Grade(s): 3rd – 4th	**Topic:** Water Cycle	**Time Frame:** 3 to 5 – 90 minute blocks

Lesson Description: The lesson focuses on identifying and explaining the different parts of the water cycle. The lesson also dives into why water is essential to plants and animals.

Specific Learning Outcomes:

- Sequence the steps of the water cycle
- Identify and describe types of clouds and precipitation.
- Model the effect of surface area on the rate of evaporation.
- Identify the basic features of the water cycle and describe their importance to life on earth.
- Describe the relationship between heat energy, evaporation and condensation of water on Earth

Resources:

- Blank Frayer models
- Internet
- Desktop/Laptop
- Projector
- *Life Cycle of A Snowman* Article
- *Water, Water, Everywhere* Article
- Water Cycle student sheet
- 5-gallon bucket
- Pyrex measuring cup
- eyedropper
- clear plastic container with a lid, about 3" x 6" (one for each group of students)
- cobalt paper, enasco.com SB16154 (A)M $15.95
- one small plastic cup that will fit inside the plastic container when the lid is closed

Resources Continuation . . .

- squirt bottle with water
- wax paper
- hair dryer
- ice cubes
- two plastic Petri dishes or other small container
- thin mirrors
- 2L empty soda bottle with the label removed, one per group
- matches
- hotplate
- pot to boil water
- pie tin
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Internet Resources:

- http://www.e-learningforkids.org/science/lesson/the-water-cycle/
- http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
- http://www.turtlediary.com/grade-1-games/science-games/the-water-cycle.html

Activity Standards

TN Science Standards	Next Generation Science Standards Practices	Common Core Standards
GLE 0407.8.1 Recognize the major components of the water cycle.	Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)	CCSS.ELA-Literacy.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.
	Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.	CCSS.ELA-Literacy.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

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	• Develop a model using an example to describe a scientific principle. (5-ESS2-1)	
		CCSS.ELA-Literacy.RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic

Guiding Questions

Also known as your essential questions. What do you want the students to be able to answer by the end of this lesson

1. Explain, thoroughly each of the parts of the water cycle?
2. How does the water cycle impact drinking water?

Possible Preconceptions/Misconceptions

1.The water cycle consists of a process that moves water from the atmosphere to Earth's surface and back.

2.The hail falls only in the winter when it is cold.

Activities/Task

What learning experiences will students engage in?

Day 1

Introduction

- Ask students to discuss with a shoulder partner and/or group, where does water come from? (3-5 min)
- Allow students to share. Jot down responses and/or misconceptions on the board or chart paper. (3-5 min)

Procedure 1a:

- Go through the *Introduction To The Water Cycle* e-learning for Kids activity (http://www.e-learningforkids.org/science/lesson/the-water-cycle/)
- After the man in the plan goes through each part of the water cycle, ask students, in their own words, to explain that process.
- Complete the tutorial.
- With a class have the students to engage in the interactive activity at the end of the presentation.
    - **If you should have an interactive board (SmartBoard, Promethean Board, eBeam, Mimo, etc) have students to come to the board to manipulate the interactive components to complete the tasks.**

or

Procedure 1b:

- Have the students to watch the Study Jams video clip on *The Water Cycle.*
- At the end of the video have the students to complete the "Test Yourself" questions that go with the video.
    - *Assessment can be done whole class, individually, or in groups/teams.*

Procedure 2:

- Inform students that it is important to not only be able to identify the different parts of the water cycle; but it is also important to know and understand what each of the parts of the cycle mean.
- Introduce the vocabulary terms with the students:
    - Evaporation
    - Precipitation
    - Transpiration
    - Condensation
    - Vapor
    - Accumulation (Collection)
- Present the Frayer Model worksheet to the students. Go over each portion of the Frayer model.

- Let students know that they will complete a Frayer Model for each of the vocabulary terms.

Day 2

The beginning part of this day will be briefly reviewing the water cycle.

Procedure 1:

- *Go through TurtleDiary.com activity with students. (http://www.turtlediary.com/grade-1-games/science-games/the-water-cycle.html)*
- *The activity allows students to interact with the vocabulary words from the previous day.*

Procedure 2:

- Pass out to the students the article *Life Cycle of A Snowman.* ***(Do not provide the students with the questions for the reading)***
- Inform students that as they read, they will read like detectives, and annotate as they read, using annotation keys.
    - Highlight – Key ideas
    - Question Mark – Things I don't understand
    - Circle – words that I don't know
- After students finish reading and making annotation, have students to get into groups of 2-3. In their groups they will (10-20 mins):
    - Support each other in defining words that are circled.
    - Compare key ideas
    - Research the things they did not understand.
- Next in their group the students will work together to explain how this article relates the water cycle. Students will be given chart paper. They can explain the water cycle concept, with the snowman as an example, using words and/or drawing pictures.
- Students will hang charts around the room.
- Each group will be given a pad of sticky notes. The groups will do a gallery walk to all other groups charts and write on the sticky note any differences they saw or like in another groups chart that they did not do on their chart. The students will stick the sticky not on the groups chart.
- In whole group students will reflect and share
- Exit Slip: Teacher will ask students to take another concept, similar to the snowman, that relates to the water cycle.

**** Homework could be the questions to the reading passage.

Day 3

Background Information:

- The teacher will complete a demonstration on how much usable fresh water there is available to plants and animals on earth and then demonstrates how the water cycle maintains itself with a water cycle demonstration.
- Students evaporate water with a hair dryer; observe condensation that forms on a mirror; observe a cloud in a bottle; and cause rain to occur in the lab.
- The teacher will have stations ready for students to rotate to.
- Students are to take their science journals to each station so that they may be able to write their observations, as well as answer the station questions.

Procedure 1:

- Inform students that 70% of the earth is covered in water.
- Ask students to write a response in their science journal to the following question: *If there is about 70% of water covering the earth, will there ever be a point that we will run out of drinking water?*
- Have students to read their responses whole class.
- Discuss with students the need to conserve water and to maintain drinkable water by not contaminating the water that we have.

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- Divided students into group of 2-3 (no larger than 3).
- Briefly go over the station tasks with the students.
- Assign students to a station.
- Have students to rotate stations every 10-15 minutes. **(More time can be added; however, this would extend the activity to the next day)**

Station A (Humidity Chamber):

- Fill a plastic container with about 2 cm of warm water.
- Place a small piece of the cobalt paper in the small plastic cup. Be sure you do not get any water on the cobalt paper.
- Float the cup with cobalt paper in the dish with the warm water.
- Close the lid.
- Check the cobalt paper every five minutes as you do the other experiments and see if a color change occurs.
- Students are to write in their science notebooks what they observe.
- Questions:
  - What is happening to the warm water in the container?
  - What is happening to the air inside the container?
  - What caused the paper to turn pink?
  - What were we testing in this experiment?
  -

Station B (Evaporation):

- Squeeze 5 small drops of water from the squirt bottle onto a piece of wax paper.
- Using a hair dryer on low setting, carefully blow on the drops of water.
- Questions:
  - What happened to your spots?
  - Where did the water go?

Station C (Condensation):

- Place two ice cubes in a plastic Petri dish. The ice should be above the level of the empty plastic Petri dish next to the one that contains the ice cube.
- Place the mirror, shiny side up, across the plastic dish containing the ice and a second dish that is empty. Notice that the under surface of the mirror rests on the ice cubes near one end.
- Let the mirror sit on the ice for 1-2 minutes.
- Questions:
  - What do you see forming on the top of the mirror above the ice?
  - Where are these water droplets coming from?
  - What forms on the mirror as you breathe on it?

Station D (Evaporation and Condensation):

- Open the 2L bottle and put in about 1 cup of lukewarm water. Be sure the water isn't too warm. Screw the cap on tightly. Swirl the water around the inside of the bottle so that most of the inside of the bottle is wet. Take the cap off the bottle.
- Have an adult light a match and blow it out. After it has gone out, immediately drop it into the water and screw the cap on tightly. Do not swirl the water in the bottle again.
- Squeeze the bottle for about 15 seconds as tightly as you can. Quickly let it go and look inside the bottle. See if you can observe a slight fog filling the bottle. You may need to do this several more times to be able to see the fog.
- Cycle back and forth between squeezing and letting go. Watch the cloud form, disappear and reform.
- Questions:
  - What is happening?

Station E (Precipitation):

- Boil a pot of water on a hotplate. Be sure the students are aware of the hot plate and stay away from

it to prevent someone getting burned. Place ice into a dry Pyrex measuring cup. Have an adult hold the Pyrex cup of ice over the pot of boiling water.
    - Questions:
        - What do you see forming on the bottom of the Pyrex cup?
        - How did the water get on the bowl?
    - When you see water droplets forming on the outside of the pot, with ice have someone carefully hold a pie tin or other container in between the ice and the boiling water. You should see it raining.
    - Questions:
        - What represents the clouds in the experiment?
        - What is precipitation?
        - What is this happening?

Procedure 2

- Have students to reflect and share their experience at the stations and their responses to the questions at each station.
- Teacher clear up any misconceptions that may have been formed.

Day 3

Procedure 1:

- Teacher will pass out the *Water, Water, Everywhere* article.
- Students will read the article and answer the question sheet that comes along with article (20 mins)

Procedure 2:

- Teacher will go over the questions (whole class).
- Teacher will inform students that when called on to answer a question, they must support their answer choice by stating where in the text they found their answer.
- Teacher will go through all questions with students to ensure they have a clear understanding of the water cycle process.

Day 4

On this day the students will begin working on their explanatory paper of the water cycle. Students must use evidence from the articles read throughout the lesson, and the lab observation and results, to support their writing. Students must also include an example to relate the water cycle process to. This may be the example that students provided the teacher with as an exit slip during day 2. To further student's skills, they will need to type the paper in a word processing software. This writing activity is the culminating activity.

Reading Task One of the literacy shifts in common core is for students to focus on more complex, non-fiction literature.	**Writing Task** In science students are responsible for writing either an explanatory or argumentative piece. Below simply type the writing prompt in which students will dive into.
Throughout the length of the lesson the students will Engage in reading two articles: - *Life Cycle of A Snowman* Article - *Water, Water, Everywhere* Article	The students will write an explanatory paper on the water cycle. It is imperative that students use evidence to support their writing. Students must use evidence from the readings, as well as the lab stations that were conducted. The teacher can and should create a writing rubric for students to follow.

Assessment

How will your students be assessed? How will you use the above learning experiences as formative assessment opportunities? (If activity is several days long, please specify the day with the activity/reading task)

- Students will be assessed from answering the questions from the Study Jams video.
- Students will be assessed from the creation of the vocab Frayer Models.
- Students will be assessed from the online water cycle activity.
- Students will be assessed from the reading activity by relating the snowman to the water cycle.

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- Students will be assessed from the water cycle lab stations and questions.
- Students will be assessed from the *Water, Water, Everywhere* article questions
- Students will be assessed from the culminating writing activity.

Modification/Accommodations:

What curriculum modifications and/or classroom accommodations can be made for students with disabilities in a class

- For the reading activities students will be provided an opportunity to be a part of a read aloud
- Students will dive into a close read, when reading the articles.
- Students will be provided fewer questions after the reading assignment.
- Groups of 3.

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