling (Gr 3-5)
- *Mr. Gumpy's Outing* by John Burningham (Gr K-2)
- *Paddle to the Sea* by Holling C. Holling (Gr 3-5)
- *Pickles to Pittsburgh* by Judi Barrett (Gr 1-3)
- *Lotus and Feather* by Ji-li Jiang (Gr 2-5)
- *Make Way for Ducklings* by Robert McCloskey (Gr K-2)



Books About Water and Rivers

Fiction

- *Over and Under the Pond* by Kate Messner (Gr 1-3)
- *Prince William* by Gloria Rand (Gr 1-3)
- *The Raft* by Jim LaMarche (Gr 2-5)
- *Rain* by Manya Stojic (Gr 1-2)
- *Rain Drop Splash* by Alvin Tresselt (Gr K-2)
- *Rain Rain Rivers* by Uri Shulevitz (Gr K-2)
- *River* by Debby Atwell (Gr 1-5)
- *A River* by Marc Martin (Gr 1-5)
- *The River: An Epic Journey to the Sea* by Patricia Hegarty (Gr K-2)
- *The Snowy Day* by Ezra Jack Keats (Gr 1-2)
- *Three Days on the River in a Red Canoe* by Vera Williams (Gr 2-5)
- *Waiting Out the Storm* by Joann Early Macken (Gr 1-2)
- *Walter Was Worried* by Laura Vaccaro Seeger (Gr 1-5)
- *Water Boy* by David McPhail (Gr 1-3)
- *The Water Princess* by Susan Verde (Gr 1-3)
- *Where the River Begins* by Thomas Locker (Gr K-2)
- *The Wind in the Willows* by Kenneth Grahame (Gr 1-5)



Books About Water and Rivers

Poetry

- *All the Water in the World* by George Ella Lyon and Katherine Tillotson (Gr K-3)
- *Earth Verse: Haiku from the Ground Up* by Sally Walker (Gr 2-4)
- *How to Cross a Pond: Poems About Water* by Marilyn Singer (Gr 3-5)
- *I Know the River Loves Me / Yo se que el rio me ama* by Maya Christina Gonzalez (Gr 1-3)
- *The Negro Speaks of Rivers* by Langston Hughes (Gr 3-5)
- *Over in a River: Flowing Out to Sea* by Marianne Berkes (Gr K-2)
- *River of Words: Young Poets and Artists on the Nature of Things* edited by Pamela Michael (Gr 1-5)
- *River Story* by Meredith Hooper (Gr K-2)
- *Song of the Water Boatman* by Joyce Sidman (Gr 1-3)
- *Thank You, Earth: A Love Letter to Our Planet* by April Pulley Sayre (Gr K-3)
- *Water Dance* by Thomas Locker (Gr K-2)
- *Water Rolls, Water Rises / El agua rueda, el agua sube* by Pat Mora (Gr 2-5, bilingual)
- *Watersong* by Tim McCanna (Gr K-1)
- *Weather Poems for All Seasons* by Lee Bennet Hopkins (Gr K-2)



Books About Water and Rivers

Nonfiction

- *Beavers* by Gail Gibbons (Gr 1-3)
- *The Big Rivers: The Missouri, the Mississippi, and the Ohio* by Bruce Hiscock (Gr 3-5)
- *A Cool Drink of Water* by Barbara Kerley (Gr K-2)
- *The Drop in My Drink* by Meredith Hooper (Gr 1-4)
- *A Drop of Water* by Walter Wick (Gr 3-5)
- *Clouds* by Anne Rockwell (Gr K-3)
- *DK Eyewitness: Pond and River* by Steve Parker (Gr 3-5)
- *DK Eyewitness: Water* by John Woodward (Gr 3-5)
- *DK Eye Wonder: Rivers and Lakes* by DK Publishing (Gr K-2)
- *Erosion* by Joelle Riley (Gr 3-5)
- *Every Last Drop: Bringing Clean Water Home* by Michelle Mulder (Gr 3-5)
- *Explore Rivers and Ponds (25 Great Projects)* by Carla Mooney (Gr K-2, Gr 3-5)
- *The Exxon Valdez Oil Spill (Scholastic)* by Peter Benoit (Gr 2-4)
- *Follow the Water from Brook to Ocean* by Arthur Dorros (Gr K-2)
- *Hurricanes* by Gail Gibbons (Gr 1-3)
- *I Get Wet* by Vicki Cobb (Gr K-2)
- *I Walk for Water* by Lindsey Andrews (Gr 1-2)
- *The Magic School Bus Inside A Hurricane* by Joanna Cole (Gr 1-3)
- *The Magic Schoolbus Inside the Waterworks* by Joanna Cole (Gr K-3)
- *Make a Splash! A Kid's Guide to Protecting Our Oceans, Lakes, Rivers, and Wetlands* by Cathryn Berger Kaye and Philippe Cousteau (Gr 3-5)
- *Marshes and Swamps* by Gail Gibbons (Gr 1-3)
- *Meadowlands: A Wetlands Survival Story* by Thomas R. Yezerski (Gr 2-5)
- *My Water Comes From the San Juan Mountains* by Tiffany Fourment et al (Gr 3-5)
- *National Geographic Kids: Water* by Melissa Stewart (Gr 1-5)
- *Not a Drop of Water to Drink (National Geographic Investigates)* by Michael Burgan (Gr 4-5)
- *Oil Spill* by Melvin Berger (Gr 1-3)
- *One Well: The Story of Water on Earth* by Rochelle Strauss (Gr 3-5)



Books About Water and Rivers

Nonfiction

- *Otters Love to Play* by Jonathan London (Gr 1-3)
- *Our World of Water* by Beatrice Hollyer (Gr 3-5)
- *The Potomac River: A History and Guide* by Garrett Peck (Gr 5 and up)
- *A River Ran Wild: An Environmental History* by Lynne Cherry (Gr 1-4)
- *River Wild: An Activity Guide to North American Rivers* by Nancy Castaldo (Gr 3-5)
- *Rivers of Sunlight* by Molly Bang and Penny Chisholm (Gr 2-5)
- *Simple Steps Toward a Healthier Earth* by Molly Smith (Gr 1-5)
- *Swamp Chomp* by Lola M. Schaefer (Gr K-2)
- *Trout Are Made of Trees* by April Pulley Sayre (Gr 1-3)
- *Water Is Water: A Book About the Water Cycle* by Miranda Paul (Gr 1-5)
- *Water Wow! An Infographic Exploration* by Antonia Banyard and Paula Ayre (Gr 1-5)
- *Why Should I Save Water?* by Jen Green (Gr K-3)
- *You Wouldn't Want to Live Without Clean Water!* by Roger Canavan and David Antram (Gr 3-5)



Water Words

Absorption

The process of being soaked up.

Acid rain

Rain, hail, or snow that is polluted as a result of certain chemicals and waste being released into the air. Acid rain is harmful to the environment.

Aqueduct

A large pipe or canal that carries a water supply to a city or a farming area. Or, a bridge with many arches for carrying water across a valley or river. The ancient Romans built enormous stone aqueducts.

Aquifer

An underground layer of rock, sand, or gravel that stores large amounts of water. Aquifers provide water for wells and springs.

Barge

A large, long boat with a flat bottom used for carrying heavy loads, especially on rivers and canals.

Biome

A large community of plants and animals adapting to their environment. There are 5 biomes on Earth. Rivers, streams, ponds, lakes, wetlands, estuaries, and oceans are part of the Aquatic Biome.

Bog

Wet, spongy ground, full of decaying mosses that form peat.

Brackish

A mix of freshwater and salt water — what you find in an estuary.

Canoe

A narrow boat with pointed ends that is moved through the water with a paddle. Canoes are open on top.



Water Words

Clouds

A mass of water vapor that floats in the sky. Different cloud types form at different altitudes and temperatures. 3 common cloud types: **Cirrus**: thin, wispy and feathery cloud. **Cumulus**: fluffy white cloud with a flat bottom. **Stratus**: wide, thick low-lying gray cloud.

Condensation

When gas cools and changes to a liquid, for example, when warm steam touches a cold window.

Conservation

The protection of natural resources, including soil, water, or forests, from loss, pollution, or waste.

Contamination

To make dirty, polluted, or unusable by adding something harmful to another substance or system. Example: some rivers have high contamination levels from chemical spills.

Dam

A bank, wall, or barrier built to block the flow of water in a stream or river, often forming a lake or reservoir. Dams are usually built to prevent flooding or produce hydropower.

Delta

A triangle of sand and soil deposited where a large river meets the sea.

Drought

A long period with little or no rain.

Ecosystem

A community of living things in a shared environment.

Eddy

A small current of water that spins against the main current, creating a small whirlpool.



Water Words

Erosion

Wearing away of the land by wind, ice, and water.

Estuary

The wide mouth of a river, where freshwater meets the salty tidal waters of the sea.

Evaporation

When a liquid heats up and changes to gas.

Flood

An overflow of water onto land that is normally dry.

Floodplain

A wide, flat area of land next to a stream or river that can flood.

Fog

A thick mass, like a cloud, made up of tiny water drops floating in the air near the ground.

Food chain

A series of living things that are linked to each other because each thing feeds on the one next to it in the series.

Food web

The interlocking food chains within a community.

Glacier

A large body of ice moving slowly down a slope or valley or spreading outward on a land surface.

Ground water

The water beneath the earth's surface that supplies springs and wells.

Hail

Frozen rain, or small balls of ice that fall from the sky.



Water Words

Hydroelectric power

Energy generated by turbines driven by water falling down from a height.

Ice

Water in a frozen, solid state.

Impervious surfaces

Surfaces that don't allow water to be absorbed, including many rooftops, driveways, and parking lots.

Indicator species

Plants or animals whose health confirms the health of the surrounding environment.

Kayak

A narrow boat like a canoe, used by the Native Inuit people and for river sports. Kayaks are covered on top.

Lake

A large area of fresh water, surrounded by land.

Levee

A raised bank alongside a river to keep the river from flooding the land.

Logging

Cutting down, transporting, and selling trees as building lumber or firewood.

Marsh

A low, wet, muddy area, often thick with tall grasses.

Meander

A natural curve or bend in a river, often occurring in the middle course.

Mouth

The place where a river runs into a larger body of water.



Water Words

Municipal water supply

Water that is provided by your local city or town government.

Oxbow

A U-shaped bend in a river.

Paddle board

A long narrow surfboard, with a paddle for motion and steering. Stand up paddle boards are very popular now!

Pond

A small body of quiet water, smaller than a lake.

Pervious (or permeable) surfaces

Surfaces that allow water to be absorbed, such as grass, groundcover, green roofs, and paver stones.

Precipitation

Water falling in the form of rain, snow, sleet, or hail.

Pollution

Damage to the environment caused by chemicals or dirty waste products.

Raft

A floating platform made from large pieces of wood tied together or other materials that float.

Rapids

A part of a river or stream where the water moves very quickly, often over rocks.

Rain

Drops of water that form in the clouds and fall from the sky.



Water Words

Rain garden

A sunken garden bed that collects and treats stormwater runoff from impervious surfaces, including rooftops, driveways, sidewalks, parking lots, and streets.

Reservoir

A man-made lake used to store water for irrigation and the water supply in towns and cities.

River

A large natural stream of fresh water flowing in a long line across the land.

Runoff

Extra rainwater that is not absorbed by the ground.

Sediment

Loose particles of rock that are carried along and deposited by a river.

Sewers

Large underground pipes that carry off the liquid and solid waste of a town or city.

Shipping

The transportation of cargo or goods as a business, especially on ships.

Snow

Soft, white flakes of ice that fall from the sky. Snow is formed when water in the upper air freezes into crystals.

Source

The place where a stream or river begins.

Spring

A place where water comes up through the ground.



Water Words

Storm sewer

A drain designed to carry away large amounts of water during heavy rains or flooding.

Stream

A small flowing body of water, smaller than a river.

Sublimation

When ice changes to gas, skipping the liquid state.

Surface tension

The "sticking together" of water molecules on the top surface. It explains why insects can walk on water!

Swamp

A low, wet area usually covered with water where trees like mangrove and cypress grow.

Transpiration

When plants give off moisture into the air.

Tributary

A stream or river that flows into a larger stream or river.

Turbine

A machine or engine which uses air, gas, water, or steam to turn a wheel and produce power.

Upper river, middle river, lower river

The 3 main parts of a river. **Upper:** the fast-moving part near the source, often with rapids and waterfalls. **Middle:** where the river gets wider and slows down, often following a winding path (meander). **Lower:** where the river reaches the end of its journey (mouth).

Utility

An important service such as water, electricity, or gas that is provided for everyone, and that everyone pays for.



Water Words

Vapor

Tiny drops of water in the air; the gas form of water. Clouds are made of water vapor.

Waste water

Water that has been used, either in homes or in industry, and contains contaminants.

Water

A clear thin liquid that has no color or taste when it is pure. It falls from clouds as rain and enters rivers, lakes, and oceans. All animals and people need water in order to live.

Water cycle

The continuous, natural circulation of the earth's water through evaporation, condensation, precipitation, and collection in lakes, streams, rivers, and oceans.

Waterfall or cascade

Where water falls from a higher place, like a cliff.

Water treatment

Any process that improves the quality of water for drinking, industrial water supply, irrigation, recreation or many other uses.

Watershed

The area of land drained by a river, river system, or lake.

Waterwheel

A wheel turned by the weight of falling or running water, creating power to operate machinery.

Well

A deep hole dug in the ground to get water.

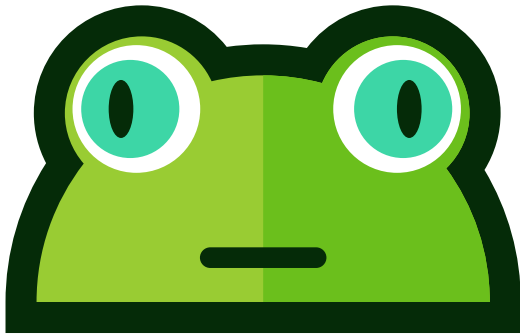
Wetland

An area of very wet, muddy land with wild plants, such as a swamp or marsh.

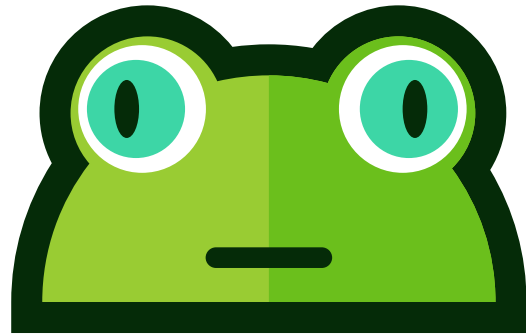
River Ranger Name Cards

Make copies of these name tags and let child each choose their own River Ranger name. They can select from the Water Words list (Oxbow, Levee, or Meander?) or a plant or animal that lives near rivers (Cattail, Dragonfly, Hawk?).

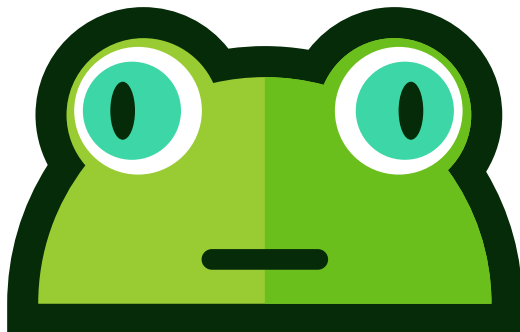
My River Ranger name is:



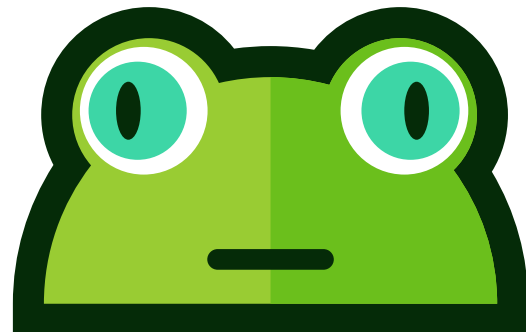
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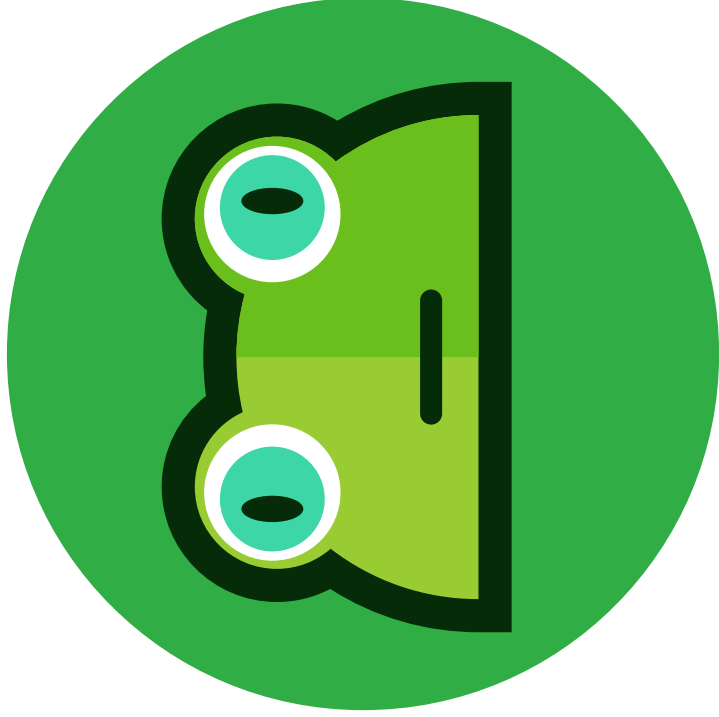
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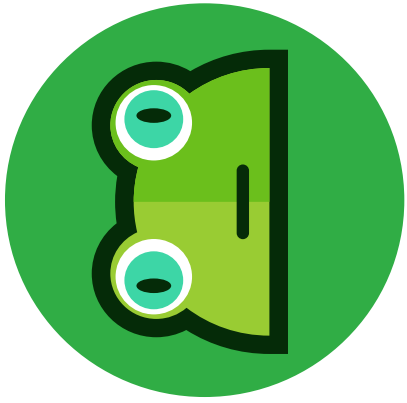


River Rangers Nature Journal

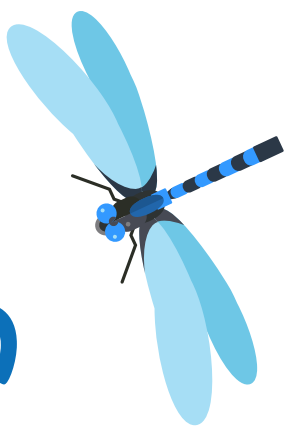


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Fold cover along dotted lines

Your name here



River Rangers



This certificate is presented to:

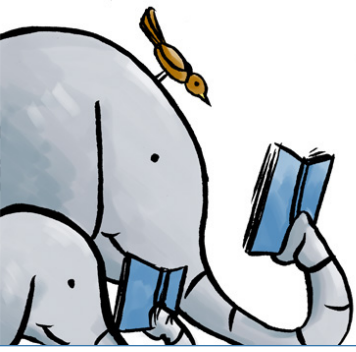


To celebrate your participation in the Rivers Rangers program!

Date

Signature





Growing readers!

Parent tips for raising strong readers and writers
from Reading Rockets



Reading Aloud: Fiction Books

The basics

- Take your time and talk about the story and pictures with your child.
- Ask your child questions and let your child ask questions.
- Read with expression to create excitement.
- You don't need to read every word. Keeping your child interested is the goal.

Try “think alouds”

When you share books with your children, they are learning to think and act like good readers — without even knowing it! You can help them get even more from reading time when you talk to them as you read.

Children learn when they can make connections between what they hear and what they know. One method you can use to help make these connections is called a think aloud, where you talk through your thoughts as you read. Here are three ways to use think alouds, with examples from some of our favorite kids' books.

Connect the book to your child's own life experience

Example: *A River Dream* by Allen Say

“This book reminds me of the time my father took me fishing. Do you remember the time we went fishing?”

Connect the book to other books they have read

Example: *Mufaro's Beautiful Daughters* by John Steptoe

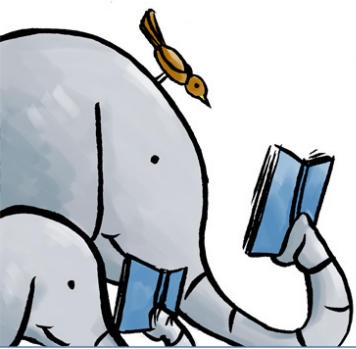
“This story reminds me of Cinderella. Both stories are about sisters. Do you know any other stories about nice and mean sisters? Let's keep reading to find out other ways the stories are similar.”

Connect the book to big ideas/lessons

Example: *Stellaluna* by Janell Cannon

“This story helps me understand that we are all the same in many ways, but it's our differences that make us special.”

Modeling these types of connections will help young readers know how to do it when they read alone!



Growing readers!

*Parent tips for raising strong readers and writers
from Reading Rockets*



Reading Aloud: Nonfiction Books

The basics

- Wonder out loud. As you are reading (or afterward), talk about facts you find interesting or questions you have.
- Explore the pictures and other graphics in the book, such as charts and diagrams.
- Don't be afraid to jump around, reading pages that especially interest your child. You don't have to read a nonfiction book straight through.

Getting the most out of nonfiction reading time

Nonfiction books give kids a chance to learn new concepts and vocabulary, as well as broaden their view of the world. Here's how to take a "book walk" with a new nonfiction book and how to model active reading.

Take a "book walk"

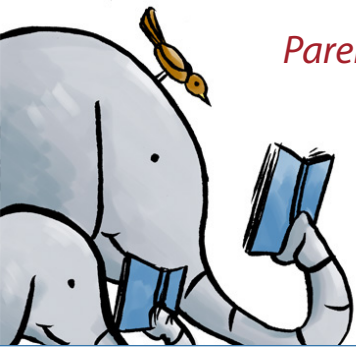
One great way to make predictions about an unfamiliar nonfiction text is to take a "walk" through the book before reading. By looking closely together at the front and back cover, the index, table of contents, the glossary, and the photographs or other images, readers can start to get a sense about the topic. This scanning and skimming helps set the expectation for the reading. Take the time to walk through the book before starting to read.

Encourage questions

A second way to develop more understanding with nonfiction books is to encourage your child to be an active reader who asks lots of questions. Parents can model these behaviors by talking or thinking out loud as you turn the pages of the book. This is a helpful way for your child to see and hear what a successful reader does when faced with difficult or unfamiliar topics.

For example, "When I looked at this photograph, I asked myself, "Where is Antarctica? Is that the same place as the South Pole?" Then talk together about how and what you would need to do to find the answer to the questions. This will reinforce that many questions can be answered by reading a text closely and by paying attention to captions and picture titles. Some children enjoy writing their questions on sticky notes and working to answer them during the reading.

Previewing a text and asking questions are two terrific ways to navigate nonfiction texts. Enjoy spending more time with some fascinating informational books!



Growing readers!

Brought to you by Reading Rockets, Colorín Colorado and LD OnLine

Literacy in the Sciences: Activity No. 14

How to Read Nonfiction Text

Kids love to read about real people, places, and events. Nonfiction books present real information in engaging and interesting ways. However, most kids read a lot more fiction than nonfiction, so spend some extra time helping your reader learn how to navigate a nonfiction book.

Talk about nonfiction

Begin by explaining that the book you're about to share is nonfiction. That means that the book will give us information that is true. The book will be organized around a specific topic or idea, and we may learn new facts through reading. Some kids even enjoy sorting their home libraries into fiction and nonfiction books. This simple categorization task helps your child understand the difference between fiction and nonfiction.

Look at the parts

Most good nonfiction books will have helpful features that are not a part of most fiction books. These parts include a table of contents, an index, a glossary, photographs and charts with captions, and a list of sources. Share the purpose of the features with your reader.

- **Table of Contents:** Located at the front of a book, the table of contents displays a list of the big ideas within the book and where to find them.
- **Index:** An index is an alphabetical list of almost everything covered within the book, with page numbers. Readers can use the index to look up specific terms or concepts and go right to the specific information they're looking for.
- **Glossary:** Located at the back of the book, a glossary contains key words that are related to the topic and their definitions. These definitions provide more information about new vocabulary words.
- **Captions:** Captions are usually right under photographs, figures, maps, and charts. Captions give a quick summary of what information is presented in the graphic.
- **Photos and Charts:** A lot of information can be found by "reading" the charts and photos found within nonfiction text. Readers will first need to figure out what information is presented. Then they'll need to discover how to navigate the information. Some charts use clear labels, others require more careful examination. Help your reader learn more about the different ways information can be displayed.

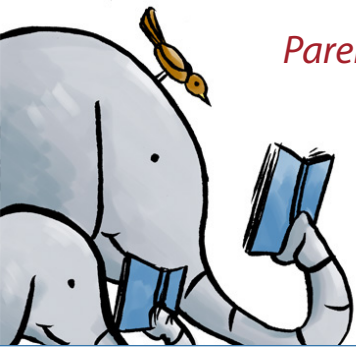
Be the reading boss

Nonfiction books do not have to be read from cover to cover. Readers can use the table of contents and index to jump right to the information they are most interested in. In that way, they are the "reading boss" of that book! However, if your reader wants to read from cover to cover, encourage him to use the table of contents to understand how the book is organized. "First we will learn about the different types of frogs. Then we'll learn where they can live, what they eat, and how they survive." Passages from the book can be reread as often as necessary until your child understands what is written. You can refer to pictures, charts and tables over and over again as well.

As natural learners, young readers are drawn to books that give information about something or explain something they've always wondered about. With a little help and guidance about reading nonfiction, you can feel good about introducing your child to a new world of information.

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Growing readers!

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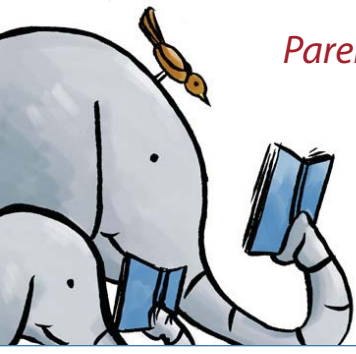
Summer Literacy Challenge!

For most parents, it's a challenge to keep kids reading and writing all summer. Suddenly 10 weeks of summer can feel like a very long time! We've got a summer literacy challenge for you and your child. It's modest enough to be manageable –pick just one thing a week to kick start your week's literacy adventures. But it's also challenging enough to include a wide range of literacy fun for the whole family.

- ✓ **Investigate your public library's summer reading program.** Most libraries offer a special program or two during the summer, including puppet shows, book authors and children's storytellers. Most are free of charge.
- ✓ **Extend your reading circle.** We often find ourselves checking out the same types of books over and over again. This week's challenge is to bring a new type of book into the house. Consider fantasy or science fiction, historical fiction, poetry, biography, or an informational book.
- ✓ **Listen up!** Audiobooks are a great way to engage readers and can introduce students to books above their reading level. Many libraries have audiobooks available for check out, and an Internet search can turn up several sites, including Speakaboos.com, that offer free audio books for children.
- ✓ **Make your own audio book!** Most phones and computers have simple recording apps on them which are perfect for making homemade audio books! Have your child make up a story, or reread a favorite loved book. The recordings will be priceless!
- ✓ **Go wordless.** Wordless picture books are told entirely through their illustrations — they are books without words, or sometimes just a few words. Grab a few wordless books the next time you're at the library and have fun "reading" different versions of the same story. The language and the conversation will inspire you!
- ✓ **Visit a museum, online!** You'll be surprised by how much you can explore without leaving your house. One example is the Smithsonian Institution Kids site. It's complete with offerings from Art to Zoo, for kids and students of all ages.
- ✓ **Pack in a whole adventure!** Find FREE themed reading adventure packs that encourage hands-on fun and learning, centered around paired fiction and nonfiction books. Visit Reading Rockets and search Adventure Pack.
- ✓ **Point, shoot, and write.** Most families have access to a digital camera, iPad or camera phone. Snap some photos and then encourage your child to write a silly caption for each photo. Not feeling that ambitious? Cut out some pictures from a magazine or the newspaper and have your child write original captions for those.
- ✓ **Mix up the media.** Your child has read every Clifford book on the shelf. But has she heard Clifford author Normal Bridwell talk about writing? Explore author interviews from over 100 authors on Reading Rockets Author Interview page. We'll bet you can't watch just one.
- ✓ **Write it down.** Encourage your child to keep a simple journal or summer diary. Track interesting things like the number of fireflies seen in one minute, the number of mosquito bites on a leg, or the different types of food that can go on the grill. Each entry is a chance to be creative!

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Growing readers!

Brought to you by Reading Rockets, Colorín Colorado and LD OnLine

Literacy in the Sciences: Activity No. 4

Making Predictions

As a young reader, your child is learning to make predictions while reading. “What do you think will happen next?” “Who do you think drank Sara’s lemonade?” These types of questions we ask children as they’re reading help them learn to monitor their understanding of the story while thinking ahead to the next part. If your child is able to make good and fairly accurate predictions while reading, chances are she comprehends the story well.

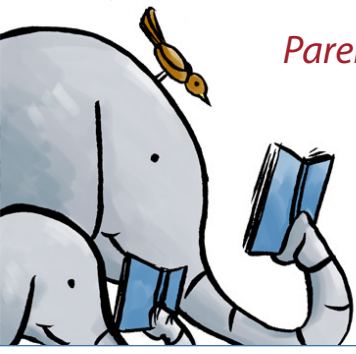
Scientists, just like readers, make predictions all the time. In fact, scientists use predictions as part of their hypothesis, or question they try to answer through their experiments. Help your child begin to see the connection between what she does as a reader and what she can do as a scientist.

Below are two simple ways you can encourage your child to put her prediction skills to work as a scientist:

- 1. Play favorites.** What is our family’s favorite flavor of ice-cream? What is our favorite movie to watch together? What is our favorite bedtime story? Choose a question, or make up your own, that your child is excited about. First, have your child predict or guess the answer to the question. Help her write down her prediction. “I think chocolate is our family’s favorite flavor of ice cream.” Then, have your child ask each member of the family for an answer. Have your child record the answers using a special Science Notebook or simply mark tally marks on paper. Finally, ask your child to compare her prediction to the actual answers.
- 2. Good guess!** Estimation is often very similar to a prediction. In both cases, your child will be working to make a good guess about an answer. As with our Play Favorites idea, encourage your child to write down (or write together) the questions and answers in a special Science Notebook. Whenever possible, encourage the use of scientific words like estimation, predication, collect data, analyze, and prove. Here are some estimation questions that require your child to make a prediction:
 - How many noodles will it take to fill up this jar? Encourage your child to use scientific language and thinking to answer. “I predict it will take 300 noodles to fill the jar.”
 - How many steps is it from our front door to the mailbox?
 - How much does our dog weigh?
 - How many library books fit on one shelf?
 - How long do you think it will take for the ice cubes to freeze (or melt)?

We predict your child will have great fun with these activities! And you can have fun knowing that you’re helping your child make important connections between the skills of prediction, reading, and science.

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Growing readers!

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Literacy in the Sciences: Activity No. 11

Making Inferences and Drawing Conclusions

Observations occur when we can see something happening. In contrast, inferences are what we figure out based on an experience. Helping your child understand when information is implied, or not directly stated, will improve her skill in drawing conclusions and making inferences. These skills will be needed for all sorts of school assignments, including reading, science and social studies. Inferential thinking is a complex skill that will develop over time and with experience.

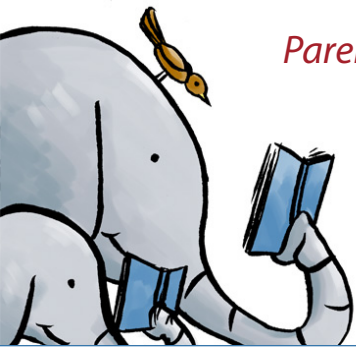
Families can create opportunities to practice inferential thinking. Below are a few ways to help familiarize your child with this way of thinking and learning:

- Explain to your child that we make conclusions about things and draw inferences all the time. Draw a conclusion together and then talk about what clues were used to come to that conclusion. For example, Erin played outside today. How can we tell? Muddy shoes, jump rope on front porch, water bottle out. Dad seems tired tonight. How can we tell? He's rubbing his eyes, he's on the couch, he was yawning at the dinner table.
- Paper bag mystery person: Put a few items into a brown paper bag. Tell your child the bag belongs to a certain type of person. Their job is to tell you something about the person. Then, take out each item one by one and talk about it.
 - Example #1: goggles, a swim cap, a swim ribbon, a stop watch
 - Example #2: a bookmark, a library card, a stuffed animal, a book
- Wordless picture books provide your child with practice using clues to create meaning. There are no wrong stories with wordless picture books, only variations based on what the “reader” sees and puts together. *Rosie's Walk* (Hutchins), *Good Dog, Carl* (Day), and *Beaver Is Lost* (Cooper) are all interesting and fun wordless picture books to explore.
- Play twenty questions! This familiar word game helps build inference skills. As your child develops skill with the game, encourage him to avoid asking direct questions like, “Is it a dog?” Rather, encourage him to ask broader questions, “Does it walk on four feet?” Then, when your child figures it out, ask him to tell you the clues that lead to the right answer.
- Create scenarios in which your child must use what they already know to predict an outcome. For example, growing seeds. Present your child with various scenarios (a seed will be given water and sunlight, a seed will get no water, a seed will be in a dark room). Ask your child to predict whether the seed will grow. Help your child become aware that she used information she knew about growing seeds, combined with new information, to fill in information about the seeds.

Learning to draw conclusions and inferences is a skill that develops over time. The skill requires children to put together various pieces of information, and relies on good word knowledge. Help your child develop skill by providing experience with inferential information, making implied information more clear, and helping your child draw conclusions based on the evidence.

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Growing readers!

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Literacy in the Sciences: Activity No. 6

Recording Observations

Science and math explorations provide your growing reader with a chance to record all kinds of observations. Young children love to keep a special journal, and fill it with all sorts of drawings, scribbles, sketches, notes, and graphs. Try to date each entry and watch as your child's observational and recording skills grow along with your child.

Create a special journal

Use any paper for the cover: cardstock, interesting cardboard and pretty greeting cards can all be used as a cover. Then, collect some twigs from the backyard and find a large, thick rubber band. Fold your cover in half. Fold your inside pages, and put them inside the cover. Trim as needed. Punch two holes with a hole punch, measuring down from the top and up from the bottom about 2 inches. Pull one end of the rubber band through the bottom hole and slide twig into the loop. Pull the other end of the rubber band through the top hole and slide the other end of twig through that. You now have a special journal into which your budding scientist can record observations.

A scientist's field notes

Begin using the science journal by taking your child outside. Encourage your child to write down what she observes about her surroundings, looking at both the big picture and the small, examining plants and rocks and insects up close. Have her make a record in their journal of what they experience with each of their senses. Then have her choose one animal or plant to watch for 10 minutes. Your child can choose anything: a dandelion, a grasshopper, a bird soaring overhead. Ask her to describe it as clearly as they can, as if she is writing for someone who's never seen that before. Have her watch for movements and take note of any sounds made. Ask your child to draw and label a picture of the plant or animal.

Other fun ideas to record in your field journal

A flower tally: Count the flowers in an area in the spring once a week for three weeks. Compare your tallies. Your child will have fun watching the numbers go up as flowers bloom in the spring.

Ant watching: There are ants everywhere! Try following them to their home and see what they're up to. Where do they live? How many can you count in one place? Record these observations and your ant grand total.

Dig a hole: As parents know, dirt can be pretty interesting to kids. Have your child dig a hole and notice how the dirt changes as he digs deeper. Can he describe the different layers? What creatures did he find as he dug? Record these and other interesting findings in the journal.

Nature scavenger hunt: Use your notebook to make (or draw) a list of some common things and a few rare ones that can be found outside near your home or in a park. Include things like: acorn, pine cone, flat rock, bird feather, weed, flower. Hand your child the notebook and let the scavenger hunt begin!

Special thanks to the Two Writing Teachers (www.twowritingteachers.wordpress.com) for their field journal directions, and Nature Rocks (www.naturerocks.org) for the nature-based ideas for family fun.

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