Pre-Kindergarten Weather: Sunshine or Clouds

Eco-Energy for Schools

Unit Overview	
Unit Title	Weather: Sunshine or Clouds
Unit Summary	The Sun's rays have an effect on the temperature of objects when it is not blocked. Throughout this unit, students will have the opportunity to explore how the sun provides heat for the Earth. This will accomplished by engineering a device to block the sun's rays; therefore, blocking the sun's thermal effects. Students will also explore the effects of clouds on the sun's rays and weather.
Subject Area Strands	Science – Earth & Space, Physical Science Math – Counting and Cardinality ELA – Information Text, Literature Social Studies – Career Development
Grade Level	Pre-Kindergarten
Appropriate Time	5 days

Lesson Foundation			
Targeted Content Standards	**Common Core Standards**		
		Mathematics	CC.3. Understand the relationships between numerals, names of numbers and quantities up to 10 (includes subtilizing—the ability to look at a quantity and say the quantity [1-4] quickly, just by looking) CC.4. Understand the relationship between numbers and quantities with concrete objects up to 10.
		English / Language Arts	<u>Reading Strands for Literature</u> RL.K.2. With guidance and support, retell familiar stories, including key details. RL.PK.4. Develop new vocabulary by engaging in meaningful discussions and activities to promote learning of unfamiliar words related to text. <u>Reading Strands for Informational Text</u> RI.PK.2. With modeling and support, recall important age appropriate facts from informational text by engaging in meaningful discussions and activities. RI.PK.9. With guidance and support, explore and identify the similarities and differences between books on the same topic. RL.K.9. With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories. <u>Writing</u> W.PK.1. With modeling and support, use a combination of drawing, dictating, and emergent writing to express a preference, opinion or idea about a specific topic or text. W.PK.2. With modeling and support, use a combination of drawing, dictating, and letters to explain information about a familiar topic or informational text.

	TN Standards	
	Science	S.PK.6. Make simple observations of the characteristics and movements of the sun, moon, stars, and clouds. S.PK.11. Demonstrate an awareness of changes that occur in their environment (e.g., freezing/melting, color mixing).
	Social Studies	SS.PK.8. Develop awareness about a wide variety of careers and work environments.
	Next Generation Science Standards	K-PS3-2. Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface.

Lesson Foundation – Big Ideas & Cross-Curricular Connections

Big Ideas

- The sun's rays give the Earth heat.
- The sun's rays can be blocked to reduce heat.

Cross-Curricular Connections

- *Clouds* by Anne Rockwell and Frane Lessac- Reading this informational text will link science, language, and writing through the description of cloud formations.
- *What Will the Weather Be* by Lynda DeWitt - Social Studies, Language, Science, and Writing will be incorporated in the discussion of weather and tools used by meteorologists.

Lesson Foundation – Essential Questions

1. How can you lessen the effect of the sun's rays?
2. How do clouds affect the temperature?

Lesson Foundation – Student Objectives

Going Beyond	• I can understand the relationship between numbers and quantities with concrete objects beyond 10. • I can identify multiple similarities and differences between two books on clouds. • I can describe the formation of clouds. • I can describe the different types of clouds. • I can identify 5 tools meteorologists use to forecast the weather. • I can give examples of canopies that block the sun's rays.

Mastery	• I can understand the relationship between numbers and quantities with concrete objects up to 10. • I can identify 2 tools meteorologists use to forecast the weather. • I can identify 2 similarities and differences between two books on clouds. • I can describe how clouds block the sun's heat. • I can explain why ice melts faster in direct sunlight than in the shade.
Building the Basics	• I can understand the relationship between numbers and quantities with concrete objects up to 5. • I can identify a similarity of two books on clouds. • I can identify that ice will melt faster in the sun than in the shade.
Lesson Foundations – Prerequisite Content & Skills	
Content Knowledge	• One-to-one correspondence up to ten. • Understanding that heat causes melting.
Skills	• Fine Motor skills that is required for basic drawing and manipulation of small objects.
Unit Anchor Text	
Unit Anchor Text	**Unit Literary Anchor Text:** • *Little Cloud* by Eric Carle **Unit Information Anchor Texts:** • *Clouds* by Anne Rockwell
Unit Companion Texts	
Informational Text(s)	**Cross-Curricular Texts:** • *Clouds* by Anne Rockwell and Frane Lessac- Reading this informational text will link science, language, and writing through the description of cloud formations. • *What Will the Weather Be* by Lynda DeWitt - Social Studies, Language, Science, and Writing will be incorporated in the discussion of weather and tools used by meteorologists. **Supplemental Literary Texts:** • *The Cloud Book* by Tomie de Paola **Supplemental Informational Texts:** • *Weather Words* by Gail Gibbons • *What Will the Weather Be* by Lynda DeWitt

Assessments	
Formative Assessments	• Students will be assessed throughout the unit using teacher observation during discussions, questioning, and learning stations. • Think, Pair, Share will be incorporated during and after the text readings. Students will summarize their new knowledge and share it with another student.

Summative Assessments	• Pre-Test
	  ○ Show the student a numeral and ask them an equal amount of Unifix Cubes. Do this for the numerals 1-10.
	• Post-Test
	  ○ Repeat the process.
	• Pre-Test
	  ○ Make an ABAB pattern using two colors of Unifix Cubes. Ask the student to continue the pattern.
	  ○ Repeat the process with an ABCABC pattern.
	• Post-Test
	  ○ Repeat the process.

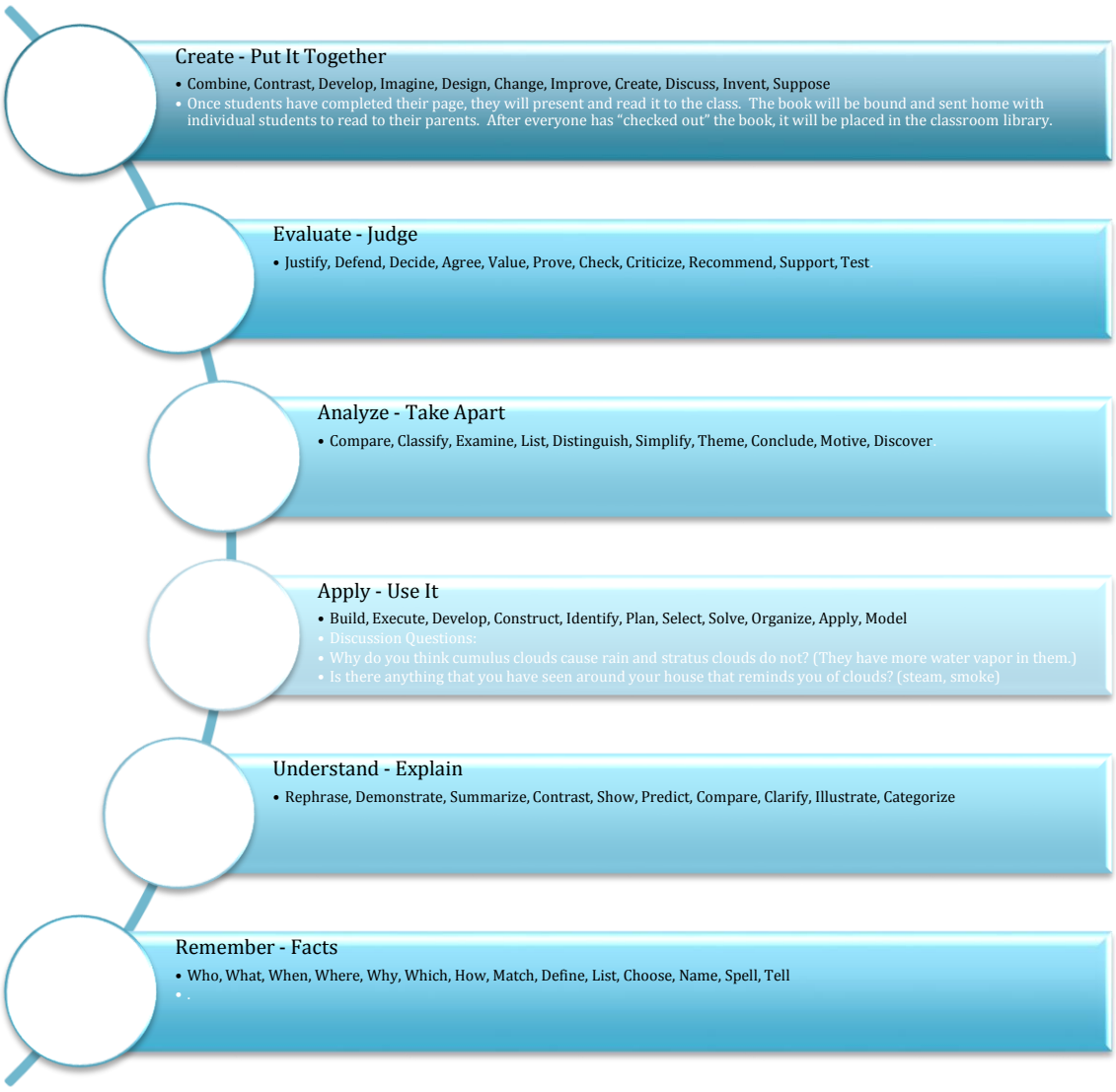
Writing Assessments	• Students' understanding will be assessed using their illustration and description of the culminating event. Students need to form an understanding that the sun's rays provide heat and creating a shadow will reduce that heat. (See rubric) • Students' phonological awareness will also be assessed through the *It Looked Like Spilt Milk* class book. (See rubric)

Unit Vocabulary	
Term	**Definition**
Clouds	Water vapor in the sky (atmosphere)
Fog	Clouds that are near the ground
Sun's Rays	Beams of light and heat from the Sun
Meteorologist	Person who forecasts the weather

Teaching the Unit	
Initial Strategies	<u>I See a Bunny. What Do You See?</u> • Take the class outside on a day with a lot of Cumulus clouds. • Everyone should lie on their backs and take turns describing the shapes of the clouds. • Ask the class if they can find an animal, something found in their home, a shape, etc.

Direct Instruction	• Read *Clouds* by Anne Rockwell.
	  ○ The book gives and explanation of the types of clouds and how they are formed.
	  ○ Then form a cloud in a jar.
	• **Materials:**
	  ○ Glass jar with lid
	  ○ Hot water
	  ○ Ice
	  ○ Dark colored paper
	  ○ Aerosol (i.e. hairspray or air freshener) or Matches
	  ○ Flashlight (optional)
	• **Directions**
	This activity requires adult supervision due to the use of hot water, glass, and the aerosol or matches.
	  ○ Fill the bottom of a clean glass jar with hot water (1" deep)
	  ○ Swish the water on the sides of the jar to raise the jar's temperature.
	  ○ Place the lid on the jar- upside down.
	  ○ Put ice on the lid. Some condensation may appear on the glass.
	  ○ Spray a small amount of air freshener or hairspray in the jar and replace the lid, VERY QUICKLY. (Instead of an aerosol, an adult can light a match, blow it out, then throw the smoking match inside the jar and replace the lid of ice.)
	  ○ Place a dark piece of construction paper behind the jar to allow students to see the cloud more easily.
	  ○ (Adapted from NOAA.gov)
	• Think, Pair, Share- What did you see? What happened?
	
	• Read *Little Cloud* and *It Looked Like Spilt Milk*.
	  ○ This may be done in two separate sessions.
	  ○ After the second book has been read, compare and contrast the cloud shapes with the class.
	  ○ Use a Venn diagram to record the students' thoughts.
	  ○ Create an *It Looked Like Spilt Milk* class book using puff paint.
	• Paint Materials:
	  ○ Shaving Cream
	  ○ Elmer's White Glue
	  ○ Blue Construction Paper
	• Mix Equal parts shaving cream and glue.
	• Allow students to finger paint onto blue paper to represent clouds in the sky.
	• Attach a text box that says "When I looked up in the sky, I thought I saw a _____ but it was just a cloud."

Higher-Level Cognitive Function Strategies	• Discussion Questions:
	  ○ Why do you think cumulus clouds cause rain and stratus clouds do not? (They have more water vapor in them.)
	  ○ Is there anything that you have seen around your house that reminds you of clouds? (steam, smoke)
	• Once students have completed their page, they will present and read it to the class. The book will be bound and sent home with individual students to read to their parents. After everyone has "checked out" the book, it will be placed in the classroom library.



Guided Practice & Activities

Learning Stations
(See additional details in the Materials section.)

Reading:
Students will practice ABAB pattern with weather shapes: sun, cloud, sunglasses

Math:
Lay several pieces of blue construction paper, a die that is marked with numerals, and cotton balls. Students will roll the die and place the corresponding amount of cotton balls into the "sky". Students may be creative and make cloud shapes.

Art:
Crayon Resit Clouds

- Use a white crayon to draw cloud designs on white pieces of paper.
- Set out some blue wash (diluted blue paint) and some brushes.
- Have the students take a cloud paper and brush the blue paint across the paper, revealing the white clouds

	Music: "Did You Ever See a Cloud" o Encourage students to create their own verse by naming a cloud shape.
STEM Projects	Students will experiment with sun's warming effect. • Materials o iPads o Ice cubes o Shallow plates o Shaded area o Timer • Brainstorm a list of how the sun affects the Earth with the students. – There is a good chance that the students will already understand that the Sun warms the Earth. • If they do not, ask the class what happens to ice cream if it is left in the Sun. • Ask them how they can prevent their ice cream from melting. (eat it quickly, go inside, go to the shade) • Explain to the class that they will do an experiment to test how fast something will melt in the sun or in the shade. • Students will place an ice cube in direct sunlight and one in the shade. The ice cubes need to be on a shallow plate. • They will make observations to see which ice cube melts first by taking pictures with the iPads every 5 minutes. A timer should be used to assure that pictures are taken at the same time. • Once both ice cubes are melted, notate the time. • Compare the pictures to create a visual of the rate of thawing. • Then discuss why. Lead the students to the fact that the temperature is lower in the shade than in direct sunlight. • Think, Pair, Share- How can we prevent the ice from melting?
STEM Culminating Event	<u>Engineering Challenge</u> • Materials: o Kinex Blocks o Legos o Wooden Blocks o Paper o Tape o Ice Cubes o Napkins • Divide the students into groups of two. • Give this problem to the students: You have been asked to bring ice cream for the class during playground time. The playground does not have any trees or pavilions. You must figure out a way to keep the ice cream in the shade. • Tell the students that they may use the supplies, but they must share with the other groups. • The teacher will oversee the materials to assure that all groups have what they need. • Allow time for construction. • Once everyone has completed the build, give each group an ice cube on a napkin. • The groups will place their ice cube under their structure. • They will make observations to see which ice cube melts first by taking pictures

	with the iPads every 5 minutes. A timer should be used to assure that pictures are taken at the same time.
	• Keep track of the melting time for each group on the board.
	• Once all the ice is melted, each group will present their structure and explain their success.
	• Have a class discussion to hypothesize (guess) why one structure was more successful than the others.
	  ○ Was it covered on all 4 walls?
	  ○ Did it trap the heat in?
	  ○ Did it allow air to flow through while still blocking the sun?
	• Ask each student to draw a picture of a structure that would protect the ice cream from melting. They must also include the sun and ice cube. Then they will describe their picture to an adult for transcribing.

Differentiated Instruction	• Reading Station:
	  ○ Students may create ABABAB patterns with 2 objects.
	• Math Station:
	  ○ Use the die with spots instead of numerals.
	• Culminating Event:
	  ○ Peer tutoring will be used to assure students' success.

Re-teaching Strategies	• Reading Station:
	  ○ Practice patterns with body movements: clap, snap, clap, snap, etc.
	  ○ Then repeat with other kinesthetic activities.
	• Math Station:
	  ○ Practice one-to-one correspondence with the clouds and die.
	  ○ Encourage the student to recreate the dot pattern of the dice and THEN count how many cotton balls they used verses the dots on the die.

Enrichment Strategies	• Reading Station:
	  ○ Use more complicated patterns: AABBAABB, ABCABCABC
	• Math Station:
	  ○ Use two dice instead of one. This will introduce basic addition.
	• Culminating Event and STEM Activity:
	  ○ Introduce a digital thermometer to judge the temperature.

Independent Practice Activities	• Blocks:
	  ○ Provide flashlights at the block center.
	  ○ Encourage the children to make shadows by shining the light from different angles on their structures.
	  ○ How can they make the shadows larger? Smaller?

Materials & Resources	iPads Internet **Touch the Sun**- Nonfiction exploration **ABC Clouds -** Letter writing and recognition **Computer Simulation** **Sid the Science Kid** *Clouds* by Anne Rockwell and Frane Lessac *What Will the Weather Be* by Lynda DeWitt *Little Cloud* by Eric Carle

The Cloud Book by Tomie de Paola
Clouds by Anne Rockwell
Weather Words by Gail Gibbons
What Will the Weather Be by Lynda DeWitt
iPad
Internet
Touch the Sun- app
ABC Clouds- app
Glass jar with lid (or use a small bowl/plate to act as a lid)
Hot water
Ice
Dark colored paper
Aerosol (i.e. hairspray or air freshener) or Matches
Flashlight (optional)
Shaving Cream
Elmer's White Glue
Blue Construction Paper
ice cubes
shallow plates
shaded area
timer
Kinex Blocks
Legos
Wooden Blocks
Paper
Tape

Music- Did You Ever See A Cloud? Original Author Unknown
Sung to: "Did you ever see a lassie"

Did you ever see a cloud
A cloud a cloud
Did you ever see a cloud
That looked like a bear?
A big one a little one
A lazy one a funny one
Did you ever see a cloud that looked like a bear?

Did you ever see a cloud
a cloud a cloud
Did you ever see a cloud
That looked like a plane
A big one a little
A fast one a slow one
Did you ever see a cloud
That looked like a plane?

Comments	This unit needs to be implemented when the weather is hot and sunny. It may also be expanded another week to include the many different types of precipitation. If you have an questions you may contact: Felicia Kellner at mary.kellner@sullivank12.net Jessica Carr at jessicawcarr@hotmail.com

Rubric:

Subject	Advanced	Proficient	Basic
Math	When given a numeral, 1-10, the student can demonstrate the corresponding amount correctly.	When given a numeral, 1-10, the student can demonstrate the corresponding amount correctly half of the time.	When given a numeral, 1-10, the student can demonstrate the corresponding amount correctly less than half of the time.
Reading	Student can continue an ABABAB and ABCABC pattern for three more repetitions.	Student can continue an ABABAB or an ABCABC pattern for three more repetitions	Student cannot repeat either pattern for three repetitions.
Writing	Student writes the correct beginning letter of a word that is used to label their drawing.	Student writes random letters to label their drawing.	Student writes random lines to label their drawing.
Writing	Student uses drawing and verbal skills to explain that the sun provides heat for the Earth. In the shaded areas or shadows, it is not as hot. The drawing contains details of their thoughts.	Student uses drawing and verbal skills to explain that the sun provides heat for the Earth. In the shaded areas or shadows, it is not as hot. The drawing is lacking details and/or verbal description is vague.	Student uses drawing and verbal skills to explain that the sun provides heat for the Earth. In the shaded areas or shadows, it is not as hot. Student's drawing is not detailed or organized. It may be off topic.