Olivia Stone
Professor Harris
ECE 335
Unit Plan

Phase 1

Topic: Cloud Types

4th Grade Science

Established Goals:

- By the end of this unit, students will be able to:
  - Identify the four basic cloud types
  - Differentiate between cloud types and associated weather conditions
  - Communicate through speaking, writing, or drawing predictions, observations, and conclusions
  - Design and conduct an investigation to answer a questions about an object, organism or an event making and recording observations using appropriate tools and instruments

Standards:

- 3.2.4.A.1-Identify and classify objects based on their observable and measurable physical properties.
- 3.2.4.B2-Identify types of energy and their ability to be stored and changed from one form to another.
- 3.2.4.B6-Give examples of how energy can be transformed from one form to another.
- 3.3.4.A2-Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere.
- 3.3.4.A5-Describe basic weather elements.
- 3.3.4.A6-SCALE-Explain how basic weather elements are measured.

Big Ideas:

- A force is required to change an object's speed or direction.
- Magnets and electricity produce related forces.
- Matter has observable and measurable physical properties.
- The earth system changes constantly as air, water, soil, and rock interact, and the earth is part of a larger, sun, earth, moon system.
- Matter has observable and measurable physical properties.

Essential Questions:

- How can the type of cloud be determined just by appearance?
- Is cloud type dependent on weather?
- Can weather be dependent on clouds?

Enduring Understandings:

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- Cloud type can be determined by appearance in a variety of ways.
- Cloud type can be dependent on weather.
- Weather can be dependent on clouds.

Students will know:

- The weather associated with different types of clouds.
- The different types of clouds.

Students will be able to:

- Understand the difference between cloud types and how to identify them.
- Understand where in the sky a certain type of cloud might be found.
- Identify different types of clouds made not only by themselves, but also by their classmates.

Phase 2

Science Unit Daily Planner

Day One:	**Day Two**:	**Day Three**:
Objective: Students will explore the different clouds and use their imagination at the same time. **Activity:** Students will make their own clouds and describe what they believe they look like. **Assessment:** Ask students to point to a cloud. Have them tell you what the cloud looks like. Ask them what clouds are made of.	**Objective:** Students will be able to observe, describe, and draw clouds. **Activity:** Students will make their own cloud chart to show the three different types of clouds. **Assessment:** Collect student work samples and assess if clouds are matched to correct name.	**Objective:** Student will identify and describe cloud types through a fill in the blank chart and create-a-cloud activity. **Activity:** Students will create a cloud and label it accordingly. They will also tell what weather is associated with that type of cloud. **Assessment:** Have student share their cloud pictures with labels and the likely weather associated with it. Collect worksheets and cloud pictures and assign a percentage grade.

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<u>Day Four</u>: **Objective:** Students will discover that clouds are made of water droplets. **Activity:** Students will use shaving cream to form different types of clouds. **Assessment:** Students will complete a worksheet to determine how many water droplets are actually in a cloud.	**<u>Day Five</u>**: **Objective:** Students will learn that clouds can change depending on weather. **Activity:** Students will observe clouds during a day when weather is constantly changing. **Assessment:** Students will discuss with the class the different types of weather they observed and the clouds that they observed.	**<u>Day Six</u>**: **Objective:** Students will be able to identify the different types of clouds based upon previous lessons and observations. **Activity:** Students will participate in a class discussion about the types of clouds and where each can be found. **Assessment:** Students will be assessed upon a worksheet that they will fill out individually. The worksheet will include both writing and the opportunity to draw the different types of clouds.

Science Unit Requisition Form (assuming you have a class of 25 students)

Item Requested for this Science Unit	Rational for this equipment or supplies	Number of Items needed	Company where you will be ordering this equipment/supplies	Cost per unit	Total cost of this equipment or supply

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Cotton balls	Used to make different types of clouds	2 bags of 100 cotton balls	Amazon.com	$6.99	$13.98
It Looked Like Spilt Milk by Charles Shaw	To introduce the different shapes of clouds	1 copy	Amazon.com	$4.59	$4.59
Clouds by Grace Hansen	To introduce weather involvement with clouds	1 copy	Amazon.com	$7.95	$7.95
				Total cost of equipment or supplies including 20% shipping on entire order	$31.82

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Student Teacher Candidate: Olivia Stone
Lesson Subject(s)/Title: Science-Clouds
Lesson Date(s): Day 1
Course & Grade(s): ECE 335-4th Grade

INSTRUCTIONAL MATERIALS:

- *Teach Children About Clouds* by Lots to Learn (video)
- *It Looked Like Spilt Milk* by Charles G. Shaw (book)
- Blue 9x13" construction paper (1 per student)
- Cotton balls (about 5 per student)
- Glue sticks (1 per student)

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

- What shape is a cloud?
- Can a cloud have more than one shape?

PURPOSE:

- The purpose of this lesson is for students to understand that clouds can be many different shapes.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

- Students will be able to identify what clouds are and use their imagination to identify cloud shapes.

STANDARDS:

- PDESAS
    - 3.2.4.A.1-Identify and classify objects based on their observable and measurable physical properties.

DIFFERENTIATION STRATEGIES:

- Enrichment
    - Give students extra literature to look through about clouds.
- Support
    - For struggling students, play the video *How Clouds Form* by Rain Drop Cartoon

ANTICIPATORY SET:

- Take students outside and have them sit down and look up to the sky.
- Ask them to look at the clouds and see if they can identify any shapes.
- Tell students that they will be learning about clouds.

INPUT/ ACQUIRE NEW KNOWLEDGE:

Sensory Register	STM	LTM
Attention	Focus	Connections
Recognition	Organization	Elaborations
Perception	Rehearsal	Meaning
	Visualization	

Facets of Understanding

1. Explanation
2. Interpretation
3. Application
4. Perspective
5. Empathy
6. Self-Knowledge

Multiple Intelligences

1. Linguistic [words]
2. Visual [pictures]
3. Mathematical [numbers & reasoning]
4. Kinesthetic [hands-on]
5. Musical [music]
6. Interpersonal [social]
7. Intrapersonal [self]
8. Naturalist [nature]

Multiple Exposures [4 x 2]

1. Dramatization
2. Visualization
3. Verbal

Complex Interactions

1. Discussion
2. Argumentation

Bloom's Taxonomy

1. Knowledge [Verbatim]
2. Comprehension [Own Words]
3. Application [Problem-Solving]
4. Analysis [Identify components]
5. Synthesis [Combine information]
6. Evaluation [Decisions]

Aspects of the Topic

1. Facts
2. Compare
3. Cause/Effect
4. Characteristics
5. Examples
6. Relationships

9 Effective Strategies

1. Similarities and Differences
2. Summarization and Note Taking
3. Reinforcing Effort and Providing Recognition
4. Homework and Practice
5. Nonlinguistic Representations
6. Cooperative Learning
7. Setting Objectives and Providing Feedback
8. Generating and Testing

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- Explicit Instruction
    - Play the video *Teach Children About Clouds*
    - Explain to students that clouds are water particles that form in the sky. When they become too heavy, it starts to rain.
    - Then, read students the story *It Looked Like Spilt Milk*.
    - Throughout the story, ask students what the different pictures look like to them.
- Guided Practice
    - Explain to the students that they will be making a picture of clouds in the sky.
    - Using the instructions in the Independent Working Time section, demonstrate how to make your own "clouds."

APPLY/ DEEPEN NEW KNOWLEDGE:

- Students should now complete this activity independently. Walk through the classroom to make sure that students are on task.
- Give each student a piece of blue construction paper and a handful of cotton balls. Have students put glue on top of the paper and drag the cotton balls over it. It will make a figure.
- Have students identify what the cotton ball cloud looks like to them. Then, students should glue or write the following poem on the bottom of their page: "I looked up to the sky and thought I saw a _____, but it was just a cloud staring back at me."

CLOSURE/ASSESSMENT:

- Have each student come to the front of the room and show off their cloud. Have them recite the poem and state what their cloud looks like.

EVALUATION/ASSESSMENT OF STUDENTS:

- Ask students to point to a cloud. Have them tell you what the cloud looks like. Ask them what clouds are made of.

INSTRUCTIONAL PROCEDURES:

Time:

The teacher will:	The students will:
1. Facilitate student observations of clouds 2. Explain what clouds are and how they are formed 3. Read the story *It Looked Like Spilt Milk* 4. Demonstrate activity that will be done during Independent Working Time	1. Observe clouds 2. Listen to explanation 3. Listen to story 4. Watch demonstration 5. Make their own clouds 6. Show off their own cloud

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5. Facilitate students making their own clouds 6. Have each student come to the front of the room and show off their cloud	

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Student Teacher Candidate: Olivia Stone
Lesson Subject(s)/Title: Science-Clouds
Lesson Date(s): Day 2
Course & Grade(s): ECE 335-4th Grade

INSTRUCTIONAL MATERIALS:

- Cotton balls
- Blue paper
- Pencils
- Glue
- *Clouds* by Grace Hansen, or a similar nonfiction text
- Class set of the Cloud Matching worksheet

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

- What are different types of clouds?
- How can we identify these types of clouds?

PURPOSE:

- The purpose of this lesson is for students to be able to differentiate between different types of clouds.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

- Students will be able to observe, describe, and draw clouds.

STANDARDS:

- PDESAS
  - 3.2.4.A.1-Identify and classify objects based on their observable and measurable physical properties.
  - 3.3.4.A6-SCALE-Explain how basic weather elements are measured.

DIFFERENTIATION STRATEGIES:

- Enrichment
  - For students who finish early, pass out the Cloud Matching worksheet for them to complete.
- Support
  - Have students use books and photographs to create their cloud pictures.

ANTICIPATORY SET:

- Ask students to think about clouds by saying, “What do you know about clouds?”
- Have students turn and talk to a partner by sharing their thinking.
- Invite several students to share their ideas.

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- Say, “Today we are going to learn all about clouds. Did you know that there are different kinds of clouds?”

INPUT/ ACQUIRE NEW KNOWLEDGE:

- Explicit Instruction
  - Read aloud the book *Clouds* by Grace Hansen.
  - Pause as you read to focus on the three types of clouds: stratus, cumulus, and cirrus. Record descriptions of each type of cloud on a class reference chart or whiteboard.
- Guided Practice
  - Explain to the class that now you will go outside and observe the clouds in the sky.
  - Encourage students to see if they can find stratus, cumulus, or cirrus clouds.
  - Go outside and observe clouds, discuss what you see and record student observations.

APPLY/ DEEPEN NEW KNOWLEDGE:

- Explain that students will now get to make their very own cloud chart to show the three different types of clouds.
- Demonstrate how to fold the paper into thirds and use cotton balls and glue to make each type of cloud and labeling each cloud type.
- Pass out supplies and then allow students to complete their projects independently.

CLOSURE/ASSESSMENT:

- Display student pictures and have students share the different kinds of clouds they made with class.

EVALUATION/ASSESSMENT OF STUDENTS:

- Collect student work samples and assess if clouds are matched to correct name.

INSTRUCTIONAL PROCEDURES:

Time:

The teacher will:	The students will:
1. Facilitate student discussion 2. Read *Clouds* and focus on three types of clouds 3. Facilitate class observations of clouds 4. Demonstrate how students will make their own cloud chart	1. Discuss what they already know about clouds 2. Listen to the story and focus on three types of clouds 3. Observe clouds 4. Watch demonstration 5. Make cloud charts 6. Share the different types of clouds that they made

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5. Facilitate students making their cloud charts 6. Facilitate students' sharing of the different types of clouds they made	

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Student Teacher Candidate: Olivia Stone
Lesson Subject(s)/Title: Science-Clouds
Lesson Date(s): Day 3
Course & Grade(s): ECE 335-4th Grade

INSTRUCTIONAL MATERIALS:

- Cloud Chart worksheet
- Blue construction paper
- Jumbo cotton balls, large bag
- Pitcher of water
- White and gray chalk

ESSENTIAL QUESTIONS/ SUBSIDIARY QUESTIONS:

- Are there different shapes with different types of clouds?
- How does weather impact cloud type?

PURPOSE:

- The purpose of this lesson is for students to understand different types of clouds and why there are differences.

SPECIFIC LEARNING OBJECTIVES: (clear, observable)

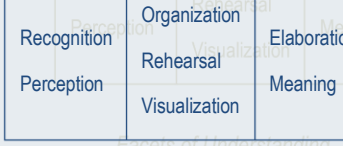
- Students will identify and describe cloud types through a fill in the blank chart and create-a-cloud activity.

STANDARDS:

- PDESAS
    - 3.2.4.A.1-Identify and classify objects based on their observable and measurable physical properties.
    - 3.2.4.B2-Identify types of energy and their ability to be stored and changed from one form to another.
    - 3.2.4.B6-Give examples of how energy can be transformed from one form to another.
    - 3.3.4.A2-Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere.
    - 3.3.4.A5-Describe basic weather elements.
    - 3.3.4.A6-SCALE-Explain how basic weather elements are measured.

DIFFERENTIATION STRATEGIES:

- Enrichment
    - Challenge students to create alternative descriptive cloud names for the cloud types.
- Support



Facets of Understanding

13. Explanation
14. Interpretation
15. Application
16. Perspective
17. Empathy
18. Self-Knowledge

Multiple Intelligences

17. Linguistic [words]
18. Visual [pictures]
19. Mathematical [numbers & reasoning]
20. Kinesthetic [hands-on]
21. Musical [music]
22. Interpersonal [social]
23. Intrapersonal [self]
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25. Setting Objectives and Providing Feedback
26. Generating and Testing Hypotheses

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- Reduce the amount of labels required on the guided practice activity. Allow students to have more time to study the cloud chart before doing the worksheet.

ANTICIPATORY SET:

- Hold up a cotton ball and describe it as fluffy and soft. Ask students to respond with a thumbs up or thumbs down to indicate their response to the question: Are clouds fluffy and soft, too?
- Explain that though they may look fluffy and soft, clouds are actually made of teeny tiny drops of water that are so small they can float in the air. As long as the cloud and the air that its made of are warmer than the air around it, it floats.
- Stretch another cotton ball into an elongated shape and add that clouds have different shapes and sometimes colors. The shapes and colors help us predict the weather.
- Pick up another cotton ball and hold it up high, then towards your middle, then to your shoes as you explain the high cloud group as **cirrus**, the middle cloud group as **alto**, and the low cloud group as **stratus**.
- Announce that students will learn to be cloud scientists as they learn to identify and ever create their very own clouds.

INPUT/ ACQUIRE NEW KNOWLEDGE:

- Explicit Instruction
  - Project the second page of the Cloud Chart and ask student volunteers to find all of the cirrus, then alto, then stratus type clouds.
  - Prompt students to realize the connection of the terms high-cirrus, middle-alto, low-stratus method of finding the clouds.
  - Point out the miles side of the chart and show that clouds starts from one mile and go up to almost nine miles. Point out that fog is so low that sometimes we can't see very well since it only rises a few feet off of the ground.
  - Point to and add features of each type of cloud and explain that since we have categorized the clouds, now we will describe them.
  - Cirrus clouds: these are made of ice and are blown by the wind into long lines that are sometimes described as looking like horse's tails. They happen in fair weather in a mostly clear sky and point in the direction of the wind.
  - **Cirrocumulus:** These are also made of ice crystals. They look like crinkly rows that some people think look like fish scales. They usually occur in the winter and indicate cold but fair weather.
  - **Cirrostratus:** Also made of crystals, this cloud type is almost see through. The sun and moon can be seen behind them. They have a halo-like or hair-like appearance. When you see them rain or snow is headed your way within 12 to 24 hours.

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- **Altostratus:** Like the cirrostratus clouds, altostratus clouds that are thin are almost see-through, but are darker in color. Thick altostratus are not at all transparent, or see through. Sometimes the thick altostratus can produce light rain, and can thicken into a nimbostratus cloud.
- **Nimbostratus:** These clouds a dark gray and usually happen with a persistent rain or snow period.
- **Stratocumulus:** These gray clouds hang low in the sky and look lumpy with streaks of clear sky in between. It usually doesn't rain with these clouds, but they can turn into rain clouds.
- **Altocumulus:** like stratocumulus clouds, these clouds look lumpy, but they are bigger puffs and are bunched together higher in the sky. If it is a warm morning, thunderstorms will probably occur before dark.
- **Cumulus:** These are the fluffy, cotton ball type clouds that are sometimes called "fair-weather clouds." But they can grow tall and become giant cumulonimbus clouds, which indicate thunderstorms ahead.
- **Cumulonimbus:** The name nimbus means rain. It is a bigger version of the cumulus cloud, which it may have started out as. These clouds can get up 6 miles high and usually happen in severe thunderstorm weather.
- **Anvil cloud/Cumulonimbus Top:** This is a cumulonimbus cloud that has a top that looks like a huge pile of hair that's flat on the top. It can also be said to have a top that is called an anvil, which is a heavy iron block with a smooth flat top. These clouds are associated with thunderstorms with lightning and high winds likely.

- Guided Practice
  - Distribute the Cloud Chart worksheet and give directions.
  - Review the answers with the whole class on the projected image of page 2 of the worksheet.
  - If needed, leave the projected image up as a resource, but remove it before independent working time.
  - Rotate around the room to check for understanding.

APPLY/ DEEPEN NEW KNOWLEDGE:

- Distribute blue construction paper, cotton balls, and chalk and allow students to use the items to create and label a cloud of their own.
- Ask students to think about what kind of weather is likely with the cloud they create and to be ready to tell what the weather is.

CLOSURE/ASSESSMENT:

- Say a cloud name and ask students to choral-respond with where in the sky it might be found (high, middle, or low) and what kind of weather is likely to occur with it.

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- If possible, take the children outside to name clouds by scientific names.

EVALUATION/ASSESSMENT OF STUDENTS:

- Have students share their cloud pictures with labels and the likely weather associated with it.
- Collect the worksheets and cloud pictures and assign a percentage grade.

INSTRUCTIONAL PROCEDURES:

Time:

The teacher will:	The students will:
1. Demonstrate that there are different types of clouds through use of cotton balls 2. Help students to realize that where a cloud is located in the sky helps to determine its type 3. Distribute worksheet and give directions 4. Facilitate students making clouds 5. Have students share their cloud pictures with labels and the weather associated with it	1. Watch demonstration 2. Realize that where a cloud is located in the sky helps to determine its type 3. Receive worksheet and directions 4. Make cloud 5. Share cloud picture with label and weather associated with it