

The Beginning: The Water Cycle

Background Information for Teachers

How are deltas like the Mississippi River delta in south Louisiana formed? To understand this, you must start at the beginning with the water cycle. The water cycle is the never-ending cycle of water on Earth. A single drop of water goes through many changes - evaporation, condensation, and precipitation - during its cycle, all powered by the sun.

Water is commonly found in three states of matter - liquid, gas, and solid. Here in south Louisiana, we most often see water in its liquid form (in bayous, the Gulf of Mexico waters, and even rain). We most often feel water in its gaseous state as water vapor in the air. And very rarely, in the winter, we can even see water in its solid state as ice on the ground or an occasional snow flurry.

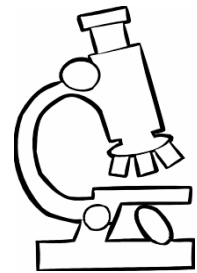
Believe it or not, it is the water cycle that begins our journey into the geology of south Louisiana. The Mississippi River drains the nation, and its water carries dirt (sediments) towards the ocean as it empties into the Gulf of Mexico. The river drops most of the sediment that forms our land here in south Louisiana. So our story begins with the water cycle, which you can introduce to your students using the following fun and educational experiments.

Image Credit: NASA Earth Science Enterprise



Time to Experiment: INTRODUCTION TO THE WATER CYCLE -

Materials: (you must provide materials unless otherwise noted)
Story of Gouttelette (provided)
Water Cycle Picture (provided)
Pencils, pens, or crayons for students to write or draw with



Procedure:

1. Read the story of Gouttelette (French for droplet - pronounced Ga' u et) 482 words long.
2. Using the image provided as a guide, photocopy so each student has their own sheet or photocopy onto an acetate sheet and project overhead. Then help your students create their own model of a water cycle while you read the story (Gouttelette).
3. Have your students fill in the different elements of the water cycle (Evaporation - water that's evaporated with the sun's energy to the clouds, Condensation - clouds form from collected water that's condensed, Precipitation - rain, snow, sleet, etc. form when the clouds are saturated, and that brings the water from the clouds back to the earth, oceans, rivers, bayous, lakes, puddles, etc.)
4. Have your students write a story about Gouttelette coming to their house. Be sure to have them include some different phases of water in their story (i.e. Gouttelette came into my house from my water faucet, she ran into my Mom's coffee pot when she was making coffee, then Gouttelette rose in steam, and was breathed in by my cat, Princess. Then Princess sneezed, and out Gouttelette came, etc... (Evaporation - steam from boiling water: cooking, hot water bathing, etc. Precipitation - water droplets: on the mirror after a bath, on the windows in the mornings, etc. Condensation - water drops: falling back into a cooking pot, falling back into an aquarium, etc. Students can also do water as liquid, water as solid (ice cubes in a drink), and water as vapor (steam from a cup of coffee).

Extensions:

1. Have your students create their own water cycle art (Water Cycle Extension Experiment).
2. If your students have computer/internet access - they can go to the NASA website and play the water cycle game with Droplet at <http://kids.earth.nasa.gov/droplet.html>. Game requires Macromedia Flash 5.
3. Have your students perform the "Water Cycle Dance" Extension Activity.
4. Engage your students in a discussion about earth forces they see around themselves everyday by using the Journal Extension Activity.

Conclusions:

Your students should be able to identify and label all the parts of the water cycle after they complete the following experiments.

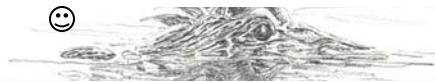


The Story of Gouttelette

Here in south Louisiana where we have a strong connection to France and French words, even our water droplets can have French names, like my friend, Gouttelette.

Gouttelette, lived in Bayou des Familles in the Barataria Preserve of Jean Lafitte National Historical Park and Preserve. She floated and played with her friends all day in the water. Sometimes she would float into the gills of a tadpole, then she would later float out. Much later, after the tadpole grew up into a frog, she would playfully role down his back when he jumped out of the bayou onto a lily pad. Sometimes if she and her friends were feeling really adventurous they would roll along the big teeth of the old mama alligator, and after the alligator babies hatched, Gouttelette and her friends would jump out of the water when the babies splashed around.

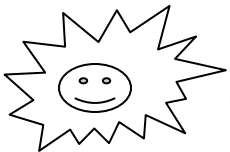
Tadpole



As she lay in the bayou, she became suddenly hot, really, really hot. And she felt strange, different from how she had ever felt before. With the heat from the sun it happened - she was changed into vapor - water vapor - she went through **evaporation!**



As she rose higher and higher, she began to cool off, then she began to get cold - really cold. The higher she went, the colder she got. Then it happened: finally she **condensed**. She formed a solid water droplet and joined many other droplets from all over the world - there was Tröpfchen from Germany, Gotita from Spain, and Gocciolina from Italy.



Gouttelette and her friends hung out in the cloud, and played all day! She missed her other friends from back home in Louisiana though and thought how fun it would be for all her new friends to meet her old friends. Suddenly she felt different, all her new friends gathered close to her, and then they were all falling as rain: they were **precipitation**.



They all rained down together, in a forest, trickled down the leaf of a maple tree, and were drunk up by a thirsty anole lizard. The lizard was eaten by a hungry red-tailed hawk, and Gouttelette and her friends were then given to the chicks of the red-tailed hawk. The red-tailed hawk babies ate and grew. After a while the chicks weren't babies anymore and were big enough to fly. One of the hawks soared all the way to the coast of Louisiana and landed to rest in the cool branches of an old baldcypress tree. As the hawk cleaned his wing feathers, Gouttelette and her friends dropped to the ground. They landed in the waters of a swamp and gently floated around. Gouttelette recognized her old home, and together with her new friends, the water droplets made their way back to Bayou des Familles. Her old friends had adventures of their own to share, and they spent a long time swapping stories with her new friends, until one day, it got hot, really, really hot...



Name:

Date:

Student Sheet

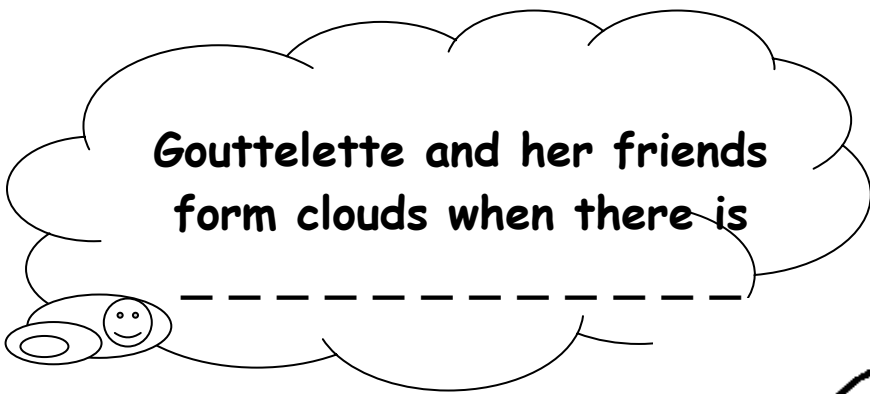
Gouttelette's Journey

Word Bank

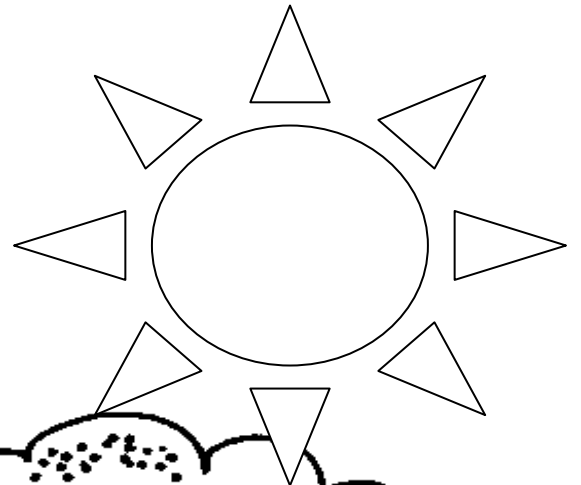
EVAPORATION

CONDENSATION

PERCIPITATION



Gouttelette and her friends form clouds when there is



Gouttelette rains down in



Gouttelette heats up in



Bayou de Familles



Instructor Sheet

Gouttelette's Journey

Word Bank

EVAPORATION

CONDENSATION

PERCIPITATION

Gouttelette and her friends
form clouds when there is
CONDENSATION

Gouttelette rains down in
PERCIPITATION

Gouttelette heats up in
EVAPORATION

Bayou de Familles



Name:

Date:

Gouttelette came to my house:

She came into my house by using the _____

(describe how water can come into your home: faucet, rain, shoes, drink, etc.)

**Then, with (my Mom, Dad, sister, brother,
grandma, grandpa, aunt, uncle, cousin, or friend)
she _____**

(describe what someone can do with water: take a bath, get a drink, brush
their teeth, water the plants, cook, etc.)

**After that, my pet was _____,
and Gouttelette _____**

(describe why a pet or other animal would want/need water)

Finally she _____

(describe something fun you can do with water, take a bubble bath, mix a
fruit drink, play water balloons, etc)

After that she left by _____

(describe how water can leave your house: drain, drink, sink, mop, clothes to
dry on a line, etc)



Benchmarks and Grade Level Expectations

Benchmarks K-4

Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry

- SI-E-A1 asking appropriate questions about organisms and events in the environment.
- SI-E-A2 planning and/or designing and conducting a scientific investigation.
- SI-E-A3 communicating that observations are made with one's senses.
- SI-E-A6 communicating observations and experiments in oral and written formats.
- SI-E-A7 utilizing safety procedures during experiments.

B. Understanding Scientific Inquiry

- SI-E-B5 presenting the results of experiments.
- SI-E-B6 reviewing and asking questions about the results of investigations.

Physical Science

A. Properties of Objects and Materials

- PS-E-A4 describing the properties of the different states of matter and identifying the conditions that cause matter to change states.
- PS-E-A1 identify objects by using the senses

Earth and Space Science

A. Properties of Earth Materials

- ESS-E-A2 Compare bodies of water found on Earth (e.g., oceans, seas, lakes, rivers, glaciers)
Explain why most of the water on Earth cannot be used as drinking (potable) water
- ESS-E-A3 investigating, observing, and describing how water changes from one form to another and interacts with the atmosphere.
Design an experiment involving evaporation

Language Arts: Reading

- ELA-1-E1 Gaining meaning from print and building vocabulary using a full range of strategies (e.g. self-monitoring and correcting, searching, cross-checking), evidenced by reading behaviors using phonemic awareness, phonics, sentence structure, and meaning
- ELA-1-E2 Using the conventions of print (e.g., left-to-right directionality, top-to-bottom, one-to-one matching, sentence framing)
- ELA-1-E3 Adjusting speed of reading (e.g., appropriate pacing, intonation, expression) to suit the difficulty of materials and the purpose for reading (e.g., enjoying, learning, problem solving)
- ELA-1-E5 Reading, comprehending, and responding to written, spoken, and visual texts in extended passages (e.g., range for fiction passages-450-1,000 words; range for nonfiction-450-850 words)
- ELA-1-E6 Interpreting (e.g., retelling, summarizing) texts to generate connections to real-life situations

Language Arts: Writing

- ELA-2-E3 Creating written texts using the writing process
- ELA-2-E4 Using narration, description, exposition, and persuasion to develop compositions (e.g., stories, letters, poems, logs)
- ELA-2-E5 Recognizing and applying literary devices (e.g., figurative language)
- ELA-2-E6 Writing as a response to texts and life experiences (e.g., journals, letters, lists)
- ELA-3-E1 Writing legibly, allowing margins and correct spacing between letters in a word and words in a sentence
- ELA-3-E2 Demonstrating use of punctuation (e.g., comma, apostrophe, period, question mark, exclamation mark), capitalization, and abbreviations in final drafts of writing assignments
- ELA-3-E3 Demonstrating standard English structure and usage by writing clear, coherent sentences
- ELA-3-E4 Using knowledge of the parts of speech to make choices for writing
- ELA-3-E5 Spelling accurately using strategies (e.g., letter-sound correspondence, hearing and recording sounds in sequence, spelling patterns, pronunciation) and resources (e.g., glossary, dictionary) when necessary

Language Arts: Critical Thinking

- ELA-7-E1 Using comprehension strategies (e.g., sequencing, predicting, drawing conclusions, comparing and contrasting, making inferences, determining main ideas) to interpret oral, written, and visual texts
- ELA-7-E2 Using basic reasoning skills, life experiences, and available information to solve problems in oral, written, and visual texts
- ELA-7-E3 Recognizing an author's purpose (reason for writing), and viewpoint (perspective)
- ELA-7-E4 Using basic reasoning skills to distinguish fact from opinion, skim and scan for facts, determine cause and effect, generate inquiry, and make connections with real-life situations



Grade Level Expectations K-4

Science as Inquiry

Abilities Necessary to do Scientific Inquiry

K 1 2 3 4

1 1 1 1 1	Ask questions about objects and events in the environment
2 2 2 2 2	Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations
4 5 6 6 7	Use the five senses to describe observations
6 7 8 8 9	Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data
7 8 9 9 10	Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate
8 9 10 11 12	Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios)
9 10 11 12 13	Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties)

Understanding Scientific Inquiry

K 1 2 3 4

13 14	Identify questions that need to be explained through further inquiry
14 15	Distinguish between what is known and what is unknown in scientific investigations
20	Determine whether further investigations are needed to draw valid conclusions

Physical Science

Properties of Objects and Materials

K 1 2 3 4

16	Observe and describe common properties of solids, liquids, and gases
17	Sort and classify objects by their state of matter
22	Investigate and explain conditions under which matter changes physical states: heating, freezing, evaporating, condensing, boiling

Earth and Space Science

Properties of Earth Materials

K 1 2 3 4

37	Illustrate how water changes from one form to another (e.g., freezing, melting, evaporating)
39	Design an experiment involving evaporation
48	Identify examples of the processes of a water cycle (e.g., evaporation, condensation, precipitation, collection of runoff)
58	Draw, label, and explain the components of a water cycle

Objects in the Sky

K 1 2 3 4

32	Discuss and differentiate objects seen in the day and/or night sky (e.g., clouds, Sun, stars, Moon)
43	Describe characteristics of the Sun, stars, and Earth's moon (e.g., relative size, shape, color, production of light/heat)

Language Arts

Standard 1 – READING

K 1 2 3 4

1,5	1-5	1,2,4,5	1-6	1-3	ELA-1-E1
6,7	9				ELA-1-E2
9,10	15	10	10	5,7	ELA-1-E5
11	16	11	11	6	ELA-1-E6

Standard 2 – WRITING

K 1 2 3 4

19,20	26				ELA-2-E1
21	27	23	22		ELA-2-E2
23	28				ELA-2-E3
25	29	25			ELA-2-E4
	30	26			ELA-2-E5
27	31	27	26		ELA-2-E6

Standard 3 – GRAMMAR

K 1 2 3 4

28-30	32	27	28	27	ELA-3-E1
31	33,34	28,29	29,30	28	ELA-3-E2
	35-38	30	31	30,31	ELA-3-E3
	39	31,32	32		ELA-3-E4
32	40-43	33-35,37	33,34,36	32	ELA-3-E5

Standard 7 – CRITICAL THINKING

K 1 2 3 4

22	17	14		ELA-7-E1
	22	18	15	ELA-7-E2
24		19,20	16	ELA-7-E3
25	24	21	19	ELA-7-E4



Your students can see water evaporation, precipitation, and condensation by the steam coming off a hot cup of water.

Time to Experiment: PHASES OF WATER-

Materials: (you must provide materials unless otherwise noted)

1 clear container (cup or bowl) - the larger the better.

Plastic wrap

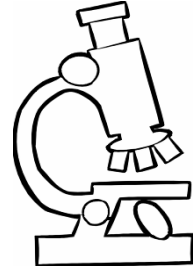
Boiling Water

Coffee maker

Student Observation sheets (and answer keys)

- written form for older students

- drawing form for either older or younger students.



SAFETY NOTE: Be sure the students only look at the cup/bowl, not touch, it could be very hot.

Procedure:

1. Bring in a cup of boiling water or fill coffee maker with water, and boil water.
2. Pour the boiling water into the clear container.
3. Cover with plastic wrap.
4. Have students record observations, using the student observation sheet, or for younger groups, make your class recordings on this sheet or use drawing sheet.
5. Wait 5-10 minutes to see condensation and precipitation as water vapor cools and forms droplets which fall back into the water.
6. Uncover the container and leave it out, near a sunny window for a week.

Conclusions:

Initially, the water in the container will evaporate, and condense on the plastic wrap and sides of container.

After 5-10 minutes, you should begin to see precipitation (water droplets falling back into the water).

After a week (or less) all the water should evaporate from the sun's heat.



Liquid water changes states and becomes a vapor by the sun's energy - evaporation. The vapor cools in clouds and condenses. Finally, after enough water vapor is formed, the clouds begin to rain down – as rain, sleet, snow, etc., - precipitation.

Image Credit: Indiana Department of Environmental Mgt., Office of Water Quality



Name:

Date:

Student Observation Sheet: Condensation, Evaporation, and Precipitation Experiment

Water in Container:

I predict (think will happen)	I observed(saw what happened)
Observation 1 _____	Observation 1 _____
_____	(made immediately)
Observation 2 _____	Observation 2 _____
_____	(made after 1 minute)
Observation 3 _____	Observation 3 _____
_____	(made after 2 minutes)
Observation 4 _____	Observation 4 _____
_____	(made after 10 minutes)
Observation 5 _____	Observation 5 _____
_____	(made after 1 week)

Conclusions (What happened and why):

What really happened:

At first I saw the water in the container (condense, evaporate, precipitate)

After 1 minute the water in the container (condensed, evaporated, precipitated) _____

After 2 minutes the water in the container (condensed, evaporated, precipitated) _____

After 10 minutes the water in the container (condensed, evaporated, precipitated) _____

After 1 week the water in the container (condensed, evaporated, precipitated) _____

Instructor Sheet: Condensation, Evaporation, and Precipitation Experiment
Water in Container:

I predict (think will happen)	I observed(saw what happened)
Immediate Observation 1 <u>Answers will vary</u>	Observation 1 <u>Steam came from top of the container-water vapor</u>
After 1 Minute Observation 2 <u>Answers will vary</u>	Observation 2 <u>Water droplets began to form on sides and top</u>
After 2 Minutes Observation 3 <u>Answers will vary</u>	Observation 3 <u>More water droplets form on sides and top</u>
After 10 Minutes Observation 4 <u>Answers will vary</u>	Observation 4 <u>More drops fall back into the container, and fewer are forming because the water is cooling</u>
After 1 Week Observation 5 <u>Answers will vary</u>	Observation 5 <u>All the water is evaporated from the sun's heat</u>

Conclusions (What happened and why):

What really happened:

At first I saw the water in the container (condense, evaporate, precipitate) Evaporate as steam came up from the surface of the container because the water changed into vapor.

After 1 minute the water in the container (condensed, evaporated, precipitated) began to condense because the steam cooled down and water droplets formed on the top/sides of the container

After 2 minutes the water in the container (condensed, evaporated, precipitated) more water vapor condensed because the entire container was cooling down, condensation actually cools down the air temperature in nature.

After 10 minutes the water in the container (condensed, evaporated, precipitated) more water drops rained down (precipitated) as the condensed water continued to cool and collect together.

After 1 week the water in the container (condensed, evaporated, precipitated) evaporated from the heat of the sun.



Name:

Date:

Student Observation Sheet: Condensation, Evaporation, and Precipitation Experiment

Water in Container:

The students can write or draw one phase of the water experiment:

I predict (think will happen)

I observed (saw what happened)

Conclusions (What happened and why):

What really happened:

When water changes phases it (evaporates, condenses, or forms precipitation) as it _____

I think this happened because _____



Instructor Sheet: Condensation, Evaporation, and Precipitation Experiment
Water in Container:

The students can write or draw one phase of the water experiment:

May have to help your students with ideas and vocabulary for their observations

I predict (think will happen)

Something similar to: Evaporation will happen because the water is hot and changing into vapor/Condensation will happen because the water is cooling off and forming droplets on the cover, sides, etc./Precipitation will happen as the water droplets collect together, and fall back into the water.

Picture of:

Water vapor (Evaporation) – steam rising from the container (cup/bowl)

Water droplets (Condensation) – droplets forming on the sides of the container (cup/bowl) or the plastic covering

Water drops (Precipitation) – drops falling from the top or sides of the container (cup/bowl) back into the bottom

I observed (saw what happened)

Something similar to: Evaporation will happen because the water is hot and changing into vapor/Condensation will happen because the water is cooling off and forming droplets on the cover, sides, etc./Precipitation will happen as the water droplets collect together, and fall back into the water.(In nature this occur in the clouds - usually due to water droplets coalesce -come together and are so heavy they over come air pressure and fall back to earth as rain, sleet, snow, etc)

Picture of:

Water vapor (Evaporation) – steam rising from the container (cup/bowl)

Water droplets (Condensation) – droplets forming on the sides of the container (cup/bowl) or the plastic covering

Water drops (Precipitation) – drops falling from the top or sides of the container (cup/bowl) back into the bottom

Conclusions (What happened and why):

What really happened:

When water changed phases it became (evaporation, condensation, or precipitation) as it Evaporates as the water was heated up/Condenses as the water vapor cooled and collected on the top and sides of the container/formed Precipitation as the condensed water droplets joined together and became too heavy to stay attached to the top and sides and fell back to bottom of the container.

I think this happened because Answers will vary - but try to help them understand why... Eventually all the water will evaporate from the sun's energy, and go into the air.



Benchmarks and Grade Level Expectations

Benchmarks K-4

Science as Inquiry

C. Abilities Necessary to do Scientific Inquiry

SI-E-A1 asking appropriate questions about organisms and events in the environment.

SI-E-A2 planning and/or designing and conducting a scientific investigation.

SI-E-A3 communicating that observations are made with one's senses.

SI-E-A4 employing equipment and tools to gather data and extend the sensory observation.

SI-E-A5 using data, including numbers and graphs, to explain observations and experiments.

SI-E-A6 communicating observations and experiments in oral and written formats.

SI-E-A7 utilizing safety procedures during experiments.

D. Understanding Scientific Inquiry

SI-E-B1 categorizing questions into what is known, what is not known, and what questions need to be explained.

SI-E-B2 using appropriate experiments depending on the questions to be explored.

SI-E-B3 choosing appropriate equipment and tools to conduct an experiment.

SI-E-B4 developing explanations by using observations and experiments.

SI-E-B5 presenting the results of experiments.

SI-E-B6 reviewing and asking questions about the results of investigations.

Physical Science

B. Properties of Objects and Materials

PS-E-A4 describing the properties of the different states of matter and identifying the conditions that cause matter to change states.

C. Forms of Energy

PS-E-C6 exploring and describing simple energy transformations.

Earth and Space Science

B. Properties of Earth Materials

ESS-E-A3 investigating, observing, and describing how water changes from one form to another and interacts with the atmosphere.

C. Objects in the Sky

ESS-E-A2 understanding that the sun, a star, is a source of heat and light energy and identifying the effects upon the Earth.

English Arts

ELA-1-E2 Using the conventions of print (e.g., left-to-right directionality, top-to-bottom, one-to-one matching, sentence framing)

ELA-2-E2 Focusing on language (vocabulary), concepts, and ideas that show an awareness of the intended audience and/or purpose (e.g., classroom, real-life, workplace) in developing compositions

ELA-2-E3 Creating written texts using the writing process

ELA-2-E6 Writing as a response to texts and life experiences (e.g., journals, letters, lists)

ELA-3-E1 Writing legibly, allowing margins and correct spacing between letters in a word and words in a sentence

ELA-3-E2 Demonstrating use of punctuation (e.g., comma, apostrophe, period, question mark, exclamation mark), capitalization, and abbreviations in final drafts of writing assignments

ELA-3-E3 Demonstrating standard English structure and usage by writing clear, coherent sentences

ELA-3-E4 Using knowledge of the parts of speech to make choices for writing

ELA-3-E5 Spelling accurately using strategies (e.g., letter-sound correspondence, hearing and recording sounds in sequence, spelling patterns, pronunciation) and resources (e.g., glossary, dictionary) when necessary



Grade Level Expectations K-4

Science as Inquiry

Abilities Necessary to do Scientific Inquiry

K 1 2 3 4

1	1	1	1	1	Ask questions about objects and events in the environment
2	2	2	2	2	Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations
		3	3	3	Use observations to design and conduct simple investigations or experiments to answer testable questions
3	3	4	4	4	Predict and anticipate possible outcomes
	4	5	5	6	Use a variety of methods and materials and multiple trials to investigate ideas (observe, measure, accurately record data)
4	5	6	6	7	Use the five senses to describe observations
6	7	8	8	9	Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data
7	8	9	9	10	Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate
		10	11		Combine information, data, and knowledge from one or more of the science content areas to reach a conclusion or make a prediction
8	9	10	11	12	Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios)
9	10	11	12	13	Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties)

Understanding Scientific Inquiry

K 1 2 3 4

	13	14	Identify questions that need to be explained through further inquiry		
	14	15	Distinguish between what is known and what is unknown in scientific investigations		
		16	Select the best experimental design to answer a given testable question		
10	11	12	15	17	Recognize that a variety of tools can be used to examine objects at different degrees of magnification (e.g., hand lens, microscope)
		18	Base explanations and logical inferences on scientific knowledge, observations, and scientific evidence		
	16	19	Describe procedures and communicate data in a manner that allows others to understand and repeat an investigation or experiment		
	20	Determine whether further investigations are needed to draw valid conclusions			

Physical Science

Properties of Objects and Materials

K 1 2 3 4

16	Observe and describe common properties of solids, liquids, and gases
17	Sort and classify objects by their state of matter
22	Investigate and explain conditions under which matter changes physical states: heating, freezing, evaporating, condensing, boiling
24	Illustrate how heating/cooling affects the motion of small particles in different phases of matter

Earth and Space Science

Properties of Earth Materials

K 1 2 3 4

37	Illustrate how water changes from one form to another (e.g., freezing, melting, evaporating)
39	Design an experiment involving evaporation
48	Identify examples of the processes of a water cycle (e.g., evaporation, condensation, precipitation, collection of runoff)
58	Draw, label, and explain the components of a water cycle

Objects in the Sky

K 1 2 3 4

32	Discuss and differentiate objects seen in the day and/or night sky (e.g., clouds, Sun, stars, Moon)
43	Describe characteristics of the Sun, stars, and Earth's moon (e.g., relative size, shape, color, production of light/heat)

Language Arts

Standard 1 – READING

K	1	2	3	4	
1,5	1-5	1,2,4,5	1-6	1-3	ELA-1-E1
6,7	9				ELA-1-E2
9,10	15	10	10	5,7	ELA-1-E5
11	16	11	11	6	ELA-1-E6

Standard 2 – WRITING

K	1	2	3	4	
19,20	26				ELA-2-E1
21	27		23	22	ELA-2-E2
23	28				ELA-2-E3
25	29		25		ELA-2-E4
	30		26		ELA-2-E5
27	31		27	26	ELA-2-E6

Standard 3 – GRAMMAR

K	1	2	3	4	
28-30	32	27	28	27	ELA-3-E1
31	33,34	28,29	29,30	28	ELA-3-E2
	35-38	30	31	30,31	ELA-3-E3
	39	31,32	32		ELA-3-E4
32	40-43	33-35,37	33,34,36	32	ELA-3-E5

Standard 7 – CRITICAL THINKING

K	1	2	3	4	
	22		17	14	ELA-7-E1
		22	18	15	ELA-7-E2
	24		19,20	16	ELA-7-E3
	25	24	21	19	ELA-7-E4



Name:

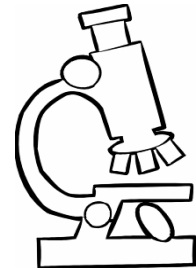
Date:

Water Cycle Art Modeling Extension Activity:

Time to Experiment: MAKING A MODEL OF THE WATER CYCLE -

Materials: (you must provide materials unless otherwise noted)

- 1 Paper Plate
- 1 Handful of Cotton Balls
- Crayons or Cutouts of Sun
- Grey Chalk or Cutouts of Mountains
- Blue Plastic wrap or paint
- Crayons or Cutouts of ocean animals
- Crayons or Blue Ribbon
- Scissors
- Glue



Procedure:

1. Using the image below as a guide, help your students create their own 3 dimensional model of a water cycle.
2. The paper plate will be the background, glue the cotton on as clouds, the sun, and cut and curl the blue ribbon as water vapor. Have your students color in (with crayons or paint) the rest of the picture model.
3. When everything is dry, you can print out strips of paper (like the ones below) that have the different parts of the water cycle on them and have your students attach to their pictures.

Conclusions:

Your students should be able to identify and label all the parts of the water cycle after the experiments.

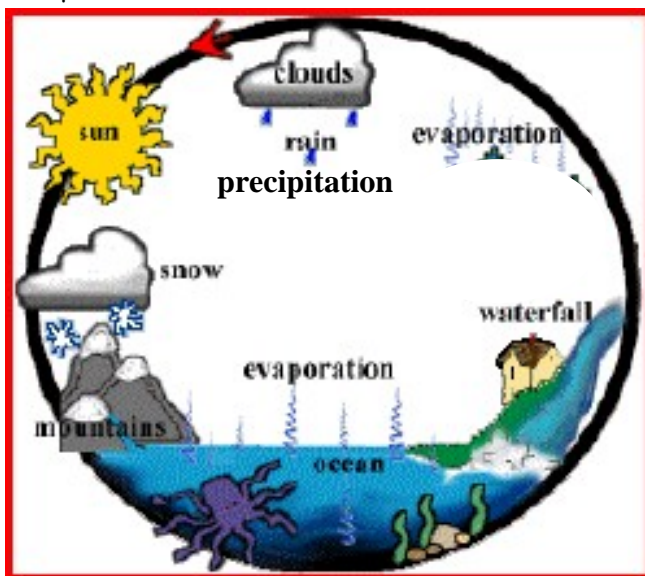


Image Credit: Region 7, Environmental Protection Agency

**Evaporation -
Water Vapor**

**Condensation -
Water Droplets**

**Precipitation-
Rain and Snow**

Benchmarks and Grade Level Expectations

Benchmarks K-4

Science as Inquiry

E. Abilities Necessary to do Scientific Inquiry

- SI-E-A1 asking appropriate questions about organisms and events in the environment.
- SI-E-A2 planning and/or designing and conducting a scientific investigation.
- SI-E-A3 communicating that observations are made with one's senses.
- SI-E-A6 communicating observations and experiments in oral and written formats.
- SI-E-A7 utilizing safety procedures during experiments.

F. Understanding Scientific Inquiry

- SI-E-B5 presenting the results of experiments.
- SI-E-B6 reviewing and asking questions about the results of investigations.

Physical Science

D. Properties of Objects and Materials

- PS-E-A4 describing the properties of the different states of matter and identifying the conditions that cause matter to change states.

Earth and Space Science

D. Properties of Earth Materials

- ESS-E-A3 investigating, observing, and describing how water changes from one form to another and interacts with the atmosphere.

E. Objects in the Sky

- ESS-E-A2 understanding that the sun, a star, is a source of heat and light energy and identifying the effects upon the Earth.
- ESS-E-B5 Give examples of how the Sun affects Earth's processes (e.g., weather, water cycle) ()

Visual Arts: Creative Expression

- VA-CE-E1 Explore and identify imagery from a variety of sources and create visual representations; (2, 3)
- VA-CE-E2 Explore and discuss techniques and technologies for visual expression and communication; (1, 2, 3)
- VA-CE-E5 Draw on imagination, individual experience, and group activities to generate ideas for visual expression; (1, 4, 5)
- VA-CE-E6 Identify relationships among visual arts, other arts, and disciplines outside the arts; (1, 4)



Grade Level Expectations K-4

Science as Inquiry

Abilities Necessary to do Scientific Inquiry

K 1 2 3 4

1 1 1 1 1

2 2 2 2 2

4 5 6 6 7

6 7 8 8 9

7 8 9 9 10

8 9 10 11 12

9 10 11 12 13

Ask questions about objects and events in the environment

Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations

Use the five senses to describe observations

Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data

Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate

Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios)

Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties)

Understanding Scientific Inquiry

K 1 2 3 4

13 14

14 15

20

Identify questions that need to be explained through further inquiry

Distinguish between what is known and what is unknown in scientific investigations

Determine whether further investigations are needed to draw valid conclusions

Physical Science

Properties of Objects and Materials

K 1 2 3 4

16

17

22

Observe and describe common properties of solids, liquids, and gases

Sort and classify objects by their state of matter

Investigate and explain conditions under which matter changes physical states: heating, freezing, evaporating, condensing, boiling

Earth and Space Science

Properties of Earth Materials

K 1 2 3 4

37

39

48

58

Illustrate how water changes from one form to another (e.g., freezing, melting, evaporating)

Design an experiment involving evaporation

Identify examples of the processes of a water cycle (e.g., evaporation, condensation, precipitation, collection of runoff)

Draw, label, and explain the components of a water cycle

Objects in the Sky

K 1 2 3 4

32

43

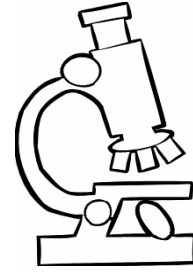
Discuss and differentiate objects seen in the day and/or night sky (e.g., clouds, Sun, stars, Moon)

Describe characteristics of the Sun, stars, and Earth's moon (e.g., relative size, shape, color, production of light/heat)



Water Cycle Dance Extension Activity:

Introduce your students to the concept that they're going to act out how molecules move in different states of matter, like states of water in the water cycle.



Time to Experiment: WATER CYCLE MOVEMENT -

Materials:

None, but enough space for your students to spread out.

Procedure:

1. Have students create a circle, very large at first, and they are very far apart (hands stretched out from their sides). They pick a direction and move in a very slow walk. This movement and distance represents water in the solid state - molecules are very far apart and move very slowly.
2. Have students remain in the circle, and get closer together (1 arm length apart). Again have them walk in a direction but a little faster. This movement and distance represents water in the liquid state - molecules are closer together and move faster.
3. Have the students remain in a circle, and get even closer together (right next to each other). Again have them walk in a circle, but this time even faster. This movement and distance represents water in the gaseous state - molecules are very close together and move very quickly.

Conclusions:

Your students should be able to identify the different states of matter and how molecules move within these different states.



Image Credit: NATIONAL PARK SERVICE



Benchmarks and Grade Level Expectations

Benchmarks K-4

Science as Inquiry

G. Abilities Necessary to do Scientific Inquiry

- SI-E-A1 asking appropriate questions about organisms and events in the environment.
- SI-E-A2 planning and/or designing and conducting a scientific investigation.
- SI-E-A3 communicating that observations are made with one's senses.
- SI-E-A4 employing equipment and tools to gather data and extend the sensory observation.
- SI-E-A5 using data, including numbers and graphs, to explain observations and experiments.
- SI-E-A6 communicating observations and experiments in oral and written formats.
- SI-E-A7 utilizing safety procedures during experiments.

H. Understanding Scientific Inquiry

- SI-E-B1 categorizing questions into what is known, what is not known, and what questions need to be explained.
- SI-E-B2 using appropriate experiments depending on the questions to be explored.
- SI-E-B3 choosing appropriate equipment and tools to conduct an experiment.
- SI-E-B4 developing explanations by using observations and experiments.
- SI-E-B5 presenting the results of experiments.
- SI-E-B6 reviewing and asking questions about the results of investigations.

Physical Science

E. Properties of Objects and Materials

- PS-E-A4 describing the properties of the different states of matter and identifying the conditions that cause matter to change states.

F. Forms of Energy

- PS-E-C6 exploring and describing simple energy transformations.

Dance: Creative Expression

- D-CE-E1 Use kinesthetic awareness, proper use of space and the ability to move safely; (1, 2, 5)
- D-CE-E2 Explore and demonstrate basic movements and the elements of dance (space, time, and energy); (1, 2)
- D-CE-E3 Recognize and explore dance as a way to create and communicate ideas and feelings; (1, 4)
- D-CE-E6 Identify relationships among dance, other arts, and disciplines outside the arts; (1, 4)



Grade Level Expectations Kindergarten

Science as Inquiry

Abilities Necessary to do Scientific Inquiry

K 1 2 3 4

1 1 1 1 1	Ask questions about objects and events in the environment
2 2 2 2 2	Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations
3 3 3	Use observations to design and conduct simple investigations or experiments to answer testable questions
3 3 4 4 4	Predict and anticipate possible outcomes
4 5 5 6	Use a variety of methods and materials and multiple trials to investigate ideas (observe, measure, accurately record data)
4 5 6 6 7	Use the five senses to describe observations
6 7 8 8 9	Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data
7 8 9 9 10	Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate
10 11	Combine information, data, and knowledge from one or more of the science content areas to reach a conclusion or make a prediction
8 9 10 11 12	Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios)
9 10 11 12 13	Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties)

Understanding Scientific Inquiry

K 1 2 3 4

13 14	Identify questions that need to be explained through further inquiry
14 15	Distinguish between what is known and what is unknown in scientific investigations
16	Select the best experimental design to answer a given testable question
10 11 12 15 17	Recognize that a variety of tools can be used to examine objects at different degrees of magnification (e.g., hand lens, microscope)
18	Base explanations and logical inferences on scientific knowledge, observations, and scientific evidence
16 19	Describe procedures and communicate data in a manner that allows others to understand and repeat an investigation or experiment
20	Determine whether further investigations are needed to draw valid conclusions

Physical Science

Properties of Objects and Materials

K 1 2 3 4

16	Observe and describe common properties of solids, liquids, and gases
17	Sort and classify objects by their state of matter
22	Investigate and explain conditions under which matter changes physical states: heating, freezing, evaporating, condensing, boiling
24	Illustrate how heating/cooling affects the motion of small particles in different phases of matter

Earth and Space Science

Properties of Earth Materials

K 1 2 3 4

37	Illustrate how water changes from one form to another (e.g., freezing, melting, evaporating)
39	Design an experiment involving evaporation
48	Identify examples of the processes of a water cycle (e.g., evaporation, condensation, precipitation, collection of runoff)
58	Draw, label, and explain the components of a water cycle

Objects in the Sky

K 1 2 3 4

32	Discuss and differentiate objects seen in the day and/or night sky (e.g., clouds, Sun, stars, Moon)
43	Describe characteristics of the Sun, stars, and Earth's moon (e.g., relative size, shape, color, production of light/heat)



Name:

Date:

Journal Making Extension Activity:

Time to Experiment: MAKING A STUDENT JOURNAL -

Materials: (you must provide materials unless otherwise noted)

2 Sheets of Colored Construction Paper

Multiple sheets of white copy paper (for the inside pages)

Photocopy of Activity/Experiment Sheets (for the inside pages)

2 or 3 Ring Hole-Puncher

Chenille stems (cut into 2 or 3 pieces depending on the number of holes)

Pencils, Pens, or Crayons

Scissors, and glue

Stickers, magazines they can cut up, pictures from the internet, etc.

Procedure:

1. Help your students create their own Journals to use, color front and back pages, and add stickers or artwork and then twist the chenille stem pieces through the holes to attach pages and front and back covers together.
2. Have your students draw or write answers to questions after they finish each section of the Traveling Trunk.
3. Hole punch their pages so they can add them to their journals
4. Add the pages to their journals with the chenille stem pieces.

Conclusions:

Your students should be create and add to their journals about all they have learned after they complete the experiments and activities in the Traveling Trunk .

Questions about Earth Forces!

1. When it rains on bare ground, the flowing water washes the dirt away by forming riverlets (tiny streams) of muddy water. Compare these to the "Big Muddy" (the Mississippi River) and explain why you think it's called the "Big Muddy."
2. Have you ever played in the mud? Describe what it felt like, by using single words (i.e. squishy) or entire sentences. Try closing your eyes so you can concentrate on feeling the mud between your fingers and toes.
3. Describe how water is important to you, the city you live in, the state of Louisiana, and even the world!
4. What do you think will happen when all the coastal land disappears?



Benchmarks K-4

Science as Inquiry

- I. Abilities Necessary to do Scientific Inquiry
 - SI-E-A1 asking appropriate questions about organisms and events in the environment.
 - SI-E-A2 planning and/or designing and conducting a scientific investigation.
 - SI-E-A3 communicating that observations are made with one's senses.
 - SI-E-A6 communicating observations and experiments in oral and written formats.
 - SI-E-A7 utilizing safety procedures during experiments.
- J. Understanding Scientific Inquiry
 - SI-E-B5 presenting the results of experiments.
 - SI-E-B6 reviewing and asking questions about the results of investigations.

Physical Science

- G. Properties of Objects and Materials
 - PS-E-A4 describing the properties of the different states of matter and identifying the conditions that cause matter to change states.

Earth and Space Science

- F. Properties of Earth Materials
 - ESS-E-A3 investigating, observing, and describing how water changes from one form to another and interacts with the atmosphere.
 - ESS-E-A1 Recognize that sedimentary rocks are composed of particles that result from weathering and erosion (e.g., sandstones, conglomerates) Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth)
 - ESS-A-A5 Demonstrate and explain how Earth's surface is changed as a result of slow and rapid processes (e.g., sand dunes, canyons, volcanoes, earthquakes)
- G. Objects in the Sky
 - ESS-E-A2 understanding that the sun, a star, is a source of heat and light energy and identifying the effects upon the Earth.
- H. Science and the Environment
 - SE-E-A2 Predict and describe consequences of the removal of one component in a balanced ecosystem (e.g., consumer, herbivores, nonliving component) (SE-E-A2)

Visual Arts: Creative Expression

- VA-CE-E1 Explore and identify imagery from a variety of sources and create visual representations; (2, 3)
- VA-CE-E2 Explore and discuss techniques and technologies for visual expression and communication; (1, 2, 3)
- VA-CE-E5 Draw on imagination, individual experience, and group activities to generate ideas for visual expression; (1, 4, 5)
- VA-CE-E6 Identify relationships among visual arts, other arts, and disciplines outside the arts; (1, 4)



Grade Level Expectations K-4

Science as Inquiry

Abilities Necessary to do Scientific Inquiry

K 1 2 3 4

- | | | | | | |
|---|----|----|----|----|--|
| 1 | 1 | 1 | 1 | 1 | Ask questions about objects and events in the environment |
| 2 | 2 | 2 | 2 | 2 | Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations |
| 4 | 5 | 6 | 6 | 7 | Use the five senses to describe observations |
| 6 | 7 | 8 | 8 | 9 | Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data |
| 7 | 8 | 9 | 9 | 10 | Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate |
| 8 | 9 | 10 | 11 | 12 | Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios) |
| 9 | 10 | 11 | 12 | 13 | Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties) |

Understanding Scientific Inquiry

K 1 2 3 4

- | | | |
|----|----|--|
| 13 | 14 | Identify questions that need to be explained through further inquiry |
| 14 | 15 | Distinguish between what is known and what is unknown in scientific investigations |
| 20 | | Determine whether further investigations are needed to draw valid conclusions |

Physical Science

Properties of Objects and Materials

K 1 2 3 4

- | | |
|----|--|
| 16 | Observe and describe common properties of solids, liquids, and gases |
| 17 | Sort and classify objects by their state of matter |
| 22 | Investigate and explain conditions under which matter changes physical states: heating, freezing, evaporating, condensing, boiling |

Earth and Space Science

Properties of Earth Materials

K 1 2 3 4

- | | |
|----|--|
| 37 | Illustrate how water changes from one form to another (e.g., freezing, melting, evaporating) |
| 39 | Design an experiment involving evaporation |
| 48 | Identify examples of the processes of a water cycle (e.g., evaporation, condensation, precipitation, collection of runoff) |
| 58 | Draw, label, and explain the components of a water cycle |
| 55 | Recognize that sedimentary rocks are composed of particles that result from weathering and erosion (e.g., sandstones, conglomerates) |
| 56 | Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth) |
| 63 | Demonstrate and explain how Earth's surface is changed as a result of slow and rapid processes (e.g., sand dunes, canyons, volcanoes, earthquakes) |

Objects in the Sky

K 1 2 3 4

- | | |
|----|--|
| 32 | Discuss and differentiate objects seen in the day and/or night sky (e.g., clouds, Sun, stars, Moon) |
| 43 | Describe characteristics of the Sun, stars, and Earth's moon (e.g., relative size, shape, color, production of light/heat) |

Science and the Environment

K 1 2 3 4

- | | |
|----|---|
| 72 | Predict and describe consequences of the removal of one component in a balanced ecosystem (e.g., consumer, herbivores, nonliving component) |
| 58 | Describe how humans have had negative and positive effects on organisms and their environments |

